

**SUB: TENDER FOR BUILDERS WORK, WATER SUPPLY, SANITARY INSTALLATION, ELECTRICAL INSTALLATION, LIFTS AND ANCILLARY WORKS FOR PROPOSED CONSTRUCTION OF 28 NOS. OF OFFICERS' QUARTERS AND 1 NO. OF VIP GUEST HOUSE AT SURYA NAGAR, BHUBANESWAR.**

## **PART-II**

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## **INSTRUCTIONS IN REGARD TO SUBMISSION OF TENDERS**

**NOTE: Tenderers should note that non-compliance of the following instructions will render the tender liable for rejection.**

1. Address to which the tender is to be submitted:

The Chief Engineer, LIC of India, East Central Zonal Office, Engineering Department, Jeevan Deep Building (4<sup>th</sup> floor), Exhibition Road, Patna 800 001.

**Tenderers are required to submit the tender in the following system:**

First part i.e. Technical Bid containing duly filled-in Enrolment Form with supporting documents, Credentials duly Notarized as detailed in the Enrolment form shall be submitted in a sealed envelope duly superscribed as Envelope-1.

The EMD either in the form of Bank guarantee/Demand Draft/ Pay Order shall be put in a separate sealed envelope duly superscribed as Envelope-2.

The Second part i.e. Financial Bid containing the filled-in Pre-Priced Schedule of Quantities including Part-I, Part-II of the Tender and drawings, shall be submitted in a separate sealed envelope duly superscribed as Envelope-3.

Envelope-1, Envelope-2 and Envelope-3 containing all documents as mentioned above shall be put in a **BIG ENVELOPE** duly sealed and superscribed with the following on the top of envelope.

**“TENDER FOR BUILDERS WORK, WATER SUPPLY, SANITARY INSTALLATION, ELECTRICAL INSTALLATION, LIFTS AND ANCILLARY WORKS FOR PROPOSED CONSTRUCTION OF 28 NOS. OF OFFICERS’ QUARTERS AND 1 NO. OF VIP GUEST HOUSE AT SURYA NAGAR, BHUBANESWAR, CONTAINING ENVELOPE – 1, ENVELOPE-2 AND ENVELOPE - 3”.**

Envelope 1 and Envelope-2 of the tender shall be opened first. Eligibility related documents of Tenderers who have submitted valid Earnest Money Deposit shall be evaluated and parties shall be qualified and disqualified by LIC of India. Financial Bid (Price Bid) will be opened only for qualified Tenderers. The date, time & place of opening of financial bid shall be intimated to all the qualified Tenderers and the financial bid (Envelope -3) shall be opened in presence of qualified tenderers or their authorized representatives.

2. Last date for receipt of tenders: **11.01.2016 up to 15.00 hours.**
3. **Tenderers should ensure that the tender is received before the date and time specified above.**
4. Tenderer should fill in all the relevant blanks and put his signature on the relevant places as indicated below:
  - a. Letter from Contractor to Chief Engineer
  - b. Appendix to the **Conditions of Contract**
  - c. Appendix to the **General Instructions to the Contractors**
  - d. Last page of the General Preambles to Schedule of Quantities
  - e. Every page of schedule of quantities and general summary.

5. The tender should be filled as follows:
  - a. The “**Percentage Rate**” column to be legibly filled in ink in both **FIGURES AND WORDS**.
  - b. All corrections to be initialed.
  - c. Each page of the Schedule of Quantities and the “**General Summary**” is to be signed by the Contractor.
  - d. Tenderer should note that he is to quote percentage below/above/at par in the “General Summary” page otherwise tender liable to be cancelled.
6. No alterations or additions are to be made by the tenderer to the text or the Schedule of these tender papers. Any tenderer who proposes any alterations to any of the condition/s laid down or which proposes any other conditions of any description whatsoever is liable to be rejected.
7. The tenderer is required to check the numbers of the pages and should any be found missing or in duplicate, or the figure or writing indistinct, he must inform the Chief Engineer at once and have the same rectified. Should the tenderer be in doubt about the precise meaning of any item or figure, for any reason whatsoever, he must inform Chief Engineer in order that the correct meaning may be decided upon before the date for the submission of the tender.
8. No liability whatsoever will be admitted nor claim allowed in respect of errors in the submitted tender due to missing / duplicate pages, indistinct writing or any other error in the tender documents which should have been rectified in the manner described above.
9. Performa of Articles of Agreement (Annexure ‘A’) should not be filled in by the tenderer. While the contract shall be deemed to have come into existence on issue of letter of acceptance to the successful tenderer, formal agreement shall be signed thereafter with the successful tenderer on non-judicial stamp paper of requisite value as per the Performa of Articles of Agreement.
10. Earnest Money accompanying the tender will be accepted in the form of “**CROSSED DEMAND DRAFT**” of any of the Nationalized Banks / Approved Scheduled Banks drawn in favour of the “**LIFE INSURANCE CORPORATION OF INDIA**” payable at **PATNA** only, and not in favour of any other Authority or location. **The Earnest money can also be in form of Bank guarantee.**
11. **The tender shall be accompanied by a certified true copy of Power of Attorney in favour of the signatory to the tender documents. If the tender is submitted on behalf of a firm, it must be signed either by all partners or person holding a valid power of attorney from all partners constituting the firm. The person signing the tender on behalf of another partner(s) or on behalf of a firm on Company shall attach with the Tender a proper Power of Attorney duly executed in his favour by such other person(s) or by all the partners in accordance with the Constitution of the Company / Articles of Association, stating that he has the authority to**

**sign on behalf of such other person(s) of the firm or the Company as the case may be, in all matters pertaining to the contract including the Arbitration Clause.**

12. Contractors are warned that Cash, or encashable Cheque, or Bank or Insurance Guarantee, or Fixed Deposit receipt in lieu of the aforementioned form of Earnest Money remittance will not be accepted.
13. The percentage rates mentioned in the tender copy will be taken as bonafide. When the percentage rates in figures and words are at variance, the percentage rate corresponding to the amount shall be taken as correct. In all other cases percentage rate in words will be taken in precedence over the rate in figures.
14. Tenders containing errors are liable to be considered non-bonafide at the discretion of the Chief Engineer
15. **Tenderer should note that tender should remain open for consideration for a minimum period of SIX MONTHS from the date fixed for the receipt of tenders.**
16. The Life Insurance Corporation of India reserves the right to accept any tender or to accept tenders in part; to reject any or all tenders without assigning reasons thereof.
17. Contractors should fill in "PERCENTAGE RATE" legibly in ink in both FIGURES and WORDS. Amounts mentioned in words shall be prefixed and suffixed by "Rs." and "only" respectively. Tenders containing the percentage rates only in figures are liable to be considered non-bonafide at the discretion of the Chief Engineer and entail forfeiture of Earnest Money Deposit.
18. If on check there are differences between the percentages rate given by the contractor in words and figures or in the amount worked out /amount quoted by him, the following shall be considered.
  - a) When there is a difference between the percentage rates in figures and in words, the percentage rates which correspond to the amounts worked out by the contractor, shall be taken as correct.
  - b) When the amount worked out by the contractor does not correspond with the percentage rate written either in figures or in words, then the percent rate quoted by the contractor in words shall be taken as correct.
  - c) When the percentage rate quoted by the contractor in figures and in words tallied but the amount is not worked out correctly, the percentage rate quoted by the contractor shall be taken as correct and not the amount.
  - d) In the event nothing is quoted (at per/above/below) by the contractor, the tender is considered as non-bonafide.

**LETTER TO CONTRACTOR FROM CHIEF ENGINEER**

To,

\_\_\_\_\_  
\_\_\_\_\_

Dear Sir / Sirs,

**SUB: TENDER FOR BUILDERS WORK, WATER SUPPLY, SANITARY INSTALLATION, ELECTRICAL INSTALLATION, LIFTS AND ANCILLARY WORKS FOR PROPOSED CONSTRUCTION OF 28 NOS. OF OFFICERS' QUARTERS AND 1 NO. OF VIP GUEST HOUSE AT SURYA NAGAR, BHUBANESWAR.**

- 1) The tender should be submitted to the **Chief Engineer, LIC of India, East Central Zonal Office, Engineering Department, Jeevan Deep Building, Exhibition Road, Patna – 800001** by following the procedures as explained in the **INSTRUCTION IN REGARD TO SUBMISSION OF TENDERS**
- 2) **Drawings provided shall form part of the financial bid and the same shall be signed and put along with financial bid. Signed drawings are considered as part of financial bid.**
- 3) The sealed tenders containing the details as explained in **Instruction in regard to submission of tenders** will be received at the office of Chief Engineer, LIC of India, East Central Zonal Office, Jeevan Deep Building, Exhibition Road, Patna -800001 on or before **15.00 Hours** on **11.01.2016** and Envelope -1 and Envelope-2 of the tender document will be opened on **11.01.2016 At 15.30 hours** in presence of contractors or accredited representatives who attend. Tenderer should ensure that their tender is received before the date and time specified as no consideration whatsoever shall be given for postal or any kind of delays. Tenders received late shall be rejected.
- 4) If tender is delivered by hand, tenderer must ensure that the date and time of receipt is endorsed on the tender envelope by the A.O. or any other Officer of the Department approved by the SE / EE (Planning) and thereafter the tender is deposited in the tender box by the tenderer or his representative.
- 5) The Life Insurance Corporation of India does not bind itself to accept the lowest or any tender.

Yours faithfully,

**CHIEF ENGINEER**

LETTER FROM CONTRACTOR TO CHIEF ENGINEER

Date: \_\_\_\_\_

To,  
The Chief Engineer  
Life Insurance Corporation of India  
East Central Zonal Office, Patna.

**SUB: TENDER FOR BUILDERS WORK, WATER SUPPLY, SANITARY INSTALLATION, ELECTRICAL INSTALLATION, LIFTS AND ANCILLARY WORKS FOR PROPOSED CONSTRUCTION OF 28 NOS. OF OFFICERS' QUARTERS AND 1 NO. OF VIP GUEST HOUSE AT SURYA NAGAR, BHUBANESWAR.**

Dear Sir,

1. Having examined and understood the Specifications of the materials for its supply at the site of work as well as for labour for all types of work including specialized work, Conditions of Contract and General Instructions relating to Part-I of tender and Schedule of Quantities relating to the above work of PART II of the tender and the drawings and other related terms and conditions, amendments etc. and having visited and examined the site of the proposed works and having acquired the requisite information relating thereto as affecting the tender invited by you on behalf of the Life Insurance Corporation of India, I/We, the undersigned hereby offer to construct, execute, complete and maintain the proposed works on Percentage rate basis in strict accordance with the Contract Conditions and Specifications for the sum of **Rs \_\_\_\_\_/(Rupees \_\_\_\_\_ only)** or such other sums as may be ascertained in accordance with the said Conditions.

2. I/We, undertake to complete and deliver the whole of the works within a period as specified in Appendix to the Conditions of Contract from the date of issue of intimation from you that the tender has been accepted and upon receiving possession of the site. **I/We shall obtain the electrical load sanction and associated estimate for the proposed construction from the appropriate Authority/Authorities. After completion of the proposed construction, I/We shall obtain the occupation/occupancy certificate from appropriate Authority/Authorities and shall carry out all that necessary to obtain the occupation/occupancy certificate from appropriate Authority/Authorities. Our quoted amount is inclusive of delivering all above requirements i.e. obtaining electrical load sanction and estimate from appropriate Authority/Authorities and obtaining occupation/occupancy certificate from appropriate Authority/Authorities etc.** I/We shall be under the obligation to pay the sum as stated in the Appendix to the Conditions of Contract for every day that the works shall remain incomplete, damages as compensation subject to the Conditions of Contract relating to extension of time.

3. I/We, enclose herewith my/our tender along with **Earnest Money Remittance of Rs. 19,36,600.00 (Rupees nineteen lac thirty six thousand six hundred) only** in the form of **CROSSED DEMAND DRAFT/PAY ORDER PAYABLE at PATNA/Bank guarantee of that amount**. I/We, hereby agree that this sum shall be forfeited by the Life Insurance Corporation of India in the event of my/our tender being accepted and I/We fail to execute the Contract when called upon to do so. I/We, note that **EARNEST MONEY REMITTANCE IN FORM OF OTHER THAN CROSSED DEMAND DRAFT/PAY ORDER ON A NATIONALISED/SCHEDULED BANK PAYABLE AT PATNA/BANK GUARANTEE OF THAT AMOUNT SHALL NOT BE ACCEPTED**.

4. In the event of the tender being accepted, I/We, agree to the retention of my/our EMD as a part of Security Deposit and the balance amount of Security Deposit to be recovered at 7.5% of Gross Value of work done from my / our Running Account Bills. **OR** I/We, agree to furnish a lump sum Security Deposit amounting to Rs. **44,20,800.00** (Rupees forty four lakh twenty thousand eight hundred only) or two like amount in the form of Bank Guarantee from any Nationalized/Scheduled Bank at Patna as per specimen given in Annexure 'B' to Conditions of Contract, within 21 (twenty-one) days of acceptance of tender. If the EMD is submitted in form of Bank Guarantee, then the Security Deposit should also be in the form of Bank Guarantee and if I/we, having paid EMD in form of Bank Guarantee, want to avail cash option for Security Deposit, then I/we have to deposit 1% estimated cost in form of Demand Draft/Pay Order drawn in favour of Life Insurance Corporation of India, payable at Patna within 21 days of intimation to the me/us of acceptance of tender and balance Security Deposit shall be accumulated through deductions from Running Account Bills at 7.5% (maximum) of gross amount of bill.

5. I/We, agree to furnish a lump sum Performance Guarantee amounting to Rs. **48,41,500.00** (Rupees forty eight lakh forty one thousand five hundred only) in the form of Bank Guarantee from any Nationalized/Scheduled Bank at **Patna** as per specimen given in Annexure 'C' to Conditions of Contract, within 20 (twenty) days from commencement of work.

6. I/We, note that the Earnest Money Deposit of **Rs. 19,36,600.00** would be refunded to me/us.

- On expiry of the validity of the tender or earlier at the discretion of Chief Engineer in case my/our tender is not accepted and
- In case my/our tender is accepted, after I/We, furnish Bank Guarantee as mentioned above.

Yours faithfully,

**(SIGNATURE OF THE CONTRACTOR)**

Name and Seal

NAME OF THE PARTNER OF THE FIRM OR  
NAME OF THE PERSON HAVING POWER OF  
ATTORNEY TO SIGN THE CONTRACT  
(CERTIFIED TRUE COPY OF THE POWER  
OF ATTORNEY SHOULD BE ATTACHED)

## **APPENDIX TO CONDITIONS OF CONTRACT**

**SUB: TENDER FOR BUILDERS WORK, WATER SUPPLY, SANITARY INSTALLATION, ELECTRICAL INSTALLATION, LIFTS AND ANCILLARY WORKS FOR PROPOSED CONSTRUCTION OF 28 NOS. OF OFFICERS' QUARTERS AND 1 NO. OF VIP GUEST HOUSE AT SURYA NAGAR, BHUBANESWAR.**

ESTIMATED TENDER AMOUNT

: Rs. 9,68,29,016.00

PERIOD FOR COMPLETION

: 24 (Twenty four) Months

EARNEST MONEY DEPOSIT:

: Rs.19,36,600.00

| Sl.No. | Clause No. of Conditions of Contract. | Description                                                          | Remarks                                                                                                                                                                                                           |
|--------|---------------------------------------|----------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1      | 11                                    | Minimum requirement of Technical staff ; Recovery for Non employment | a) Graduate Engineer Rs.40, 000.00 per month.<br><br>b) Diploma Engineer Rs.25, 000.00 per month.                                                                                                                 |
| 2      | 13                                    | Date of commencement                                                 | 1. Either 21 (twenty-one) days from the date of acceptance letter issued to the contractor<br><br><b>OR</b><br>2. The day on which contractor is instructed to take possession of the site, whichever is earlier. |
| 3      | 13 & 26                               | Date of completion                                                   | <b>24 (Twenty four) months</b> from the date of commencement                                                                                                                                                      |
| 4      | 19                                    | Liquidated damages                                                   | Quantum of liquidated damages 0.5% of contract sum per week subject to a maximum of 7.5% of contract sum.                                                                                                         |
| 5      | 21                                    | Period of final measurement                                          | 60 (sixty) days from the date of completion of the contract.                                                                                                                                                      |
| 6      | 22                                    | Interim certificate                                                  | Rs.40,35,000.00                                                                                                                                                                                                   |
| 7      | 22                                    | Period of honoring interim certificate (Payment of R.A. Bill)        | 20 (Twenty) days.                                                                                                                                                                                                 |
| 8      | 22                                    | Period of honoring final certificate. (Payment of Final Bill)        | <b>90</b> days from the date of submission of final bill with details.                                                                                                                                            |



| Sl.No. | Clause No. of Conditions of Contract. | Description                                                     | Remarks                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|--------|---------------------------------------|-----------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 9      | 35                                    | a) Security Deposit<br>b) Performance Guarantee                 | a) <b>Rs. 44,20,800.00</b> ( Rupees forty four lakh twenty thousand eight hundred only)<br>b) <b>Rs. 48,41,500.00</b> (Rupees forty eight lakh forty one thousand five hundred only)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| 10     | 35                                    | Recovery of Security Deposit                                    | In case of cash option, EMD of successful tenderer shall be retained as part of Security Deposit and balance of Security Deposit shall be recovered from R.A. Bills at 7.5% of Gross amount of bill. (If Security Deposit is paid in the form of Bank Guarantee, no recovery from R.A Bills shall be made and EMD shall be refunded after acceptance of Bank Guarantee). If the EMD is submitted in form of Bank Guarantee, then the Security Deposit should also be in the form of Bank Guarantee and if the contractor, having paid EMD in form of Bank Guarantee, wants to avail cash option for Security Deposit ,then he has to deposit 1% estimated cost in form of Demand Draft/Pay Order drawn in favour of Life Insurance Corporation of India ,payable at Patna within 21days of intimation to the contractor of acceptance of tender and balance Security Deposit shall be accumulated through deductions from Running Account Bills at 7.5% (maximum) of gross amount of bill. |
| 11     | 37                                    | Interest on Lump sum Advance                                    | 10.00 % per annum(Simple Interest)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 12     | 17.5                                  | Contractor's All Risk Policy inclusive of Third Party Liability | 7.5% of contract value.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 13     | 17.6                                  | Workman's Compensation Policy                                   | As per requirement of prevalent Laws.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |

**(SIGNATURE OF THE CONTRACTOR)**

**NO CLAIM CERTIFICATE CUM RECEIPT**

(To be given on Contractor's letterhead)

Received Rupees \_\_\_\_\_

(Rupees \_\_\_\_\_) being the amount against my/our final  
bill dated \_\_\_\_\_ for \_\_\_\_\_ (Name of Work) in full and final settlement of bill.

CONTRACTOR

(Signature of Contractor on Revenue stamp)

Rubber stamp/seal of the contractor /company

**APPENDIX TO GENERAL INSTRUCTIONS TO CONTRACTORS**

**CLAUSE NO.2 OF CONDITIONS OF CONTRACT:**

**Name and Location of the proposed work:**

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**LOCATION: Village/Mouza: Suryanagar, PO: Suryanagar, P.S.: New Capital, Tahasil: Bhubaneswar, Dist Khurda, Plot No: A/18 corresponding to revenue Plot No: 346, Area 280'x186' (Acres 1.195), Layout Plot No: 558(GA).**

**GENERAL OUTLINE OF STRUCTURE:**

| SL.NO | LOCATION | NOS OF 2BHK FLATS | NOS OF 3BHK FLATS | OTHER ACCOMODATIONS AND REMARK                                                                                                                                                                                                             |
|-------|----------|-------------------|-------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1     | STILT    | NIL               | NIL               | CAR PARKING, CARE TAKER ROOM AND ELECTRICAL PANEL ROOM.                                                                                                                                                                                    |
| 2     | FLOOR-1  | 4                 | 2                 | DUPLEX FOR SDM AND VIP GUEST HOUSE.                                                                                                                                                                                                        |
| 3     | FLOOR-2  | 4                 | 2                 | DUPLEX FOR SDM AND VIP GUEST HOUSE.                                                                                                                                                                                                        |
| 4     | FLOOR-3  | 5                 | 3                 | -----                                                                                                                                                                                                                                      |
| 5     | FLOOR-4  | 5                 | 2                 | THOUGH THE ARCHITECTURAL DRAWING SHOWS 3NOS OF 3BHK FLATS IN THIS FLOOR, ONLY 2 NOS OF 3BHK FLATS SHALL BE CONSTRUCTED. THE 3BHK FLAT, WHICH SHALL NOT BE CONSTRUCTED, SHALL BE DECIDED BY THE DY.CHIEF ENGINEER IN-CHARGE OF THE PROJECT. |

**(SIGNATURE OF THE CONTRACTOR)**

**SPECIAL CONDITIONS:****1. PHOTOGRAPHS OF THE BUILDING**

- 1.1 The contractor shall submit 3 sets of the prints with negatives of the photographs size 4" x 6" to LIC of India on the following stages:
- The plot before the start of construction showing any localized depression, rock outcrop, if any and any other things which affects construction.
  - Excavated pits for foundation showing type of soil/rock.
  - Foundation work, reinforcement, concreting and curing. Columns (floor wise) reinforcements, shuttering, concreting and curing.
  - Shuttering and reinforcement details floor wise before laying of concrete. Photographs during concreting and after laying of concrete including curing.
  - Completion stage of masonry work before plastering.
  - External filling and compaction process.
  - Water proofing of terrace and testing. Toilet water proofing, testing of internal water supply line before concealing the same.
  - After plastering but before painting.
  - Completed building before handing over the building.

The photographs can also be submitted in CD / DVD/Pen Drive in lieu of printed photographs.

- 1.2 One or more photographs shall be taken to have complete clear views of the project as directed by Corporation's Engineer. The further stage of work shall proceed only on confirmation of such photographs (as mentioned above clause 1.1) seen by LIC Engineers (concerned Executive Engineer/Superintending Engineer and Dy.Chief Engineer under whose jurisdiction the project comes) and a written site instructions obtained in this regard. The concerned Engineers shall also put up to the Chief Engineer the said stage wise photographs and confirmation conveyed to the contractor.
- 1.3 The quoted rates shall include for the same and no extra is payable to contractor on this account.

**2. TESTING OF MATERIALS**

**During the progress of work, tests as prescribed below for various materials of construction shall be conducted as per the frequency noted in the table below. Contractor's attention is also drawn to Clause 9 of Conditions of Contract as well as Clause 9 of General Preambles to Schedule of Quantities.**

Following charts to be followed for the frequency of tests:

**TABLE-A**

| Sl. No. | Materials                    | Test                                                                                    | Frequency                                                                                                                                                                                                         |
|---------|------------------------------|-----------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1.      | Water                        | Chemicals & Physical properties for water                                               | One test per source before commencement of work                                                                                                                                                                   |
| 2.      | Sand (Fine Aggregates)       | a) Slit content(field test)<br>b) Gradation<br><br>c) Bulking (Field test)              | This is a routine test and should be carried out for sand for each consignment.<br><br>Every 45 Cum or part thereof or whenever moisture content is doubtful.                                                     |
| 3.      | Stone (Coarse Aggregate)     | a) Aggregate crushing value<br><br>b) Gradation                                         | One in beginning of stacking of materials thereafter for every change of source.<br><br>Every consignment.                                                                                                        |
| 4.      | Cement                       | a) Initial and final setting time<br><br>b) Compressive strength                        | One in beginning of stacking of materials thereafter for every change of source.<br><br>One test for 100 tones or part there of and for every change of brand of cement if the cement is used for structural work |
| 5.      | Steel                        | 1. Tensile strength<br>a) Ultimate tensile stress<br>b) Yield stress<br>c) % Elongation | One test per category for every consignment used in work.                                                                                                                                                         |
| 6.      | Brick                        | a) Water absorption<br>b) Efflorescence<br>c) Compressive strength                      | One test for every 200000 Nos. or part there of and for every change of brand (set of 5 bricks)                                                                                                                   |
| 7.      | Timber                       | a) Moisture content<br>b) Specific gravity<br>c) Species in sample of teak wood         | One test for every 30cum or part thereof.                                                                                                                                                                         |
| 8.      | Anodized coating of aluminum | Thickness of Anodic Coating.                                                            | One Test for material costing Rs.8.00 Lac or part thereof.                                                                                                                                                        |
| 9.      | Marble mosaic tiles          | a) Wet Transverse Strength<br>b) Water Absorption<br>c) Abrasion Test                   | One test for every 1 lakh tiles or part thereof.                                                                                                                                                                  |
| 10.     | Flush Door                   | End Immersion<br>Knife<br>Adhesion                                                      | Destructive test based on no. of shutter.<br>1-100 one test<br>101-200 two test<br>201-500 three test<br>500 & above four test                                                                                    |

| Sl. No. | Materials                       | Test                                                                  | Frequency                                          |
|---------|---------------------------------|-----------------------------------------------------------------------|----------------------------------------------------|
| 11.     | Ceramic Tiles / Vitrified Tiles | Water absorption<br>Crazing Test                                      | One test for every 5000 nos. or part thereof.      |
| 12.     | Marble                          | Moisture Absorption test                                              | One test for every 800 sq.mt. or part thereof.     |
| 13.     | Panel Door<br>Shutter           | a) Physical Test<br>b) Glue Adhesion Test                             | One test from each lot.<br>One test from each lot. |
| 14.     | Particle Board                  | a) Identification (Physical verification)<br>b) Dimensional Tolerance | One test from each lot.<br>One test from each lot. |
| 15.     | Sand Stone                      | Water Absorption                                                      | Frequency of test as specified by CPWD             |

- Electricity Load Sanction:** The contractor shall obtain the electricity load sanction and estimate from local Electricity supply Authority/Authorities as appropriate for the construction of the said job at the said locality. The quoted tender amount shall be inclusive of all expenses for carrying out this job. However, any official fees required to be paid shall be borne by LIC of India.
- The contractor shall obtain the occupancy/occupation certificate and shall carryout all that necessary to obtain the occupancy/occupation certificate. The quoted tender amount shall be inclusive of expenses for obtaining the occupancy/occupation certificate and other allied works relating to obtaining occupancy/occupation certificate. However, any official fees required to be paid shall be borne by LIC of India.
- During construction of the building the entire premises shall be covered by protective measures to ensure pollution free atmosphere in the surrounding and inconvenience to general public should not be made by construction.
- The contractor has to make his own arrangement for water to be used for construction work by following the rules, regulation and directives of authorities. The water has to be tested to determine its suitability for concreting and construction work.

(SIGNATURE OF THE CONTRACTOR)

## **GENERAL PREAMBLES TO SCHEDULE OF QUANTITIES**

These preambles apply to all the sections of the "Schedule of Quantities".

### **1. RATE TO COVER:**

- 1.1 The rates quoted by the Contractor shall be held to include for providing and fixing, all conveyance and delivery, loading & unloading, carrying in, storing, hoisting, all labour, setting, fitting and fixing in position, making straight, cutting, waste, return of packing and all materials and labour and everything else necessary for the proper completion of each item of work to the approval of Corporation's Engineer and for Establishment Charges, overheads and profits. The Contractor shall provide at his expense all labour, materials and things required by the Corporation's Engineer for testing and measuring the work, for weighing, testing the efficiency of any portion of the work, all planking, gangways etc. necessary for affording access to every part of the work except where specifically stated otherwise.
- 1.2 The Contractor should also cover in his rates for the method of work, cost of materials, labour etc., to comply with the "Trade Specifications", General Instructions to Contractor", "Conditions of Contract", "Special Conditions", (if any), and all documents of this contract.
- 1.3 All the materials or procedures or specifications for work, unless otherwise stated, shall conform to the current Indian Standard whether or not specific mention is made thereof. The Contractor shall be responsible for and shall replace or make good at his own expense, any materials lost or damaged, or of quality not approved, temporarily disturbed roads, pavements, approaches, gates, walls or any such dismantling carried out to execute the work.
- 1.4 All rates quoted shall include for Supplying and fixing although the same may not have been mentioned in the item of the Schedule of Quantities. Words "Providing and Fixing where used shall have same meaning as "Supplying and Fixing".
- 1.5 **Rates quoted shall include for hoisting to any height and the work at all levels and lifting of materials shall not form any criterion for any extra claims, except where otherwise specified.**

### **2. ANCILLARY WORKS:**

- 2.1 The Contractor shall have to carry out all ancillary and connected work within and near vicinity of the plot of the proposed work and inside the Building if ordered to do so by the Chief Engineer at the rates quoted in the Schedule of Quantities, at any time during the currency of this Contract including extension of time, if any granted.

**3. PRICE FLUCTUATION / VARIATION:**

- 3.1 Rates quoted by the Contractor shall be firm throughout the currency of the Contract including extensions of time, if any granted. No price adjustment due to variation in cost of materials or labour or any variation under any State or Central Legislation or any other reason whatsoever shall be allowed, except as stated in relevant clauses below with regard to variation in price on materials & labour and price fluctuation in Cement & Steel.

**4. CEMENT:**

**CONTRACTOR'S QUOTED RATES:**

- 4.1 Contractor shall quote his rates for various relevant items in the tender on the basis of provisions of this clause detailed hereunder and on the basis of the price of cement at site of work as mentioned in Annexure attached herewith (hereinafter called the Basic Price of Cement).

**APPROVAL OF SOURCE OF PURCHASE AND PRICE:**

- 4.2 Contractor shall purchase cement from approved reputed cement manufacturers such as ACC, UltraTech, J. P. Rewa, Vikram, Shree Cement, Birla Jute, CCI, Madras cement, Chettinad cement, India cement etc. as approved by Ministry of Industry, Govt. of India and having license to use ISI Certification mark for their products and from C&F agents and authorized dealers (with dealership certificate). Cement shall be Ordinary Portland Cement 33 / 43 Grade of fresh manufacture conforming to IS: 269/ IS: 8112 respectively; Portland Pozzolana Cement: IS: 1489 (Part 2): 1991; Portland Slag Cement: IS: 455 (1989) or relevant Indian Standards (latest revision). Cement shall be purchased and transported to the work site by the contractor in bulk quantity required to achieve desired progress in next 3 months, from the above source of purchase (including brand of cement). At the time of starting the work, the request for approval shall be submitted within 15 days of receipt of tender acceptance letter. The contractor shall intimate the EE/SE the quantity of cement being procured, with the names, full addresses and telephone numbers of cement suppliers. For subsequent approvals the contractors shall approach Employer's Engineer at site at least 20 days in advance of the desired date of delivery of cement. The contractor shall submit his request for the approval through Employer's Engineer at site with one copy of the letter to EE/SE. The contractor's request letter shall mention the quantity of cement to be/ being purchased and also the quantity of cement in stock at site on the date of submitting the request.

**BASIC PRICE OF CEMENT:**

- 4.3 The basic price of cement stated in Annexure is inclusive of all costs upto the site of work, including purchase price, all levies and duties including excise duty, sales tax, octroi / town duty, transportation charges including loading and unloading charges at all points (except unloading at site), transit insurance and any other expenses (*expenditure*) not mentioned above but required etc. and shall be included by the contractor in his quoted rates. All other costs such as unloading the



cement at site, handling, stacking, storage, providing watch and ward arrangements, loss due to pilferage, theft, damages if any including cement which may become unfit for consumption due to prolonged storage or due to rains etc. shall be to contractor's account and shall be included by the contractor in rates quoted in the tender.

#### **QUALITY OF CEMENT:**

- 4.4 The contractor shall satisfy himself that the cement arriving at site is ordinary port-land cement conforming to the requirement of IS: 269/8112 for 33 / 43 Grade respectively; Portland Pozzolana Cement: IS: 1489 (Part 2); Portland Slag Cement: IS: 455 (1989) or relevant Indian Standard and shall procure Manufacturer's Certificate to this effect. In case the contractor has any doubt regarding the quality of cement, it is up to him to have it tested at his own cost and make sure before incorporation in the works that the cement is of right quality. Each consignment of cement supplied should have Test Certificate of the Manufacturer.

#### **PAYMENT DUE TO VARIATION ON PRICE OF CEMENT**

- 4.5 If after submission of the tender, the price of Cement specified in Annexure 'P' increases/ decreases beyond the price(s) prevailing at the time of the last stipulated date for receipt of tenders including Tender opening extensions, if any for the work, then the variation in amount shall accordingly be paid and that any such variations shall be effected only for stipulated period of Contract including the justified contract period extended without imposition of liquidated clauses.

However for work done/during the justified period extended as above, it will be limited to indices prevailing at the time of stipulated date of completion or as prevailing for the period under consideration, whichever is less. In case of extension granted with imposition of liquidated damage, no price variation shall be allowed during extended period but recovery due to price variation shall be effected.

The increase/decrease in prices of cement, shall be determined by the Price indices as published by Economic Advisor to Government of India, Ministry of Commerce and Industry and base price for cement, as indicated in Annexure 'P' as valid on the last stipulated date of receipt of tender, including extension if any and for the period under consideration.

The amount will be worked out as per the formula given below for individual material:-

Adjustment for component of cement.

$$V = P \times Q \times \frac{CI - C_{lo}}{C_{lo}}$$

Where,

V = Variation in Cement cost i.e. increase or decrease in the amount to be paid or recovered.

P = Base Price of cement as indicated in Annexure 'P' as valid at the time of the last stipulated date of receipt of tender including extensions, if any.

Q = Quantity of Cement consumed in the works since previous bill.

Clo = All India Whole Sale Price index for cement, as issued by Office of the Economic Advisor, Dept. of Industrial Policy & Promotion under Ministry of Commerce and Industry, Government of India as valid on the last stipulated date of receipt of tenders including extensions, if any.

CI = All India Whole Sale Price index for cement, as issued by Office of the Economic Advisor, Dept. of Industrial Policy & Promotion under Ministry of Commerce and Industry, Government of India for period under consideration.

#### **CONTRACTOR'S OTHER RESPONSIBILITIES / LIABILITIES:**

4.6

- (i) Contractor shall comply with all requirements/procedures etc. that may be stipulated if any, by Government /controlling authority from time to time and accordingly obtain the requisite supply of cement for the work.
- (ii) Even though the source of cement is approved by the employer but the employer shall not be responsible for quality of cement or any loss/ damage in transit, delays due to non-availability of cement with the factory / C&F agents /authorized dealers and/or required transport etc. The contractor shall not be entitled to make any claim and Extension of time or Cost on the employer on such grounds.
- (iii) Cement shall be kept in custody of the contractor at site. The contractor shall be responsible for the safety of the cement by providing watch and ward as is necessary and directed. In case any cement is damaged, unaccounted for or lost due to pilferage or any other reason either in transit or at site, the accountability will be with contractor. If any quantity of cement is found in excess of requirement or left over after completion of the work, same shall not be removed from site without the written permission of the Engineer-in-charge.
- (iv) The contractor shall maintain a stock register at the site and shall record therein the receipt and consumption of cement, the same day it is received or consumed. He shall also get the entries in the register for receipt and consumption of cement countersigned by Employer's Site Engineer, on the same day cement is received or consumed.
- (v) Pozzolana/ Slag cement shall be used only if specifically permitted by the Chief Engineer. The Chief Engineer reserves the right not to allow the use of Pozzolana/ Slag cement. In case Pozzolana / Slag cement is used, the Contractor shall have to observe increased periods for striking form and additional period of one week for curing for which no claim shall be entertained.
- (vi) The cement shall be got tested by the Engineer-in-charge of employer as and when new consignment comes and there is change in manufacturer's brand. The contractor shall supply free of charge the cement required for testing including its transportation cost to testing laboratories. The cost of tests shall be borne by the contractor/Department in the manner indicated below:-
  - (a) By the contractor, if the results show that the cement does not conform to relevant BIS codes.
  - (b) By the Department, if the results show that the cement conforms to relevant BIS codes.

(vii) The contractor is allowed to use reasonable quantity from the cement brought at site for constructing temporary water storage tank to store water for construction, site office and godowns at site. The quantity used for this purpose shall not be account for payment due to price variation defined elsewhere.

(viii) The actual issue and consumption of cement on work shall be regulated and proper accounts maintained. The theoretical consumption of cement shall be worked out as per procedure prescribed elsewhere in the contract. In case the cement consumption is less than theoretical consumption including permissible variation, recovery at the rate so prescribed shall be made. In case of excess consumption no adjustment shall be made.

(ix) If the work executed is not conforming to acceptable standard as prescribed in the tender elsewhere, the work will not be considered for payment.

The damaged cement shall be removed from the site immediately by the contractor on receipt of a notice in writing from the Engineer-in-charge. If he does not do so within 3 days of receipt of such notice, the Engineer-in-charge shall get it removed at the cost of the contractor.

**Chief Engineer may change the brand of Cement depending upon availability in local market, if needed. Instructions in this respect can be issued by them at regular intervals. The name of manufacturers should be finalized after taking into consideration the suggestions of contractors during pre bid meeting, if any.**

***Similar conditions for cement of other types like slag cement etc. may be incorporated wherever required by the authority by providing for relevant BIS Codes, suitable brands of cement and instructions issued by the department.***

**MILD STEEL BARS AND HIGH STRENGTH DEFORMED BARS FOR REINFORCEMENT IN R.C.C. WORK TO BE SUPPLIED BY CONTRACTOR:**

**5. CONTRACTOR'S QUOTED RATES:**

**5.1** Contractor shall quote his rates for relevant items in the tender on the basis of provisions of this clause detailed hereunder and on the basis of price of steel at site of work as mentioned in Annexure "P" attached herewith (hereinafter called the Basic Price of Steel).

## 5.2 APPROVAL OF SOURCE OF PURCHASE

- (1) **The contractor shall procure TMT bars of Fe415/ Fe500 grade (the grade to be procured is to be specified) from primary producers such as SAIL or TISCO or RINL as approved by Ministry of Steel.** The TMT bars procured from primary producers shall conform to manufacturer's specifications. In case of non-availability of steel from primary producers, the approving authority may permit use of TMT reinforcement bars procured from secondary producers. In such cases following action is to be followed:
  - (a) The grade of the steel such as Fe415/Fe500 or other grade to be procured is to be specified as per BIS 1786 /2008.
  - (b) The secondary producers must have valid BIS license to produce HSD bars conforming to IS 1786: 2008. In addition to BIS license, the secondary producer must have valid license from either of the firms Tempcore, Thermex, Evcon Turbo & Turbo Quench to produce TMT Bars.
  - (c) The TMT bars procured from primary producers shall conform to manufacturer's specifications.
  - (d) The TMT bars procured from secondary producers shall conform to the specifications as laid by Tempcore, Thermex, Evcon Turbo & Turbo Quench as the case may be.
  - (e) TMT bars procured either from primary producers or secondary producers, the specifications shall meet the provisions of IS 1786 : 2008/2012 pertaining to Fe415D or Fe 500D grade of steel as specified in the tender (while preparing Tender the grade of the steel to be specified).
- (2) The contractor shall have to obtain and furnish test certificates to the Engineer-in-charge in respect of all supplies of steel brought by him to the site of work.
- (3) Samples shall also be taken and got tested by the Engineer-in-Charge as per the provisions in this regard in relevant BIS codes. In case the test results indicate that the steel arranged by the contractor does not conform to the specifications as defined under para (1)(d) & (1)(e) above, the same shall stand rejected, and it shall be removed from the site of work by the contractor at his cost within a week time or written orders from the Engineer-in-Charge to do so.
- (4) **The steel reinforcement bars shall be brought to the site in bulk supply required to achieve desired progress of the work in next 3 months, from the above source of purchase (including brand of steel) as decided by the Engineer-in-charge. At the time of starting the work, the request for approval shall be submitted within 15 days of receipt of tender acceptance letter. The contractor shall intimate the EE/SE the quantity of steel being procured, with the names, full addresses, and telephone numbers of steel suppliers. For subsequent approvals the contractors shall approach Employer's Engineer at site at least 20 days in advance of the desired date of delivery of steel. The contractor shall submit his request for the approval through Employer's Engineer at site with one copy of the letter to EE/SE. The contractor's request letter shall mention the quantity of steel to be/ being purchased and also the quantity of steel in stock at site on the date of submitting the request.**

- (5) The steel reinforcement bars shall be stored by the contractor at site of work in such a way as to prevent their distortion and corrosion, and nothing extra shall be paid on this account. Bars of different sizes and lengths shall be stored separately to facilitate easy counting and checking.
- (6) For checking nominal mass, tensile strength, bend test, re-bend test etc. specimens of sufficient length shall be cut from each size of the bar at random, and at frequency not less than that specified in the tender.

**BASIC PRICE OF STEEL:**

- 5.3 The basic price of steel stated in Annexure D is inclusive of all costs upto the site of work, including purchase price, all levies and duties including excise duty, sales tax, octroi / town duty, transportation charges including loading and unloading charges at all points (except unloading at site), transit insurance, and any other expenses (*expenditure*) not mentioned above but required etc. and shall be included by the contractor in his quoted rates. All other costs such as unloading the steel at site, handling, stacking, storage, providing watch and ward arrangements, loss due to pilferage, thefts or any other reasons shall also be to contractor's account and shall be included by the contractor in rates quoted in the tender.

**QUALITY OF STEEL:**

- 5.4 The contractor shall satisfy himself that the steel arriving at site is TMT bars of Fe415/ Fe500 grade as per BIS 1786-2008/ 2012 or other grade bars procured either from primary producers or secondary producers, the specifications shall meet the provisions of IS 1786 : 2008/ 2012 pertaining to Fe 415D or Fe 500D grade of steel as specified in the tender and shall be supported by test certificate from the suppliers. In case the contractor has any doubt regarding the quality of steel, it is up to him to have it tested at his own cost and make sure before incorporation in the works that the steel is of right quality. Each consignment of steel supplied should have Test Certificate of the Manufacturer.

**CONTRACTOR'S OTHER RESPONSIBILITIES/LIABILITIES**

- (i) Contractor shall comply with all requirements/procedures etc. that may be stipulated if any, by Government /controlling authority from time to time and accordingly obtain the requisite supply of steel for the work.
- (ii) Even if the source of steel is approved by the employer, the employer shall not be responsible for quality of steel, correctness of diameter/ size or any loss /damage in transit, delays due to non-availability of steel with the manufacturer/suppliers and/or required transport etc. The contractor shall not be entitled to make any claim & Extension of Time or Cost on the employer on such grounds.

- (iii) The contractor shall be responsible for proper storing arrangement at site. Steel shall be kept in custody of the contractor at site. The contractor shall be responsible for the safety of the steel by providing watch and ward as is necessary and directed. In case any steel is damaged, unaccounted for or lost due to pilferage or any other reasons either in transit or at site, the accountability will be with contractor. If any quantity of steel is found in excess of requirement or left over after completion of the work, same shall not be removed from site without the written permission of the Engineer-in-charge.
- (iv) **The contractor shall maintain a stock register at the site and shall record therein the receipt and consumption of steel (category wise), the same day it is received or consumed. He shall also get the entries in the register for receipt and consumption of steel countersigned by Employer's Site Engineer, on the same day steel is received or consumed.**
- (v) The wastage shall be to contractor's account and shall be taken away by the contractors after obtaining written permission from the **Engineer-in-charge** and the rates quoted shall allow for the same.
- (vi) The payment of steel reinforcement shall be made on weight worked out on the basis of measurement of lengths of various categories as incorporated in the work and sectional weights mentioned in tender.
- (vii) The contractor shall obtain a test certificate from the manufacturer for the lot of steel purchased for the work. The employer's site Engineer may also order testing of steel when new consignment comes and / or there is change in manufacturer's brand, by the contractor before allowing its use in the work irrespective of the test certificate and in such case the contractor shall supply free of charge the steel required for testing including its transportation cost to testing laboratories. The cost of tests shall be borne by the contractor/Department in the manner indicated below but not any other incidental expenses for arranging the testing, which shall be to contractor's account and included in quoted rates:-
  - a. By the contractor, if the results show that the steel does not conform to relevant BIS codes.
  - b. By the Department, if the results show that the steel conforms to relevant BIS codes.
- (viii) The actual issue and consumption of steel on work shall be regulated and proper accounts maintained. The theoretical consumption of steel shall be worked out as per procedure prescribed elsewhere in the contract. In case the steel consumption is less than theoretical consumption including permissible variation, recovery at the rate so prescribed shall be made. In case of excess consumption no adjustment shall be made.
- (ix) The substitution of any category of steel shown in drawing with any other category of steel shall be done only if permitted by the EE/SE in writing.
- (x) The steel brought to site and the steel remaining unused shall not be removed from site without the written permission of the Engineer-in-charge.

## 6.0 PAYMENT DUE TO VARIATION IN PRICE OF STEEL

If after submission of the tender, the price of Steel specified in Annexure 1 increases/ decreases beyond the price(s) prevailing at the time of the last stipulated date for receipt of tenders including Tender opening extensions, if any for the work, then the variation in amount shall accordingly be paid and that any such variations shall be effected only for stipulated period of Contract including the justified contract period extended without imposition of liquidated clauses.

However, for work done/during the justified period extended as above, it will be limited to indices prevailing at the time of stipulated date of completion or as prevailing for the period under consideration, whichever is less. If the extension is granted with imposition of liquidated damage, no price variation shall be paid but recovery due to price variation shall be effected.

The increase/decrease in prices of steel, shall be determined by the Price indices as published by Economic Advisor to Government of India, Ministry of Steel and base price for steel, as indicated in Annexure 2 as valid on the last stipulated date of receipt of tender, including extension if any and for the period under consideration.

The amount will be worked out as per the formula given below for individual material:-

Adjustment for component of steel.

$$V = P \times Q \times \frac{CI - C_{lo}}{C_{lo}}$$

Where,

V = Variation in Steel cost i.e. increase or decrease in the amount to be paid or recovered.

P = Base Price of steel as indicated in Annexure 2 as valid at the time of the last stipulated date of receipt of tender including extensions, if any.

Q = Quantity of Steel consumed in the worksite i.e. as measured and recorded since previous bill. Wastage if any, to be on contractor's account.

C<sub>lo</sub> = All India Whole Sale Price index for steel, as issued by Office of the Economic Advisor, Dept. of Industrial Policy & Promotion under Ministry of Commerce and Industry, Government of India as valid on the last stipulated date of receipt of tenders including extensions, if any.

CI = All India Whole Sale Price index for steel, as issued by Office of the Economic Advisor, Dept. of Industrial Policy & Promotion under Ministry of Commerce and Industry, Government of India for period under consideration.



**6. WASTAGE OF CEMENT AND STEEL:**

6.1 The wastage of Cement and Steel shall be to the contractor's Account and the rates quoted shall allow for the same.

**7. BALANCE STOCK OF CEMENT / STEEL ON COMPLETION OF JOB:**

7.1 Irrespective of what is mentioned anywhere else in this tender the surplus stock of Cement/Steel remaining at the site on completion of work, shall be the property of the Contractor. However, he shall remove the surplus stock only after furnishing the necessary details of such stock in writing to the Corporation's Engineer who shall give approval after satisfying himself that the amount advanced for the above stock has been fully recovered.

**8. STEEL OTHER THAN USED FOR REINFORCEMENT:**

8.1 Rolled steel sections such as angles, joists, channels, flats etc. and mild steel used for M.S. Grills, railing, gates and M.S. Plates etc., shall be procured by the Contractor and Annexure "P" will not apply for cost of these items.

**9. TESTING OF MATERIALS INCLUDING CEMENT AND STEEL:**

9.1 Testing of all materials including cement & steel during the progress of work shall be as per frequency given in Table A, clause 2 of Special Conditions.

9.2 Contractor shall facilitate testing of materials viz, cement, steel, cubes and any other material as per the frequency/sampling mentioned in Table-A, clause-2 of Special conditions. Contractor shall also facilitate testing of any material to be incorporated in work even if it is not specifically mentioned. The testing charge against invoice shall be directly remitted by the Corporation to the test house. If the material fails to conform to the Standards (BIS), the test charges shall be recovered from Contractor's bill.

9.3 For all other materials listed in Special conditions, expenses towards testing shall be borne by LIC. If the material fails to conform to the Standards (BIS), the test charge shall be recovered from Contractor's bill.

9.4 The Corporation's Engineer may get tested any material to be incorporated in work even if it is not specifically mentioned. In all such cases, testing charges will be borne by LIC. If the material fails to conform to the Standards (BIS), the test charges shall be recovered from Contractor's bill.

9.5 For all tests, incidental charges such as cutting, loading, unloading, casting wherever applicable such as mortar briquettes/cubes and facilitating in transportation including materials required for testing shall be borne by the contractor.

**Above stipulations (9.1, 9.2, 9.3, 9.4 and 9.5) supersede any other conditions /stipulations pertaining to testing of materials mentioned elsewhere in this tender.**



**10. "PRINCIPAL MAKE/S OR OTHER EQUAL AND APPROVED" FOR MATERIALS / PRODUCTS:**

- 10.1 The Contractor shall note that materials having ISI monogram shall primarily be used in the work. If in the tender "Certain Principal Make / Makes or other equal and approved of any material / Product is mentioned in any item or Trade Preambles relating to the particular items in its respective Trade Schedule, the Contractor shall have to use the Principal Make/Makes specified in the relevant item or the trade Preambles. In case the specified particular Principal make / makes of the materials product is/are not readily available, the Contractor shall take prior permission and approval of the Chief Engineer in writing before use of the alternative equivalent make of the Material / Product.
- 10.2 All principal makes specified for any item shall be treated at par as per the accepted quoted rate.
- 10.3 Use of the make other than the Principal Make/Makes (which shall be treated as an Equivalent make) shall be at the discretion of the Chief Engineer and such Make/Makes shall be used after the approval of the Chief Engineer.
- 10.4 In such cases the Contractor will not be paid any extra payment over the accepted quoted rate in any case. However if it is ascertained that the price of approved Equivalent Make or the Material/product is lower than that for the Principal Make/Makes of the same material / product the difference of the price shall be payable by the contractor to LIC. Such difference of price shall be suitably decided by the Chief Engineer whose decision shall be final and binding to the Contractor in this regard.

**11. ADJUSTMENT IN PRICES OF MATERIALS AND LABOUR (OTHER THAN CEMENT & STEEL):**

- 11.1 Adjustment in price of material, labour shall apply to original civil work for construction of building which may include piling, plumbing & sanitary work, electrical installations and which shall have a stipulated completion period of more than six months. **The adjustment in prices under this clause shall not apply to works such as tube-well, lifts and substation equipment, interior work, repair & maintenance contracts unless otherwise specified.**
- 11.2 Adjustment in prices of material & labour shall be allowed on the basis of clause-11.6 subject to the condition given below.
- 11.3 Adjustment shall be made only for tender items and deviated items for the stipulated contract period.

11.4 & 11.5

**In case of extension of time, the escalation is paid as follows:**

- a) When there is authorized extension i.e. no imposition of Liquidated Damage, escalation may be paid for the extended period with prevailing index.

- b) Extension granted but with imposition of Liquidated damages: The escalation may be paid by considering index as that prevailing on scheduled date of completion or that prevailing on the date of billing during the extended period of contract whichever is lower .
- c) Extension granted due to failure on the part of the contractor but due to reasons beyond his control The Department has taken a lenient view for not imposing Liquidated Damages, no escalation shall be paid whatsoever after scheduled date of completion.

### **ADJUSTMENT OF MATERIALS:**

- 11.6 For the purpose of adjustment in price of materials, the component shall be 60% of the value of work done upto a given stage. While computing the adjustment, the cost of cement, steel or any other materials for which basic price has been stipulated in the tender shall be deducted from the component worked out at 60% of the value of work. The cement and steel as covered under Clauses 4 and 5 of the General Preambles to schedule of quantities shall be excluded from the purview of the adjustment.

$$V_m = \{60/100 (R_n - R_{n-1}) + C_m - M_n - 1 + M_n\} \times (W - W_0) / W_0,$$

Where,

$V_m$  = Variation in price for materials i.e. increase or decrease in the amount in rupees to be paid or recovered.

$R_n$  = Total value of work done (excluding prime cost items, extra items, and advance on materials at site upto the period under reckoning) on the basis of accepted tender rates. The deviated items worked out fully on the basis of rates prevailing at the time of last date of receipt of tender to be included.

$C_m$  = Total value of cement and steel at basic price stipulated in the tender and shall comprise of C & S as explained below and any other material which basic price is mentioned:

C = Cost of cement used in the work and recorded for any specific bill period under reference and worked out at basic price stipulated in Annexure attached in the tender.

S = Cost of steel for reinforcement (covered under Clause 5.1 AND 5.2 of the General Preambles to schedule of quantities) used in the work and recorded for any specific bill period under reference and worked out at issue price / basic price stipulated in the tender.

$R_{n-1}$  = Total value of work done (excluding prime cost items, extra items and advance on materials at site) considered in the bill prior to the period under reckoning. The deviated items and such other items shall be considered as per  $R_n$  above.

$M_n$  = Advance being allowed in the bill under consideration against materials at site (other than cement and steel)

$M_{n-1}$  = Advance allowed in the bill prior to the period under scrutiny against materials at site (other than cement and steel)

$W_0$  = All India Wholesale Price Index for all commodities (Base = 100; Year 2004-05) as prevailing on the last day for submission of tender (including extended date, if any).

W = Average All India Wholesale Price Index for all commodities Base = 100; year 2004-05; as published in the RBI Bulletin for the period of the bill under consideration viz. from the date of previous bill (date of commencement in case of first bill) to date of current bill (date of virtual completion in case of final bill or any earlier cut off date as fixed).

- 11.7 The adjustment on materials is worked out on the basis that material component in the building construction work is 60% of the value of work done, the rest being labour and profit. But in the initial stages of construction work, it might so happen that the cost of materials used exceeds 60% which is taken as an average and therefore adjustment gets worked out on negative side even though the economic index might have gone up. In such cases, the negative adjustment shall also have to be made in the bill.

#### **ADJUSTMENT ON LABOUR:**

- 11.8 The contractor shall pay wages to the skilled and unskilled labour not less than the rates prescribed under the minimum wages act and as stated in clause no.18 of the General Instructions to contractors for Builders's work. Variation in prices of labour shall be worked out by applying the following formula and necessary payment/ recovery made:

$$VL = 25 / 100 \times (R_n - R_{n-1}) \times (I - I_0) / I_0$$

VL = Variation in price for labour i.e. increase or decrease in the amount in rupees to be paid or recovered

I = Average All India Consumer Price Index for Industrial Workers (base 100 year - 2001) declared by Labour Bureau, Govt. of India, as published in Reserve Bank of India Bulletin during the period under reckoning.

Average All India Consumer Price Index for Industrial Workers for the period of the bill under consideration viz. from date of previous bill (date of commencement in case of first bill) to date of current bill (date of virtual completion in case of final bill or any earlier cut off date as fixed)

$I_0$  = All India Consumer Price Index for Industrial workers (base 100-year 2001) ruling on the last date of submission of tender (including extended date, if any)

$R_n$  = As defined under 11.6 above

$R_{n-1}$  = As defined under 11.6 above

- 11.9 If the last date for submission of tender / date of bill is between 1st to 15th of a particular month the relevant economic index (W,  $W_0$ , I,  $I_0$ ) for the previous month is to be considered. However, if the last date of submission of tender / date of bill is between 16th and end of month, the relevant economic index for the month shall be reckoned while calculating the material / labour price adjustment.

**NOTE:** 1) The adjustment in prices of Materials and Labour shall be considered /effected only when the Contractor submits authentic data for prevailing indices along with the RA/Final Bill. The Employer reserves the right to set aside certain amount from the Bill if the Contractor does not submit the authentic data of prevailing indices along with the bill.

- 2) For adjustment in prices of materials & labour the indices ( WPI / CPI ) published by RBI as mentioned above which are available as on the date of submission of final bill ( final /

provisional indices ) will only be considered for settlement of final bill . No further review will be done, even if there are variations in indices (WPI / CPI) after the final bill is settled.

- 3) In case during the period of contract, the base years for publishing Economic Indices are changed as per statute, then the revised indices will be considered as per the published data available at the time of settling the bill/s.

## 12. ADJUSTMENT OF PRICE AND LABOUR FOR LIFT WORKS: (ITEM NO 20.01 AND ITEM NO:20.02 OF SHEDULE OF QUANTITIES)

The price quoted/confirmed is based on the input cost of raw materials/components and labour cost as on the date of quotation and the same is deemed to be related to prices and the wholesale price index numbers for metal products and all India average consumer price index number for industrial workers as specified in the adjustment clause given below. In case of any variation in these indices, the price payable shall be subject to adjustment up or down, in accordance with the following formula:

$$P = P_0 / 100 \{ 15 + 55(MP/MP_0) + 15(W_0(D)/W_0) + 15(W_0(I)/W_0) \}$$

Wherein,

P=Price payable as adjusted in accordance with the above formula.

P<sub>0</sub> = Price quoted.

MP<sub>0</sub>=Wholesale price index number of metal products. This index number is as applicable on the month, four months prior to the date of tendering.

W<sub>0</sub>=All India average consumer price index for Industrial workers, as published by the Labour Bureau, Ministry of Labour, Govt of India(Base 2001=100).This index number is as applicable for the month four month prior to date of tendering.

For example, if the date of tendering falls in the month of December 2015, the applicable wholesale price index number for metal products (MP<sub>0</sub>) and all India average consumer price index number (W<sub>0</sub>) should be for the month of August 2015.

MP=Wholesale price index number for metal products. This index number is as applicable on the month, four months prior to the date of delivery.

W<sub>0</sub>(D) = All India average consumer price index number for Industrial workers (Base 2001=100),as published by labour bureau, Ministry of Labour, Govt of India. This index number is as applicable for the month, four months prior to the date of delivery of manufactured material.

W<sub>0</sub>(I) = All India average consumer price index number for Industrial workers,(Base 2001=100) as published by labour bureau, Ministry of labour, Govt.of India. This index number is as applicable for the month, four months prior to the date of completion of installation work.

The date of delivery is the date on which the manufactured material with its entire components are available at site and ready for inspection by Corporation Engineer or the contracted delivery date i.e. six month before the scheduled date of completion of the entire project whichever is earlier.

The date of completion of installation is the date on which the lift work is notified as being completed and ready for testing or two months before the scheduled date of completion of the entire project whichever is earlier.

**Wholesale price index number for metal products is as published by the office of Economic adviser, Ministry of Commerce and Industry, Govt of India with Base = 100; Year 2004-05.**

**(SIGNATURE OF THE CONTRACTOR)**

## **ANNEXURE “M”**

**MEASUREMENTS: - The measurement shall be recorded by the Corporation's Site Engineer or by an Engineer from Zonal Office /Divisional Office specifically authorized for the purpose in the Measurement Book (MB) Supplied By Corporation.(Refer Clause-21 with all its Sub-clauses of Conditions of Contract of the Tender(Part-I)**

LIFE INSURANCE CORPORATION OF INDIA

ANNEXURE "P"

**SUB: TENDER FOR BUILDERS WORK, WATER SUPPLY, SANITARY INSTALLATION, ELECTRICAL INSTALLATION, LIFTS AND ANCILLARY WORKS FOR PROPOSED CONSTRUCTION OF 28 NOS. OF OFFICERS' QUARTERS AND 1 NO. OF VIP GUEST HOUSE AT SURYA NAGAR, BHUBANESWAR.**

**BASIC PRICE OF CEMENT at the Work-Site.**

(Refer Clause No. 4.3 of the General Preambles to Schedule of Quantities).

Contractor's Quoted rates shall be Based on the BASIC PRICE of Cement at the work-site which includes purchase price of Cement, all Levies and duties such as Excise Duty, Sales Tax, Octroi/ Town duty, Transportation charges from the factory / stockfish's go-down to the work-site, loading and unloading charges at all points, transit insurance etc.

**A) Ordinary Portland Cement / Pozzolana  
Portland Cement / Other Specified Cement**

**Rs. 5600.00 / TONNE**

**BASIC PRICE OF STEEL at the Work-Site:**

(Refer clause No. 5.3 of the General Preambles to Schedule of Quantities)

Contractor's QUOTED rates shall be based on the BASIC PRICE of Steel at the Work-Site which includes purchase price of Steel, all Levies and Duties such as Excise Duty, Sales Tax, Octroi/ Town Duty, Transportation Charges from the factory / stockiest go-down to the work-site including bending and binding charges at all points, Transit Insurance, Weighment charges, etc.

|                                                                                                                            |                             |
|----------------------------------------------------------------------------------------------------------------------------|-----------------------------|
| <b>A) High Strength Deformed Bars or other specified reinforcing steel of all diameters in coil or in straight lengths</b> | <b>Rs. 43000.00 / TONNE</b> |
| <b>B) Mild steel bars of all diameters in coil or in straight lengths.</b>                                                 | <b>Rs. 43000.00 / TONNE</b> |

**Note:**

1. Packing of Cement (like gunny bags, polythene bags. etc.) cost of which is included in the purchase price, shall **BE THE PROPERTY OF THE CONTRACTOR.**

ANNEXURE - "Q"

**STATEMENT SHOWING QUANTITIES OF THEORETICAL CONSUMPTION OF CEMENT  
FOR MAJOR ITEMS OF WORKS**

| Sl.No. | Description                                                                                                                                          | Units    | Quantity of cement per unit /<br>Quantity of work in quintal |
|--------|------------------------------------------------------------------------------------------------------------------------------------------------------|----------|--------------------------------------------------------------|
| 1.     | <b>PLAIN CEMENT CONCRETE WORK</b>                                                                                                                    |          |                                                              |
|        | A) Cement concrete (1:2:4)                                                                                                                           | Cu.M.    | 3.20                                                         |
|        | B) Cement concrete (1:3:6)                                                                                                                           | Cu.M.    | 2.20                                                         |
|        | C) Cement concrete (1:4:8)                                                                                                                           | Cu.M.    | 1.70                                                         |
|        | D) Cement concrete (1:5:10)                                                                                                                          | Cu.M.    | 1.30                                                         |
| 2.     | <b>DAMP PROOF COURSE</b>                                                                                                                             |          |                                                              |
|        | A) 25mm thick in C.C. (1:2:4)                                                                                                                        | 100 Sq.M | 8.0                                                          |
|        | B) 38 mm thick in C.C. (1:2:4)                                                                                                                       | 100 Sq.M | 12.16                                                        |
|        | C) 50 mm thick in C.C. (1:2:4)                                                                                                                       | 100 Sq.M | 16.0                                                         |
| 3.     | <b>REINFORCED CEMENT CONCRETE WORK</b>                                                                                                               |          |                                                              |
|        | A) R.C.C work in C.C. (1:2:4)                                                                                                                        | Cu.M.    | 3.20                                                         |
|        | B) R.C.C. work in C.C. (1:1½ :3)                                                                                                                     | Cu.M.    | 4.00                                                         |
|        | C) R.C.C. work in C.C. (1:1:2)                                                                                                                       | Cu.M.    | 6.10                                                         |
|        | D) Providing and fixing precast R.C.C. (1:2:4) set in partition in CM 1:2 including finishing with cement plaster 1:3 of thickness not exceeding 6mm | Cu.M.    | 3.80                                                         |
|        | i) Kerb, step and the like                                                                                                                           | Cu.M.    | 3.80                                                         |
|        | ii) Copings, bed plates, Anchor blocks, window sills and the like                                                                                    | Cu.M.    | 3.80                                                         |
|        | iii) Small lintels not exceeding 1.5m clear, coping, shelves and the like                                                                            | Cu.M.    | 3.77                                                         |
| 4.     | <b>A) Brickwork (all classes)<br/>In cement mortar 1:3</b>                                                                                           |          |                                                              |
|        | i) with modular thick                                                                                                                                | Cu.M     | 1.12                                                         |
|        | ii) with F.P.S. brick                                                                                                                                | Cu.M     | 1.28                                                         |

| Sl.No. | Description                                                       | Units     | Quantity of cement per unit /<br>Quantity of work in quintal |
|--------|-------------------------------------------------------------------|-----------|--------------------------------------------------------------|
|        | B) Brick work (all classes) in mortar 1:4                         |           |                                                              |
|        | i) with modular thick                                             | Cu.M      | 0.84                                                         |
|        | ii) with F.P.S. brick                                             | Cu.M      | 0.95                                                         |
|        | C) Brick work (all classes) In mortar 1:5                         |           |                                                              |
|        | i) with modular thick                                             | Cu.M      | 0.68                                                         |
|        | ii) with F.P.S. brick                                             | Cu.M      | 0.78                                                         |
|        | D) Brick work (all classes) In mortar 1:6                         |           |                                                              |
|        | i) with F.P.S. brick                                              | Cu.M      | 0.62                                                         |
|        | E) Half Brick work (all classes) In mortar 1:3                    |           |                                                              |
|        | i) with modular thick                                             | 100 Sq.M  | 12.75                                                        |
|        | ii) with F.P.S. brick                                             | 100 Sq.M  | 14.28                                                        |
|        | F) Half Brick work (all classes) In mortar 1:4                    |           |                                                              |
|        | i) with modular thick                                             | 100 Sq.M  | 9.50                                                         |
|        | ii) with F.P.S. brick                                             | 100 Sq.M  | 10.64                                                        |
|        | G) Brick work 3" thick in cement mortar 1:3 with F.P.S. brick     | 100 Sq.M. | 9.23                                                         |
|        | H) Honey comb brick work half brick thick in C.M. (1:4)           |           |                                                              |
|        | i) with modular brick                                             | 100 Sq.M  | 5.54                                                         |
|        | ii) with F.P.S. brick                                             | 100 Sq.M. | 6.56                                                         |
|        | I) Brick drip course at junction of roofs and walls in C.M. (1:4) |           |                                                              |
|        | i) 10 cm thick with modular brick                                 | 100 M     | 0.84                                                         |
|        | ii) 7.6 cm thick with F.P.S. brick                                | 100 M     | 0.83                                                         |
|        | J) Brick drip course at junction of rooms and walls in C.M. (1:6) |           |                                                              |
|        | i) 10 cm thick with Modular brick                                 | 100 M     | 0.55                                                         |
|        | ii) 7.6 cm thick with F.P.S. Brick                                | 100 M     | 0.54                                                         |



| Sl.No. | Description                                                                                                                                                                                                                  | Units    | Quantity of cement per unit /<br>Quantity of work in quintal |
|--------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|--------------------------------------------------------------|
|        | K) Providing brick band 5cm projected from wall face in C.M. (1:4)                                                                                                                                                           |          |                                                              |
|        | i) 10cm thick 5 cm Projected with modular brick                                                                                                                                                                              | 100 M    | 0.42                                                         |
|        | ii) 7.6 cm thick 5.7 cm projected with F.P.S. brick                                                                                                                                                                          | 100 M    | 0.41                                                         |
| 5.     | <b>STONE WORK</b>                                                                                                                                                                                                            |          |                                                              |
|        | A) Random Rubble masonry within foundations or superstructure in cement mortar 1:6 including leveling up with cement concrete 1:6:12 at plinth or sill or ceiling level                                                      | Cu.M.    | 0.85                                                         |
|        | B) coarse rubble masonry in foundation and super structure in cement mortar 1:6                                                                                                                                              | Cu.M.    | 0.75                                                         |
|        | C) Stone work plain ashlar cyclopean, sunk or moulded and ashlar punched in cement mortar 1:6 including pointing with cement mortar 1:2 with an admixture of pigment matching the stone shade.                               | Cu.M.    | 0.54                                                         |
|        | D) Stone work plain ashlar cyclopean sunk or moulded arch, dome or circular moulded and curved columns in cement mortar 1:3 including pointing with cement mortar 1:2 with an admixture of pigment matching the stone shade. | Cu.M.    | 1.07                                                         |
|        | E) Stone work plain in coping cronies; string courses and plinth course in cement mortar 1:6 including pointing with cement mortar 1:2 with an admixture of pigment matching the stone shade.                                | Cu.M.    | 0.54                                                         |
|        | F) Stone work for wall lining etc. average thickness 40mm to 70mm in cement mortar 1:3 including pointing with cement mortar 1:2 with an admixture of pigment matching the stone shade                                       | 100 Sq.M | 8.75                                                         |

| Sl.No. | Description                                                                                                                                                                                                                                                                                            | Units     | Quantity of cement per unit /<br>Quantity of work in quintal |
|--------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|--------------------------------------------------------------|
|        | G) 30mm thick sand stone shelves, fixed in walls in cement mortar 1:3 including finishing complete                                                                                                                                                                                                     | 100 Sq.M. | 1.64                                                         |
| 6.     | <b>FLOORING</b>                                                                                                                                                                                                                                                                                        |           |                                                              |
|        | A) Brick flooring in cement mortar 1:4                                                                                                                                                                                                                                                                 | 100 Sq.M. | 11.02                                                        |
|        | B) Brick flooring in cement mortar 1:6                                                                                                                                                                                                                                                                 |           | 7.25                                                         |
|        | C) 25mm thick cement concrete flooring 1:2:4 finished with a floating coat of neat cement                                                                                                                                                                                                              |           | 12.20                                                        |
|        | D) 40mm thick cement concrete flooring 1:2:4 finished with a floating coat of neat cement                                                                                                                                                                                                              |           | 17.00                                                        |
|        | E) 50mm thick cement concrete flooring 1:2:4 finished with a floating coat of neat cement                                                                                                                                                                                                              |           | 20.20                                                        |
|        | F) 75mm thick cement concrete flooring 1:2:4 finished with a floating coat of neat cement                                                                                                                                                                                                              |           | 28.20                                                        |
|        | G) Cement concrete pavement (25mm to 50mm thick) with 1:2:4 including finished complete                                                                                                                                                                                                                | Cu.M.     | 3.20                                                         |
|        | H) 50mm thick cement concrete flooring with metallic concrete hardener topping, under layer of 40 mm thick cement concrete 1:2:4 and top layer 10mm thick metallic cement, hardener consisting of mix 1:2 by volume with metallic hardening compound of approved quality is mixed in the ratio of 4:1. | 100 Sq.M  | 21.10                                                        |
|        | I) 40mm thick cast - in situ m.m. flooring (28mm thick under layer and 12mm thick top layer)                                                                                                                                                                                                           |           |                                                              |
|        | i) Neutral shade with Grey cement                                                                                                                                                                                                                                                                      | 100 Sq.M  | 19.07                                                        |
|        | ii) Light shade with white cement Grey Cement                                                                                                                                                                                                                                                          | 100 Sq.M  | 8.10                                                         |
|        | iii) Medium shades 50% Grey Cement                                                                                                                                                                                                                                                                     | 100 Sq.M  | 10.97                                                        |
|        | White cement                                                                                                                                                                                                                                                                                           |           | 15.02                                                        |
|        | J) Pre-cast terrazzo tiles 22mm thick with marble chips of sized upto 6mm, laid in 20mm thick bed of cement mortar 1:6, cement slurry, jointing with gray cement                                                                                                                                       |           | 4.05                                                         |

| Sl.No. | Description                                                                                                                                                                                                     | Units                | Quantity of cement per unit /<br>Quantity of work in quintal |
|--------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|--------------------------------------------------------------|
|        | i) Light shade using White cement<br>Grey cement                                                                                                                                                                | 100 Sq.M             | 4.40<br>10.00                                                |
|        | ii) Dark shades (with Grey cement)                                                                                                                                                                              | 100 Sq.M             | 14.40                                                        |
|        | K) Pre-cast terrazzo tiles 22mm thick with marble chips of sizes upto 6mm. In skirting on walls, laid on 12mm thick cement plaster (1:3) jointed with neat cement slurry.                                       |                      |                                                              |
|        | i) Light shade using white cement Grey cement                                                                                                                                                                   | 100 Sq.M             | 2.20<br>13.94                                                |
|        | ii) Medium shade using 50% white cement & 50% grey cement.<br>White cement<br>Grey cement                                                                                                                       | 100 Sq.M             | 1.10<br>12.84                                                |
|        | iii) Dark shades (with Grey cement)                                                                                                                                                                             | 100 Sq.M             | 16.14                                                        |
|        | L) checkered terrazzo tiles 22mm thick with marble chip of sizes upto 6mm on 25mm thick bed of lime mortar jointed with neat cement slurry                                                                      |                      |                                                              |
|        | i) Light shade using white cement<br>Grey cement                                                                                                                                                                | 100 Sq.M             | 4.40<br>12.90                                                |
|        | ii) Medium shade using 50% white cement & 50% grey cement.<br>White cement<br>Grey cement                                                                                                                       | 100 Sq.M             | 2.20<br>15.10                                                |
|        | iii) Neutral shades (with Grey cement)                                                                                                                                                                          | 100 Sq.M             | 17.30                                                        |
|        | M) White glazed tiles 5.5 mm thick in flooring, treads and risers of steps, skirting and dado on 12mm thick cement plaster 1:3 in base and jointed with white cement slurry etc.<br>White cement<br>Grey cement | 100 Sq.M<br>100 Sq.M | 2.50<br>9.42                                                 |
|        | N) Marble stone slab flooring over 20mm thick base lime mortar and jointed with grey cement slurry etc.                                                                                                         |                      |                                                              |
|        | i) 20mm thick                                                                                                                                                                                                   | 100 Sq.M             | 5.0                                                          |
|        | ii) 30mm thick                                                                                                                                                                                                  | 100 Sq.M             | 5.12                                                         |
|        | iii) 40mm thick                                                                                                                                                                                                 | 100 Sq.M             | 5.36                                                         |

| Sl.No. | Description                                                                                                                                               | Units    | Quantity of cement per unit /<br>Quantity of work in quintal |
|--------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|----------|--------------------------------------------------------------|
|        | O) Marble stone slab flooring over 20mm thick base of cement mortar (1:4 and jointed with Grey cement slurry)                                             |          |                                                              |
|        | i) 25mm thick                                                                                                                                             | 100 Sq.M | 13.51                                                        |
|        | ii) 30mm thick                                                                                                                                            | 100 Sq.M | 13.63                                                        |
|        | iii) 40mm thick                                                                                                                                           | 100 Sq.M | 13.87                                                        |
|        | P) Extra if white cement slurry used instead of Grey cement slurry in joints of stone flooring. (White cement)                                            | 100 Sq.M | 0.76                                                         |
|        | Q) Marble tiles 25mm thick in riser of steps, skirting and pillars, laid on 12mm thick cement mortar (1:3) and jointed with grey cement slurry            | 100 Sq.M | 12.34                                                        |
|        | R) Kotah stone slab flooring over 20mm thick base of lime mortar and jointed with cement slurry etc.                                                      |          |                                                              |
|        | i) 25mm thick                                                                                                                                             | 100 Sq.M | 6.40                                                         |
|        | ii) 30mm thick                                                                                                                                            | 100 Sq.M | 6.80                                                         |
|        | lii) 40mm thick                                                                                                                                           | 100 Sq.M | 7.60                                                         |
|        | S) Kotah stone slab flooring over 20mm thick base of cement mortar (1:4) and jointed with neat cement slurry etc.                                         |          |                                                              |
|        | i) 25mm thick                                                                                                                                             | 100 Sq.M | 14.91                                                        |
|        | ii) 30mm thick                                                                                                                                            | 100 Sq.M | 15.31                                                        |
|        | iii) 40mm thick                                                                                                                                           | 100 Sq.M | 16.11                                                        |
|        | T) Kotah stone slab 25mm thick in riser in steps, skirting dado and pillars laid on 12mm thick cement mortar 1:3 and jointed with neat cement slurry etc. | 100 Sq.M | 13.74                                                        |
|        | U) 40mm thick sand stone flooring over 30mm thick base of cement mortar 1:5 with joints finished flush.                                                   | 100 Sq.M | 7.75                                                         |
|        | V) 40mm thick sand stone flooring over 20mm thick base of cement mortar 1:5 including pointing with cement mortar 1:2 (1cement 2 stone dust)              | 100 Sq.M | 9.31                                                         |
|        | W) 40mm thick sand stone flooring over 20mm thick lime mortar including pointing with cement mortar 1:2                                                   | 100 Sq.M | 1.56                                                         |

| Sl.No. | Description                                                                                                                                                                             | Units    | Quantity of cement per unit /<br>Quantity of work in quintal |
|--------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|--------------------------------------------------------------|
|        | X) 40mm thick fine dressed and rubbed stone flooring over 20mm thick base of cement mortar 1:5 (1cement 5 sand ) with joints 5mm thick finished flush.                                  | 100 sq.M | 8.28                                                         |
|        | Y) 40mm thick fine dressed and rubbed stone, flooring, over 20mm thick base of cement mortar 1:5 with joints 5mm thick including pointing with cement mortar 1:2 (1cement 2 stone dust) | 100 Sq.M | 9.84                                                         |
| 7.     | <b>FINISHING</b>                                                                                                                                                                        |          |                                                              |
|        | A) 12mm cement plaster 1:3                                                                                                                                                              | 100 Sq.M | 7.34                                                         |
|        | B) 12mm cement plaster 1:4                                                                                                                                                              | 100 Sq.M | 5.47                                                         |
|        | C) 12mm cement plaster 1:5                                                                                                                                                              | 100 Sq.M | 4.46                                                         |
|        | D) 12mm cement plaster 1:6                                                                                                                                                              | 100 Sq.M | 3.60                                                         |
|        | E) 15mm cement plaster 1:3                                                                                                                                                              | 100 Sq.M | 8.77                                                         |
|        | F) 15mm cement plaster 1:4                                                                                                                                                              | 100 Sq.M | 6.54                                                         |
|        | G) 15mm cement plaster 1:5                                                                                                                                                              | 100 Sq.M | 5.33                                                         |
|        | H) 15mm cement plaster 1:6                                                                                                                                                              | 100 Sq.M | 4.30                                                         |
|        | I) 20mm cement plaster 1:3                                                                                                                                                              | 100 Sq.M | 11.42                                                        |
|        | J) 20mm cement plaster 1:4                                                                                                                                                              | 100 Sq.M | 8.51                                                         |
|        | K) 6mm cement plaster 1:3 to ceiling                                                                                                                                                    | 100 Sq.M | 3.67                                                         |
|        | L) 6mm cement plaster 1:4                                                                                                                                                               | 100 Sq.M | 2.74                                                         |
|        | M) Neat cement punning                                                                                                                                                                  | 100 Sq.M | 2.20                                                         |
|        | N) 18mm cement plaster in two coats underlay 12mm cement plaster 1:5 finished with a top layer 6mm thick cement plaster 1:6                                                             | 100 Sq.M | 6.26                                                         |
|        | O) 18mm cement plaster in two coats under layer 12mm cement plaster 1:5 finished with a top layer 6mm thick cement plaster 1:3                                                          | 100 Sq.M | 8.13                                                         |

| Sl.No. | Description                                                                                                                                                                                                                  | Units    | Quantity of cement per unit /<br>Quantity of work in quintal |
|--------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|--------------------------------------------------------------|
|        | P) 12mm cement plaster 1:2<br>(1 cement 2 stone dust)                                                                                                                                                                        | 100 Sq.M | 9.79                                                         |
|        | Q) 18mm thick or artificial red<br>stone plaster of 12mm thick under<br>layer of cement plaster 1:4 with<br>6mm thick finishing coat of<br>cement mortar 1:1:3 mixed with<br>red oxide (1cement:1marble<br>dust:3stone dust) | 100 Sq.M | 9.47                                                         |
| 8.     | <b>POINTING</b>                                                                                                                                                                                                              | 100 Sq.M |                                                              |
|        | A) Flush or ruled or cut or<br>Weather pointing on brick work<br>with cement mortar 1:3                                                                                                                                      | 100 Sq.M | 1.53                                                         |
|        | B) Raised and cut pointed on<br>brick work with cement mortar 1:3                                                                                                                                                            | 100 Sq.M | 2.04                                                         |
|        | C) Flush or ruled pointing on<br>stone work with cement mortar<br>1:3                                                                                                                                                        | 100 Sq.M | 1.17                                                         |
|        | D) Raised and cut pointing on<br>stone work with cement mortar<br>1:3                                                                                                                                                        | 100 Sq.M | 2.35                                                         |
| 9.     | <b>MORTAR</b>                                                                                                                                                                                                                |          |                                                              |
|        | A) Cement mortar 1:1                                                                                                                                                                                                         | Cu.M     | 10.20                                                        |
|        | B) Cement mortar 1:2                                                                                                                                                                                                         | Cu.M.    | 6.80                                                         |
|        | C) Cement mortar 1:3                                                                                                                                                                                                         | Cu.M.    | 5.10                                                         |
|        | D) Cement mortar 1:4                                                                                                                                                                                                         | Cu.M.    | 3.80                                                         |
|        | E) Cement mortar 1:5                                                                                                                                                                                                         | Cu.M     | 3.10                                                         |
|        | F) Cement mortar 1:6                                                                                                                                                                                                         | Cu.M     | 2.50                                                         |
| 10.    | <b>SANITARY INSTALLATIONS:</b>                                                                                                                                                                                               |          |                                                              |
|        | A) Fixing long pan or Orissa<br>Pattern, squatting or pedestal type<br>W.C pan                                                                                                                                               | Each     | 0.025                                                        |
|        | B) Fixing Flat back or wall corner<br>type lipped front urinal basin                                                                                                                                                         | Each     | 0.01                                                         |

| Sl.No. | Description                                                                                                                                                                                                                                                                                                   | Units    | Quantity of cement per unit /<br>Quantity of work in quintal |
|--------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|--------------------------------------------------------------|
|        | C) Fixing sink or wash basin                                                                                                                                                                                                                                                                                  | Each     | 0.015                                                        |
|        | D) Fixing Holder bat clamps for 100 / 75 / 50 mm dia sand cast iron pipes                                                                                                                                                                                                                                     | Each     | 0.005                                                        |
|        | E) Fixing sand cast iron trap                                                                                                                                                                                                                                                                                 | Each     | 0.025                                                        |
|        | F) Providing and fixing G.I fittings and clamps including cutting and making good the walls etc. (Internal work)                                                                                                                                                                                              |          |                                                              |
|        | Exposed Walls                                                                                                                                                                                                                                                                                                 | 100 RM   | 0.05                                                         |
|        | 15mm dia                                                                                                                                                                                                                                                                                                      | 100 RM   | 0.06                                                         |
|        | 20mm dia                                                                                                                                                                                                                                                                                                      | 100RM    | 0.07                                                         |
|        | 25mm dia                                                                                                                                                                                                                                                                                                      | 100 RM   | 0.075                                                        |
|        | 32mm dia                                                                                                                                                                                                                                                                                                      | 100 RM   | 0.08                                                         |
|        | 40mm dia                                                                                                                                                                                                                                                                                                      | 100 RM   | 0.08                                                         |
|        | 50mm dia                                                                                                                                                                                                                                                                                                      |          |                                                              |
|        | G) Concealed pipe including ceiling chases and making good the walls 15/20 mm normal bore                                                                                                                                                                                                                     | 100 R.M  | 0.88                                                         |
|        | H) 100 mm dia SWG pipes                                                                                                                                                                                                                                                                                       | 100 RM   | 22.91                                                        |
|        | I) 150mm dia SWG pipes                                                                                                                                                                                                                                                                                        | 100 RM   | 26.01                                                        |
|        | J) Fixing square mouth S.W Gully trap                                                                                                                                                                                                                                                                         | Each     | 0.40                                                         |
|        | K) Inspection chambers Inside size 0.75 x 0.75 x 1.00 m depth                                                                                                                                                                                                                                                 | Each     | 2.13                                                         |
|        | L) Inspection chamber Inside size 1.20 x 0.90 x 1.00 m to 2.00 depth                                                                                                                                                                                                                                          | Each     | 3.70                                                         |
| 11.    | <b>MISCELLANEOUS</b>                                                                                                                                                                                                                                                                                          |          |                                                              |
|        | A) Lime concrete terracing average 10cm thick with 25mm brick ballast and 50% lime concrete 1:2 (1 Lime putty: 2 surkhi) rammed and finished with gur and belgri finished with gur and belgri treatment and covered with flat brick tiles grouted with cement mortar 1:3 over 12mm layer of cement mortar 1:3 | 100 Sq.M | 6.63                                                         |

| Sl.No. | Description                                                                                                                             | Units    | Quantity of cement per unit /<br>Quantity of work in quintal |
|--------|-----------------------------------------------------------------------------------------------------------------------------------------|----------|--------------------------------------------------------------|
|        | B) Providing and laying average, 10cm thick cement based water proofing treatment with brick bat coba as per manufactures specification | 100 Sq.M | (*)                                                          |
|        | C) Providing and filling with waterproof brickbat cement concrete                                                                       | 100 Sq.M | (*)                                                          |
|        | D) Rough cast or pebble dash plaster in two layers under layer 12mm cement plaster 1:4 and top layer 10mm cement plaster 1:3            | 100 Sq.M | 11.59                                                        |
|        | E) Plinth protection 50mm thick in cement concrete 1:3:6 over 75mm bed of dry brick ballast                                             | 100 Sq.M | 11.0                                                         |
|        | F) Brick edging 10cm wide 10cm deep to plinth protection including grouting with cement mortar 1:4                                      | 100 Sq.M | 1.14                                                         |
|        | G) Fixing of precast cement concrete jalli 1:2:4 in cement mortar 1:3                                                                   | 100 Sq.M | 1.64                                                         |
|        | i) 50mm thick                                                                                                                           |          |                                                              |
|        | ii) 40mm thick                                                                                                                          |          |                                                              |
|        | iii) 25mm thick                                                                                                                         |          |                                                              |
|        | H) CC blocks for hold fasts                                                                                                             | 100 Nos. | 1.10                                                         |
|        | i) CC blocks for hold fasts for windows                                                                                                 | 100 Sqm. | 1.30                                                         |

(\*) As specified by the specialist firm at the time of tendering

**NOTE:** For any other item of work, Site Engineer shall refer to the CPWD specification and norms. In case no coefficient is available for a specific item, the decision of Chief Engineer, shall be final and binding on the contractor.



ANNEXTURE I

LIFE INSURANCE CORPORATION OF INDIA  
**FORM OF GUARANTEE FOR WATERPROOFING**

(To be given by Waterproofing Agency)

Name of the work: \_\_\_\_\_

Location & Approximate Area: \_\_\_\_\_

Name of the Main contractor: \_\_\_\_\_

Name of Water Proofing Agency

M/s. \_\_\_\_\_

\_\_\_\_\_

We M/s. \_\_\_\_\_

\_\_\_\_\_ hereby guarantee that the surfaces treated by us for waterproofing in the above work, for

M/s. \_\_\_\_\_

the General builders Contractors for the above work, shall remain entirely watertight. Should, however, due to any unforeseen defect left out in the work carried out by us at the time of execution of the work, there be any leakage from any surface treated by us during the period of **ten years** from the date of virtual completion of work i.e. from \_\_\_\_\_ to \_\_\_\_\_ the same shall be rectified by us without any cost to the Life Insurance Corporation of India. However, we shall not be responsible in any way if our work is tampered with or if the body of the structure is damaged due to sinking, cracking and/or by any other act of God. The intimation received from LIC of India during Guarantee period shall be deemed to have been received from Main Builder's Contractor and inspection as well as necessary work shall be carried out and reported upon by us forthwith.

**Signature of Waterproofing Agency**

**Signature of the Main Builders' Contractor**

ANNEXURE - "S"

LIFE INSURANCE CORPORATION OF INDIA  
**PROFORMA FOR REQUEST FOR PAYMENT TO CEMENT SUPPLIERS**  
**BY LIC ON BEHALF OF CONTRACTORS**

Dated: \_\_\_\_\_

(Refer clause 4.5 of General Preambles to Schedule of Quantities)

To,  
CHIEF ENGINEER  
LIC OF INDIA

Dear Sir,

Name of work:

1. The cement balance in stock as on day is \_\_\_\_\_ tonnes. It is expected to last upto \_\_\_\_\_. We now require \_\_\_\_\_ tonnes of additional quantity for the work upto \_\_\_\_\_. We shall be grateful if you arrange to place order and make payment of the cement to any one of the approved suppliers at approved rate on our behalf. We accept the responsibility of taking proper delivery of cement and all other responsibilities as per the relevant clause of tender referred to above.

**NOT APPLICABLE**

2. The order for transport of cement may also be placed on our behalf by you on any one of the approved transport agency at approved rate. The transport charges and octroi charges etc. shall be paid by us initially and the original bills/receipts produced to you later on for reimbursement.

3. We note that in case any quantity of cement is not delivered at site of work within reasonable time, the advance amount paid by you towards the quantity of cement to be supplied shall immediately be recovered from us from any amount due to us including Security Deposit lying with you.

Yours faithfully,

**(SIGNATURE OF CONTRACTOR)**

ANNEXURE - "T"

LIFE INSURANCE CORPORATION OF INDIA  
**PROFORMA FOR REQUEST FOR PAYMENT TO  
STEEL SUPPLIERS BY LIC ON BEHALF OF CONTRACTOR**

Dated : \_\_\_\_\_

(Refer Clause 5.5 of General Preambles to Schedule of Quantities)

To  
THE CHIEF ENGINEER  
LIC OF INDIA

Dear Sir,

Name of Work: \_\_\_\_\_

We now require the following steel for the work. The approximate balance quantity at site for the required categories of steel as on date and further additional quantities are mentioned below.

| <u>Category of Steel</u> | <u>Balance quantity at site</u><br>MT | <u>Further quantity required</u><br>MT |
|--------------------------|---------------------------------------|----------------------------------------|
|--------------------------|---------------------------------------|----------------------------------------|

**NOT APPLICABLE**

We shall be grateful if you arrange to place order and make payment for the steel to anyone of the approved steel suppliers on our behalf. We accept the responsibility of taking proper delivery of steel and all other responsibilities as per the relevant clause of tender referred to above.

1. The order for transport of steel may also be placed on any of the approved transport agency at approved rate on our behalf by you. The transport charges and octroi charges etc., shall be paid by us initially and the original bills/receipts produced to you later on for reimbursement.
2. We note that in case any quantity of steel is not delivered at site of work within reasonable time, the advance amount paid by you towards quantity of steel to be supplied shall immediately be recovered from us from any amount due to us including Security Deposit lying with you.

Yours faithfully,

**(SIGNATURE OF CONTRACTOR)**

**SCHEDULE "A"**

TO BE READ IN CONNECTION WITH ANNEXURE "P"

- a. Contractor shall note that although the materials and the basic prices for the same have been mentioned in this schedule, the responsibility of procurement of the materials shall rest with the Contractor.
- b. Contractor shall consider in his quoted rates for the relevant item/s the basic rate mentioned in this schedule. The basic rates for the items mentioned in this schedule are ex-work site and are inclusive of:-
  - i. Cost of material,
  - ii. All taxes levied by Central/State Government/Local Bodies, such as excise duty, sales tax, octroi/Town duty etc.
  - iii. Transportation including transit insurance from factory/suppliers/stockiest/ dealers go-down/ shop/depot including loading and unloading charges at all points except unloading at work site.
  - iv. All other expenses including wastage shall be to the Contractor's account and shall be included in his quoted rates.
  - v. **Contractor shall purchase those materials which basic price is mentioned in the tender items (other than cement and steel) in required quantities from the approved source after the Chief Engineer/Dy.Chief Engineer has approved the price of materials to be purchased.**
  - vi. Contractor shall produce the vouchers/bills in support of the material purchased and brought by him from the approved supplier.
- c. Storage and safety of the material shall be the Contractors responsibility.

**ANNEXURE -U**

**(ON STAMP PAPER OF REQUISITE VALUE)**

**FORM OF GUARANTEE FOR ANTI-TERMITE**

Name of the project:-

Location and Approx. plinth area:-

We hereby guarantee that the area treated by us for Anti-termite in the above work shall remain Termite-proof. Should, however, due to any reasons, there be any traces of termite within the area treated by us during the period of ten years from the date of virtual completion of the work i.e. from..... to.....the same shall be rectified by us without any extra cost to the Life Insurance Corporation of India.

\_\_\_\_\_  
Signatures of the Contractor

(ON STAMP PAPER OF REQUISITE VALUE)

**FORM OF GUARANTEE FOR ANTI-TERMITE**

Name of the project:-

Location and Approx. plinth area:-

Free Maintenance Guarantee-Anti-termite Work  
by M/s \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

We, The.....hereby guarantee that the areas treated by us for Anti-termite in the above work, for M/s ....., the General Builders, contractors for the above work, shall remain termite-proof. Should, however, due to any reasons, there be any traces of termite during the period of ten years from the date of virtual completion of the work i.e. from ..... to.....the same shall be rectified by us without any extra cost to the Life Insurance Corporation Of India.

The intimation received from the LIC of India during guaranty period shall be deemed to have been received from main contractors and inspection as well as necessary work shall be carried out and reported upon by us forthwith.

\_\_\_\_\_  
SIGNATURE OF ANTI-TERMITE AGENCY

\_\_\_\_\_  
SIGNATURES OF THE GENERAL BUILDER'S CONTRACTOR.

**LIST OF PRINCIPAL / APPROVED MAKES FOR CIVIL WORKS**

| SL. No. | ITEM                                             | MAKES/AGENCIES/BRANDS                                 |
|---------|--------------------------------------------------|-------------------------------------------------------|
| 1.      | <b>GI PIPES</b>                                  | Jindal<br>Zenith<br>Apollo<br>GST<br>Prakash<br>QST   |
| 2.      | <b>GI PIPES FITTINGS</b>                         | R-Brand<br>K.S. Brand<br>Zoloto<br>RR<br>SSS<br>NMC   |
| 3.      | <b>COPPER PIPES /TUBES</b>                       | Rajco Metal Industries<br>B.P. Conex<br>Comap         |
| 4.      | <b>MULTI LAYER COMPOSITE PIPES</b>               | Ki-TEC<br>Kisan<br>Flowguard CPVC Astral              |
| 5.      | <b>PVC PIPES AND FITTINGS</b>                    | Chemplast<br>Prince<br>Supreme<br>Finolex<br>Oriplast |
| 6.      | <b>UPVC (UNPLASTICIZED PIPES &amp; FITTINGS)</b> | Prince<br>Supreme<br>Paras                            |
| 7.      | <b>GATE VALVES, GLOBE VALVE</b>                  | Leader<br>Kirloskar<br>Zoloto<br>Orient               |
| 8       | <b>FOOT VALVES, CHECK VALVE</b>                  | Kirloskar<br>Leader<br>Ashoka                         |
| 9       | <b>WATER METERS</b>                              | Capstan<br>Anandaasahi<br>Dasmesh<br>Remco            |
| 10      | <b>FERRULES</b>                                  | Leader<br>Hindco<br>Neta<br>Annapurna                 |

| SL. No. | ITEM                                                                | MAKES/ AGENCIES/ BRANDS                                                      |
|---------|---------------------------------------------------------------------|------------------------------------------------------------------------------|
| 11.     | <b>BIB COCKS, STOP COCKS, PILLAR TAPS</b>                           | Jaguar (Continental Series)<br>Marc (Orient Series)<br>Essco<br>ARK<br>GEM   |
| 12.     | <b>LOW LEVEL FLUSHING CISTERNS (PVC/CERAMIC)</b>                    | Parryware<br>Cera<br>Hindware<br>Commander                                   |
| 13.     | <b>VITREOUS SANITARY WARE LIKE WC, WASH BASIN, URINALS, EWC ETC</b> | Parryware<br>Cera<br>Hindware<br>Neycer                                      |
| 14.     | <b>PLASTIC SEAT AND COVER</b>                                       | Commander<br>Parryware<br>Bestolite<br>Duroshine                             |
| 15.     | <b>BATH ROOM FITTINGS</b>                                           | Jaguar (Continental Series)<br>Essco<br>GEM<br>ARK<br>Marc (Oriental Series) |
| 16.     | <b>C.I. PIPES &amp; FITTINGS</b>                                    | Hind<br>BIS<br>BIC<br>Neco                                                   |
| 17.     | <b>C.I. NAHANI TRAP</b>                                             | BIC<br>SKF<br>NECO<br>RAJCO                                                  |
| 18.     | <b>SW PIPES</b>                                                     | HIND<br>PERFECT<br>BURNS                                                     |
| 19.     | <b>PVC CABINET MIRROR</b>                                           | Commander                                                                    |
| 20.     | <b>SLUICE VALVE</b>                                                 | Leader<br>Kirloskar                                                          |
| 21.     | <b>HDPE/LDPE/LLDPE WATER STORAGE TANKS</b>                          | Sintex<br>Polycon<br>G & P                                                   |



| SL. No. | ITEM                                         | MAKES/AGENCIES/BRANDS                                                                                 |
|---------|----------------------------------------------|-------------------------------------------------------------------------------------------------------|
| 22.     | <b>CERAMIC / GLAZED TILES</b>                | Nitco<br>Somany<br><br>Kajaria<br><br>Euro<br>H.R. Johnson                                            |
| 23.     | <b>VITRIFIED TILES</b>                       | Nitco<br>Somany<br><br>Kajaria<br><br>RAK<br>EURO                                                     |
| 24.     | <b>PLY WOOD (BWR,BLOCK BOARD)</b>            | Kitply<br>Archid<br>Green Ply<br>Century Ply<br>Bhutan Ply<br>Sharon<br>Anchor<br>Swastik<br>National |
| 25.     | <b>FLOAT GLASS</b>                           | Saint Gobin<br>Modi Guard<br>Triveni Sheet Glass<br>Indo Asahi Glass Co.<br>Tata<br>Atul              |
| 26.     | <b>PVC DOORS &amp; DOOR FRAMES</b>           | Rajshri<br>Sintex<br>Supreme                                                                          |
| 27.     | <b>ALUMINIUM EXTRUDED SECTIONS</b>           | Hindal<br><br><br>Jindal<br><br>Indal<br>Hindalco                                                     |
| 28.     | <b>STAINLESS STEEL KITCHEN SINKS</b>         | Nirali<br>Farnkee<br>Jayna<br>Diamond<br>Neelkanth                                                    |
| 29.     | <b>PRELAMINATED/ VENEERED PARTICLE BOARD</b> | Novopan<br>Green Lam<br>Kitlam<br>Archid Lam<br>Swastik                                               |

| SL. No. | ITEM                        | MAKES/AGENCIES/BRANDS                                                                                                                       |
|---------|-----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|
| 30.     | <b>FLUSH DOOR SHUTTERS</b>  | Kutty Flush Door<br>Century<br>Green Ply<br>Shiva Hari Plywood Ltd.(Corbett)<br>Anchor Ply<br>Swastik Ply<br>Western India<br>Parvathi Wood |
| 31.     | <b>DECORATIVE LAMINATES</b> | Green Lam<br>Merino<br>Sunmica/Formica<br>Century<br>Durian<br>Sundek<br>Anchor<br>Decolam                                                  |
| 32.     | <b>FLOOR SPRINGS</b>        | Everite<br>Hardwyn<br>Efficient Gadgets<br>Garness<br>Dormer                                                                                |
| 33.     | <b>VENEERS</b>              | Decowood<br>Euro Veneers<br>Durian<br>Green Lam                                                                                             |
| 34      | <b>MDF BOARDS</b>           | Duratuff<br>Nuwood<br>Century<br>Novopan<br>Kitply<br>Green Ply                                                                             |
| 35      | <b>ADHESIVE</b>             | Fevicol SH<br>Araldite<br>Ciba Giegy<br>Mowiool HV of Mafatlal                                                                              |
| 36      | <b>WOOD PRESERVATIVES</b>   | Bison<br>Godrej<br>Kot                                                                                                                      |

| SL. No. | ITEM                           | MAKES/AGENCIES/BRANDS                                                                                                      |
|---------|--------------------------------|----------------------------------------------------------------------------------------------------------------------------|
| 37      | <b>HARDWARE FITTINGS</b>       | Jyoti<br>Argent<br>C.I.E.F.<br>Classic<br>Everite<br>Metaco India<br>JH Aluminium<br>PV Radhakrishna<br>Etalite<br>Hardwin |
| 38      | <b>DOOR CLOSER</b>             | Everite<br>Hardwyn<br>Efficient Gadgets<br>Ebco<br>Dorma<br>Garness                                                        |
| 39      | <b>DRAWER SLIDERS</b>          | Efficient Gadgets<br>Ebco<br>Etahoa<br>Sisco                                                                               |
| 40      | <b>LOCK</b>                    | Godrej<br>Golden<br>Efficient Gadgets<br>Mark<br>Sheet<br>Vision<br>Dorma                                                  |
| 41      | <b>MIRRORS</b>                 | Atul<br>Sun<br>Commander<br>Modi Guard<br>Saint Gobin<br>Globe                                                             |
| 42      | <b>WATER PROOFING COMPOUND</b> | Impermo<br>Cico<br>Pidliite<br>Roff<br>Choksey<br>Hindustan –Ciba Gaigey<br>Accoproof<br>Sika<br>Fosroc                    |

| SL. No. | ITEM                                              | MAKES/AGENCIES/BRANDS                                                                                                                                                      |
|---------|---------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 43      | <b>STEEL WINDOWS AND VENTILATORS</b>              | Agew Steel Mfg. Co. Ltd.<br>Sen Harvic<br>Hopes<br>Diana Casement<br>Madhu Industries Bangalore<br>Multiwin Unique Metal Windows<br>Ankur Industries<br>Modern Fabricators |
| 44      | <b>AC PIPES/SHEETS</b>                            | Charminar<br>Everest<br>Visakha<br>Orient<br>Ramson                                                                                                                        |
| 45      | <b>SPECIAL PROTECTIVE &amp; DECORATIVE FINISH</b> | Snowcem Paint<br>Asian Paints<br>Berger<br>Jenson & Nicholson<br>Kansai Nerolac<br>ICI<br>Godawari                                                                         |
| 46      | <b>OIL BOUND DISTEMPER</b>                        | Asian<br>Berger<br>Jenson & Nicholson<br>ICI<br>Kansai Nerolac<br>Godawari                                                                                                 |
| 47      | <b>CEMENT PAINT</b>                               | Snowcem Plus<br>Berger<br>Asian Paints<br>Jenson & Nicholson<br>Kansai Nerolac<br>ICI<br>Godawari                                                                          |
| 48      | <b>SURFACE TEXTURE</b>                            | Heritage (Bakelite Hylam Ltd.)<br>Spectrum                                                                                                                                 |

| SL. No. | ITEM                                                                                       | MAKES/AGENCIES/BRANDS                                                                                |
|---------|--------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|
| 49      | <b>TEXTURE PAINT</b>                                                                       | Snowcem India Ltd. Santex Matt<br>Asian<br>Jenson & Nicholson<br>Berger<br>Kansai Nerolac            |
| 50      | <b>ENAMEL PAINT<br/>PRIMERS/READY MIXED<br/>PUTTY FOR WOOD WORK ,<br/>IRON &amp; STEEL</b> | Asian<br>Berger<br>Jenson & Nicholson<br>Kansai Nerolac<br>ICI<br>MRF<br>Godawari                    |
| 51      | <b>WALL PUTTY</b>                                                                          | Birla wall Care<br>Snowcem paints<br>JK<br>Asian paints                                              |
| 52      | <b>EXTERIOR EMULSION</b>                                                                   | Asian Paints - Apex<br>Berger Paints<br>Kansai Nerolac<br>MRF<br>Jenson Nicholson<br>ICI<br>Godawari |
| 53      | <b>CEMENT CONCRETE PIPE</b>                                                                | The Indian Hume Pipe<br>Premier Pre-stressed Co.                                                     |
| 54      | <b>EXPANSION JOINT BOARD</b>                                                               | Shalimar Tar Products<br>Lloyds Insulations<br>Fosroc<br>Shalitex                                    |
| 55      | <b>FALSE CEILING</b>                                                                       | India Gypsum<br>Armstrong<br>Daikin<br>Insula<br>QED Panels                                          |
| 56      | <b>VERTICAL BLINDS</b>                                                                     | Vista Levlor<br>TRAC<br>MAC<br>Marvel                                                                |

| SL. No. | ITEM                                 | MAKES/AGENCIES/BRANDS                                                                          |
|---------|--------------------------------------|------------------------------------------------------------------------------------------------|
| 57      | <b>ADHESIVE FOR TILE FIXING</b>      | Roffe<br>Balendura<br>Cera Bond<br>Fosroc<br>Choskey Chemicals<br>Dr. Fixit<br>Sika<br>Sunanda |
| 58      | <b>PAVING TILES</b>                  | Eurocon<br>Ultra<br>Duracrete                                                                  |
| 59      | <b>PVC FLOORING</b>                  | Flora<br>Armstrong                                                                             |
| 60      | <b>VINYL FLEXIBLE FLOORING</b>       | Wonder Floor<br>Armstrong<br>BHOR<br>Rikvin<br>Tusker                                          |
| 61      | <b>FIBRE GLASS DOORS</b>             | Master Craft                                                                                   |
| 62      | <b>SS/CP FRICTION HINGES</b>         | Ebco<br>Jyoti<br>Everest<br>Magnum                                                             |
| 63      | <b>SOFT BOARD</b>                    | Jolly Board                                                                                    |
| 64      | <b>SCREW</b>                         | Nettelefold<br>GKW                                                                             |
| 65      | <b>FIBRE REINFORCEMENT COMP.DOOR</b> | Loknath Unique                                                                                 |

**APPROVED MAKES OF MATERIALS FOR ELECTRICAL, FIRE ALARM & STRUCTURAL CABLING WORK**

| SR. NO | MATERIAL                                            | MAKES                |                  |                  |
|--------|-----------------------------------------------------|----------------------|------------------|------------------|
|        |                                                     | (a)                  | (b)              | (c)              |
| 1      | COPPER CONDUCTOR PVC INSULATED FR GRADE WIRES       | (a) FINOLEX          | (b) HAVELLS      | © V GUARD        |
|        |                                                     | (d) RRS              |                  |                  |
|        |                                                     |                      |                  |                  |
| 2      | PVC INSULATED ARMOURED CABLES ( LT/HT )             | (a)FINOLEX           | (b) FORT GLOSTER | © CCI            |
|        |                                                     | (d) RR KABLE         | (e) DELTON       |                  |
|        |                                                     |                      |                  |                  |
| 3      | MAIN SWITCH WITH HRC FUSES                          | (a) L & T            | (b)SIEMENS       | © GE             |
|        |                                                     | (d) ENGLISH ELECTRIC | (e) STANDARD     | (f) HAVELLS      |
| 4      | MAIN SWITCHES WITH REWIRABLE FUSE                   | (a) L & T            | (b) CROMPTON     | © STANDARD       |
|        |                                                     | (d) HAVELS           |                  |                  |
|        |                                                     |                      |                  |                  |
| 5      | MCCB                                                | (a) SIEMENS          | (b) L & T        | © SCHNIEDER i MJ |
|        |                                                     | (d) LEGRAND          |                  |                  |
|        |                                                     |                      |                  |                  |
| 6      | MCB / ELCB / ELMCB / DB                             | (a) LEGRAND          | (b) SIEMENS      | © HAGGER         |
|        |                                                     | (d) SCHNEIDER MJ     |                  |                  |
|        |                                                     |                      |                  |                  |
| 7      | CHANGE OVER SWITCH / SWITCH FUSE UNIT UPTO 100 AMP  | (a) HPL              | (b) L & T        | © HAVELLS        |
|        |                                                     | (d) STANDARD         | (e) SIEMENS      |                  |
|        |                                                     |                      |                  |                  |
| 8      | CHANGE OVER SWITCH / SWITCH FUSE UNIT ABOVE 100 AMP | (a) HPL              | (b) L & T        | © SIEMENS        |
|        |                                                     |                      |                  |                  |
| 9      | RISING MAINS                                        | (a) ENGLISH ELECTRIC | (b) GEC          | © SCHNIEDER      |

| SR.<br>NO | MATERIAL                                                 | MAKES           |                 |             |
|-----------|----------------------------------------------------------|-----------------|-----------------|-------------|
|           |                                                          | (a)             | (b)             | (c)         |
| 10        | PVC CONDUIT ( ISI MARK )                                 | (a) PRECISION   | (b) AVON PLAST  | © ESSARKE   |
|           |                                                          | (d) SUDHAKAR    | (e) KALINGA     | (f) AKG     |
| 11        | PVC CASING CAPING                                        | (a) PRECISION   | (b) KALINGA     | © AKG       |
|           |                                                          | (d) SUDHAKAR    | (e) DIAMOND     |             |
| 12        | M.S. CONDUIT                                             | (a) SUPREME     | (b) BEC         | © NIC       |
|           |                                                          | (d) AKG         |                 |             |
| 13        | FLOOR TRUNKING SYSTEM                                    | (a) LEGRAND     | (b) MK ELECTRIC | © PRECISION |
|           |                                                          | (d) MODI        |                 |             |
| 14        | G.I. PIPE                                                | (a) JINDAL      | (b) SENITH      | © PRAKASH   |
|           |                                                          | (d) TATA        | (e) GST         | (f) APOLLO  |
| 15        | MODULAR SWITCHES, ACCESSORIES & ELECTRONIC REGULATOR     | (a) ANCHOR ROMA | (b) SSK         | © LEADER    |
|           |                                                          | (d) CRABTREE    | (e) MK          |             |
| 16        | NON MODULAR SWITCHES, ACCESSORIES & ELECTRONIC REGULATOR | (a) ANCHOR      | (b) LEADER      | © SSK       |
|           |                                                          | (d) CPL         |                 |             |
| 17        | INDUSTRIAL PLUG & SOCKET                                 | (a) LEGRAND     | (b) HAVELLS     | © CROMPTON  |
|           |                                                          | (d) HAGGER      | (e) STANDARD    |             |
| 18        | CEILING / EXHAUST / WALL FAN                             | (a) USHA        | (b) CROMPTON    | © ORIENT    |
|           |                                                          | (d) BAJAJ       | (e) ALMONARD    |             |
| 19        | INDOOR LIGHT FITTINGS                                    | (a) PHILIPS     | (b) WIPRO       | © CROMPTON  |
|           |                                                          | (d) GE          |                 |             |
| 20        | OUTDOOR LIGHT FITTINGS                                   | (a) PHILIPS     | (b) WIPRO       | © CROMPTON  |
|           |                                                          | (d) GE          | (e) K i LITE    |             |



| SR.<br>NO | MATERIAL                 | MAKES            |             |          |
|-----------|--------------------------|------------------|-------------|----------|
|           |                          | (a)              | (b)         | ©        |
| 21        | CABLE GLANDS             | COMET            | DOWELLS     | BRACO    |
|           |                          | SIEMENS          |             |          |
| 22        | LUGS                     | DOWELLS          | COMET       |          |
| 23        | CONNECTORS               | ELMEX            | CONNECTWELL | PHOENEX  |
| 24        | FLUORESCENT LAMP         | PHILIPS          | OSRAM       | CROMPTON |
|           |                          | BAJAJ            | GEC         |          |
| 25        | COMPACT FLUORESCENT LAMP | PHILIPS          | OSRAM       | HAVELLS  |
|           |                          | WIPRO            |             |          |
| 26        | MOTOR STARTER            | SIEMENS          | L & T       | CROMPTON |
| 27        | MONOBLOCK PUMP           | KIRLOSKAR        | CROMPTON    | CRI      |
| 28        | LIGHTENING ARRESTOR      | PACTIL           | HECO        | ATLAS    |
|           |                          | G.K. ELECTRICALS |             |          |
| 29        | TRANSFORMER              |                  |             |          |
| (i)       | UPTO 500 KVA             | PACTIL           | EMCO        | CROMPTON |
|           |                          | KIRLOSKAR        | GEC         | TESLA    |
| (ii)      | ABOVE 500 KVA            | KIRLOSKAR        | GEC         | ©        |
| 30        | A.B. SWITCH & D.O. FUSE  | PACTIL           | JENCO       | CROMPTON |
|           |                          | ATLAS            |             |          |
| 31        | SELECTOR SWITCH          | KAYCEE           | SIEMENS     | C & S    |
| 32        | INDICATING LAMPS         | VAISHNO          | ESSEN       | PHILIPS  |
|           | CONTACTORS               | SIEMENS          | L & T       | ABB      |
|           |                          | SCHNIEDER        |             |          |
|           |                          |                  |             |          |

| SR.<br>NO | MATERIAL                                                      | MAKES             |                         |                   |
|-----------|---------------------------------------------------------------|-------------------|-------------------------|-------------------|
|           |                                                               | (a) AMP           | (b) MECO                | © AE              |
| 33        | MEASURING INSTRUMENTS                                         | (d) ENERCON       | (e) PROK-DV&#246;s      |                   |
| 34        | PF IMPROVEMENT<br>CAPACITOR & APFC PANEL                      | (a) EPCOS         | (b) NEPTUNE             | © L & T           |
|           |                                                               | (d) CROMPTON      |                         |                   |
| 35        | RELAY FOR AUTOMATIC PF<br>IMPROVEMENT                         | (a) EPCOS         | (b) CONZERVE            | © L & T           |
| 36        | CURRENT TRANSFORMER                                           | (a) AE            | (b) RISHABH             | © KUPPA           |
|           |                                                               | (d) L & T         |                         |                   |
| 37        | DATA CABLES & FACTORY<br>MADE PATCH CHORDS                    | (a) LEGRAND       | (b) D LINK              | © FINOLEX         |
|           |                                                               | (d) MOLEX         | (f) AMP                 |                   |
| 38        | INFORMATION OUTLET / RJ<br>45 CONNECTORS / RJ – 11<br>SOCKETS | (a) D LINK        | (b) LEGRAND             | © MOLEX           |
|           |                                                               | (d) SYSTEMAX      | (e) AMP                 |                   |
| 39        | TELEPHONE WIRES                                               | (a) FINOLEX       | (b) DELTON              | © HAVELLS         |
|           |                                                               | (d) RR KABLE      |                         |                   |
| 40        | RG 6 CABLE FOR TV                                             | (a) FINOLEX       | (b) DELTON              | © NATIONAL        |
| 41        | JACK PANEL                                                    | (a) D LINK        | (b) LEGRAND             | © MOLEX           |
|           |                                                               | (d) SYSTEMAX      | (e) VALRACK             | (f) AMP           |
| 42        | RACK                                                          | (a) VALRACK       | (b) DIGITRON            | © HCL             |
|           |                                                               | (d) A LINK        |                         |                   |
| 43        | FIRE ALARM PANEL                                              | (a) HONEY<br>WELL | (b) CARMEL              | © ZICOM           |
|           |                                                               | (d) NOTIFIER      | (e) MIRCOM/SE<br>CUTRON | (f) MORLEY<br>IAS |

| SR. NO. | MATERIAL                                       | MAKES             |                     |                     |
|---------|------------------------------------------------|-------------------|---------------------|---------------------|
| 44      | SMOKE / HEAT DETECTOR                          | (a) APOLLO        | (b) MORLEY IAS      | © EDWARD            |
|         |                                                | (d) SYSTEM SENSOR | (e) HONEY WELL      | (f) MIRCOM/SECUTRON |
| 45      | MANUAL CALL POINT / HOOTER/ RESPONSE INDICATOR | (a) HONEY WELL    | (b) ZICOM           | © NOTIFIER          |
|         |                                                | (d) SIMPLEX       | (e) MIRCOM/SECUTRON | (f) CARMEL          |

### Note:

All Switch-gear and the Distribution Boards should be clearly marked with Red, Yellow, Blue and Black colour for phases and neutral. All busbar enclosures Angle iron frame and switch-gears should be painted with battleship grey oil paint. Danger and caution boards at appropriate places on main boards and Distribution Boards should be fixed. All controlling main switches on main boards and distribution boards should clearly indicate with white oil paint lettering the floor and section controlled by it. All equivalent alternative materials used on the job will have to be approved by Chief Engineer of LIC before it is actually used. If any item is installed without prior approval, the contractor will be asked to dismantle the installation and use materials as specified. The insulated wire used for concealed wiring shall be with Red, Yellow, Blue colour for respective phases, Black for neutral & Green for earth wires.

### LIST OF PRINCIPAL / APPROVED MAKES FOR FIRE FIGHTING WORKS

| Sl. No. | ITEM                                                                                     | MAKE                                                                    |
|---------|------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|
| 1       | Pressure Boosting Terrace Pump                                                           | KIRLOSKAR / CROMPTON GREAVES / CRI                                      |
| 2       | Hydrant (Landing) Valve. Conforming to IS-5290                                           | NEW AGE / EVERS SAFE / MINIMAX / SAFE GUARD                             |
| 3       | Fire delivery hose-IS-636-type-B fitted with delivery hose coupling-conforming to IS-903 | NEW AGE / EVERS SAFE/CRC / JAYSHREE                                     |
| 4       | Short branch pipe universal-conforming to IS-2871                                        | EVERSAFE / VIKING/GE / MINIMAX / NEWAGE / SAFE GUARD                    |
| 5       | Hose cabinet :                                                                           | NEW AGE / EVERS SAFE / MINIMAX / SAFE GUARD                             |
| 6       | Isolation valve                                                                          | KIRLOSKAR / LEADER / ZOOTO / ORIENT                                     |
| 7       | Non-return valve                                                                         | KIRLOSKAR / LEADER / ASHOKA                                             |
| 8       | Fire service inlet                                                                       | EVERSAFE /NEW AGE / MINI MAX / SAFE GUARD                               |
| 9       | First Aid Hose Reel Swinging Type:-                                                      | EVERSAFE / NEW AGE / MINI MAX / SAFE GUARD.                             |
| 11      | Piping                                                                                   | JINDAL / ZENITH / APOLLO / GST / PRAKASH / QST                          |
| 12      | Pressure Gauge                                                                           | H GURU / DWYER / FIEBIG / INDFOS / DANFOSS                              |
| 13      | Butterfly Valve                                                                          | AUDCO / DANFOSS / CASTLE                                                |
| 14      | Fire Alarm Control Panel                                                                 | HONEY WELL / NOTIFIER / MORLEY IAS / MICROM / SECUTRON / CARMEL / ZICOM |
| 15      | Manual call Point                                                                        | HONEY WELL / ZICOM / NOTIFIER / SIMPLEX / MICROM / SECUTRON / CARMEL    |
| 16      | Hooter                                                                                   | HONEY WELL / ZICOM / NOTIFIER / SIMPLEX / MICROM / SECUTRON / CARMEL    |
| 17      | Connecting wire / Cable                                                                  | FINOLEX / HAVELLS / V GUARD / RR CABLES.                                |
| 18      | PVC Conduit                                                                              | AKG / PRECESSION / AVON PLAST / ESSARKE / SUDHAKAR / KALINGA            |
| 19      | Carbon dioxide type portable fire extinguisher                                           | EVERSAFE / FIRESHIELD / MINIMAX / CEASE FIRE                            |
| 20      | ABC type stored pressure portable fire extinguisher                                      | EVERSAFE / FIRESHIELD / MINIMAX / CEASE FIRE                            |
| 21      | Water Co2                                                                                | EVERSAFE / FIRESHIELD / MINIMAX                                         |
| 22      | Amplifier battery backup. With microphone & AUX line.                                    | AHUJA / PHILIPS                                                         |
| 23      | Speaker                                                                                  | AHUJA / PHILIPS                                                         |

**TECHNICAL SPECIFICATIONS FOR BUILDING WORKS****SUB: TENDER FOR BUILDERS WORK, WATER SUPPLY, SANITARY INSTALLATION, ELECTRICAL INSTALLATION, LIFTS AND ANCILLARY WORKS FOR PROPOSED CONSTRUCTION OF 28 NOS. OF OFFICERS' QUARTERS AND 1 NO. OF VIP GUEST HOUSE AT SURYA NAGAR, BHUBANESWAR.****1. EARTH WORK****1. SITE CLEARANCE :**

Contractor's rate shall cover for clearing the site of shrubs, brush wood, under growth and trees not exceeding 30cm. in girth measured at 1 meter above ground before commencement of work. The rubbish which may thus be obtained would be disposed off as directed.

**2. BLOCK LEVEL PLAN:**

Before starting earth work on site, the requisite block level of the entire site shall be taken by the contractor in consultation with Executive Engineer/Superintending Engineer of LIC of India. The record of levels shall be prepared and shall be jointly signed by the contractor and the Executive Engineer/Superintending Engineer countersigned by the concerned Dy.Chief Engineer of LIC of India. The copy of the said level sheet shall be sent to the Chief Engineer of LIC of India for record.

Excavation in trenches/overareas - Rates shall include for cartage of materials outside the/Contractor's own dump including all cost for transportation.

**3. FILLING WITH APPROVED EXCAVATED EARTH:**

The plinth and low laying areas on site shall be first filled in by approved excavated surplus earth, consolidated and quantity of filling measured. Before the item of filling with approved sand/soil brought from outside is operated, the contractor shall take prior permission of the Executive Engineer. The rate of Contractor shall include the filling of approved excavated earth, unless otherwise specified in description of item.

**4. FILLING WITH APPROVED EARTH BROUGHT FROM OUTSIDE BY THE CONTRACTOR:**

- a. Black cotton soil shall not be used for back filling. Soil used for filling shall be free from roots and vegetable moulds and shall be approved by the Executive Engineer.
- b. Earth for filling brought by the contractor from his own source from outside shall be of approved quality and from approved source.

**5. METHOD OF EARTH FILLING:**

Earth filling shall be in layers not exceeding 15 cms. (30 cms in case of site filling) thick, watered and thoroughly consolidated. All lumps clods are to be broken up so as to allow a regular subsidence of the work through out. The finished surfaces shall be formed to correct lines, levels, slopes, shapes, etc. as directed.

**6. RATES OF EARTH/SAND FILLING BROUGHT FROM OUTSIDE BY THE CONTRACTOR:**

Rates quoted shall include cost of earth, royalty, taxes, octroi, duties, all transport, plant and machinery required for carrying, handling, dumping and consolidation, labour, loading and unloading at all points, stacking, lead and lifts, dumping sectioning, dressing consolidation, making payments and deposits to all concerned (local and Government) authorities. Rates shall also include bailing out surface water due to rains or sub soil water if encountered and dewatering by pumps wherever required.

**7. TEMPORARY DRAINAGE ARRANGEMENTS:**

Adequate drainage arrangement must be made to provide katcha drainage at suitable intervals as directed by the Executive Engineer, so as to prevent flooding in the locality on account of filling, Some gaps may also be kept and suitable pipe drain or katcha culverts be provided so as to keep the area dry. No extra payment will be made for the temporary drainage arrangements so provided.

**8. MODE OF MEASUREMENTS :****i. (Mode of taking cross sectional areas :  
(IN CASE OF FILLING OF LARGE AREAS)**

- a) Before commencing filling in the low lying site detailed cross sections shall be taken at every 5 mtrs or at suitable intervals, as may be required both ways as decided by Executive Engineer. For this purpose a base line shall be fixed along edge of the area and parallel cross sections lines will be fixed at every 5 mtrs. or suitable intervals along this base line. Levels shall be taken at sufficiently close intervals and at salient points along each of these cross section lines. In all cases leveling must precede filling. The cross section along which levels are taken will be permanently demarcated with their starting and terminal points to represent fixed chain age of their respective cross section. all further leveling for finding out quantities will be done on these cross sections only.
- b) In order to fix these base lines and cross section lines etc., before start of work the contractor shall provide the pillars for bench marks at his cost and maintain them till completion of work and till final measurements are recorded. The said pillars for bench marks shall be 25 cms x 25cms brick masonry with plaster.
- c) After levels in a 5 mtrs. (or suitable intervals as may be decided) grid have thus been taken and jointly signed by the contractor and Executive Engineer the filling shall be commenced. The method of quarrying, conveying and filling is left to the contractor who shall however have to get the same approved by Executive Engineer before starting the work. The materials may be quarried by a bull dozer, shovel, etc., and conveyed by trucks to site.

- d) The final measurement of the filling will be with reference to the stipulated level as directed by the Executive Engineer only. Other measurements being treated as purely interim for part payment. Thus the final measurements will be for the quantity inclusive of consolidation that takes place till then.
  - e) The interim payments shall be based on the quantity of filling arrived at by cross sections used on average of existing Ground level and the top levels of filling under development of area. However, for final measurements the quantity of the earth filling should be worked out on sectional method.
  - f) The contractor shall carry out the filling in the area marked by boundary stones as and when directed. No payment shall be made for materials dumped in any other area without the knowledge and permission of the Executive Engineer.
- ii. Interim payments will be made by taking spot levels and thereby arriving at the average depth of filling which will be multiplied with area to arrive at cubical contents.
  - iii. The final measurement will be by section measurements using following formula:
    - A. Area of cross section =  $d/3 \{(\text{first ordinate} + \text{last ordinate}) + 4 (\text{total of even ordinates}) + 2 (\text{total of odd ordinates})\}$  where d = Distance between the ordinates.

The above formula shall be used for odd number of ordinates.

Note: In case the numbers of ordinates are even, the area of last section shall be computed on the basis of average ordinate of last section.

    - B. Volume =  $D/3 \{(\text{area of first section} + \text{Area of last section}) + 4 (\text{total of areas of even sections}) + 2 (\text{total of areas of odd sections})\}$

Where D = Distance between the Section.

NOTE: The above formula shall be used for odd number of sections. In case the number of section is even the volume of last section shall be computed by average method.
  - iv. **The net quantity of filling for payment shall be arrived at by applying five percent (5%) deductions from the total consolidated quantity of filling computed as above.**

## **2. CONCRETE WORK**

### **GENERAL :**

P.C.C shall mean Plain Cement Concrete.

R.C.C. shall mean Reinforced Cement Concrete.

R.M.C shall mean Ready Mixed Concrete

1. All concrete specified in this tender shall be ordinary mix./ Design Mix/ Ready Mix concrete.

### **2. MIXES OF CONCRETE:**

Concrete used shall be in volumetric mix such as 1:4:8, 1:3:6, 1:2:4, 1:1.5:3, 1:1:2, etc. (Cement: Sand: Stone Chips) / Design Mix/ RMC such as M20, M25 etc.

### **3. WORKABILITY:**

Workability of concrete should be controlled by direct measurement of water content, making allowance for any surface water in the fine and coarse aggregates. The slump test or compacting factor test shall be carried out at intervals as directed by the Corporation's Engineer. The slump test is suitable for slump of 5 cm. to 15 cm.

### **4. ALLOW IN RATES FOR CONCRETE ITEMS:**

Apart from various factor mentioned elsewhere in the tender, rates quoted for all concrete items shall include for:-

- a) All labour, materials, use of equipments, tools and plants etc.
- b) All necessary operations for the proper volume batching, mixing, handling, transporting, placing, directed, hacking of concrete surfaces where they have to receive plaster (but the plaster on concrete surfaces shall be measured and paid separately under respective plaster items) etc.
- c) Pouring concrete around reinforcement for reinforced concrete work but reinforcement shall be measured and paid for separately, unless otherwise stated in the tender.
- d) Rates quoted for all concrete items shall include for concreting of structural members of any shape and sections as per drawings including providing slopes to slabs, beams, chajjas, canopies etc. wherever required. Form work shall be measured and paid separately.
- e) Allowing work of another agencies being carried out by them like laying conduits, boxes, pipes, clamps etc. as directed before laying concrete and coordinating with other agencies viz, electrical, sanitary ,air conditioning and ventilation Contractor and other agencies working on site.



- (f) Filling the bolt holes (of the shuttering) on concrete surface with cement mortar (1:3) and finishing the same as directed.

## **5. FORM WORK:**

- a) Irrespective of what is stated in general specifications for builder's work, trade preambles for "CONCRETE", contractor's rates quoted for concrete items shall be exclusive of form work. Formwork for all concrete items shall be measured and paid for separately. Form work or shuttering shall be water tight and for all concrete of mix 1:2:4 and higher grades shall be of timber/Steel/Plywood unless otherwise specified. Area of shuttering in contact with concrete surface shall be measured for payment purposes.
- b) Unless otherwise stated, rates quoted for formwork shall include columns /slabs /beams etc. at regular floor heights upto 3.5 meter or at smaller heights as shown on the drawings.
- c) The materials used for shuttering, if not confirming to the specifications required for providing waterproof shuttering, shall be rejected.
- d) For the purpose of measurement of formwork for external side of external/end beams full heights from top of slab to bottom of beams shall be considered under formwork for the beams.

## **6. ALLOW IN RATES FOR FORM WORK:**

Apart from various factors mentioned elsewhere in the tender, rates quoted for the formwork items shall include for:-

- a) All labour, materials, use of equipments, tools, nails, bolts, screws, Centering, oiling etc. required for formwork specified in the tender.
- b) All necessary operation for the proper erection and removal of the formwork when directed.
- c) For necessary provision in the formwork for forming holes and pockets for bolts, balusters, for taking out dowels bars, fan hooks and for other inserts in the concrete as shown including making provisions for other large size openings for doors/ windows/ ventilators/grills etc. in the walls.
- d) For formwork of any shape and sections as per drawings including providing necessary slopes, camber to slab, etc. wherever required.
- e) For necessary provisions in the formwork for forming chamfers, bands, splays, drip moulding, rounded or curved angles, chases, grooves, rebates, making notches, dowels etc. in the concrete wherever directed.
- f) For making construction joints and dummy joints as directed.

- g) Work involving plain or circular, straight or curved forms or in slopes etc. as directed.
- h) Sinking of formwork wherever shown on drawings.

**7. CEMENT SHOULD CONFORM TO FOLLOWING STANDARDS (IS: 269-1976 / IS: 8114) / IS: 455:**

**a) FINENESS:**

When tested for fineness in terms of specific surface by Blaines' air permeability method as directed in IS:4031-1968, the cement shall comply with the following requirements:

| Type of Cement | Specific Surface Sq/Cm/g |
|----------------|--------------------------|
| Ordinary       | Not less than 2250       |
| Low heat       | Not less than 3200       |

**b) SOUNDNESS:**

- b.1. When tested by the 'Le Chatelier' method described in IS:4031-1968, unaerated ordinary and low heat Portland cements shall not have an expansion of more than 10mm.
- b.2. In the event of the cement failing to comply with the above requirement, a further test shall be made by the 'Le Chatelier' method described in IS:4031 - 1968, from another portion of the same sample, after aeration, by being spread out to a depth of 75mm at a relative humidity of 50 to 80 % for a total period of 7 days, when the expansion of each of the two types of cements mentioned above, shall not be more than 5mm.
- b.3. Unaerated ordinary and low heat Portland cements having a magnesia content of more than 3 % shall be tested for soundness by autoclave test described in IS:4031-1968 and shall not have an expansion of more than 0.8%. However, if specified by the purchaser at the time of placing the order, cements having a magnesia content of less than or equal to 3%, shall be also tested for autoclave expansion as described in IS:4031-1968 and shall not have an expansion of more than 0.8%.

**c) SETTING TIME:**

The setting time of the cements, when tested by the Vicat apparatus method described in IS: 4031-1968 shall confirm to the following requirements:

|                                                   | <u>Ordinary</u> | <u>Low heat</u> |
|---------------------------------------------------|-----------------|-----------------|
| i) Initial setting time in Minutes, not less than | 30              | 60              |
| ii) Final setting time in Minutes, not more than  | 600             | 600             |

- d) Compressive Strength: The average compressive strength of at least three mortar cubes (area of face 50 Sq.cm.) composed of one part of cement, three parts of standard sand (Confirming to IS: 650-1966) by mass and P/4 + 3 % (of combined mass of cement plus sand) water and prepared, stored and tested in the manner described in IS: 4031-1968 shall be as follows:

| Kgf/SqCm.                  | Ordinary | Low Heat |
|----------------------------|----------|----------|
| a) 72 + 1h, not less than  | 160      | 100      |
| b) 168 + 2h, not less than | 220      | 160      |
| c) 672 + 4h, not less than | -        | 350      |

Note 1: Standard sand shall confirm to IS:650-1966

Note 2: P is the percentage of water required to produce a paste of standard consistency.

## 8. WATER PROOFING COMPOUND:

Cement water proofing compound wherever mentioned in the items shall be "IMPERMO" manufactured by M/s SNOWCEM (India Ltd.) , 2% by weight of cement or "CICO" waterproofing compound manufactured by M/s STRUCTURAL WATERPROOFING Co. Pvt. Ltd., Kolkata, 3% by weight of cement or other equal and approved as per Manufacturer's Specification and rates quoted shall include for the same (As per approved materials).

## 9. MATERIALS: ALL MATERIALS SHALL BE OF APPROVED QUALITY.

## 10. AGGREGATES:

Aggregates shall conform to IS:383/1970 and IS:2386-1963 and shall be from approved sources.

## 11. LOADING OF FLOOR SLABS:

Materials shall not be stored or stacked on suspended floors and roofs without the Corporation's Engineer's prior approval.

## 12. WATER :

Water used for both mixing and curing shall be potable and free from injurious amounts of deleterious materials which are likely to affect the strength or durability of concrete. Water containing any sugar shall not be allowed for use. Also, water which fails to satisfy the following requirements shall be not be used

- a. To neutralize 100 ml. sample of water, it should not require more than 5 ml. of 0.2 normal HCL.

- b. To neutralize 100 ml. sample of water, it should not require more than 25 ml. of 0.02 normal  $H_2SO_4$ .
- c. Water should not contain solids in excess of the following :-

|                       |                         |
|-----------------------|-------------------------|
| Organic               | 200 mg/ltr.             |
| Inorganic             | 3000mg/ltr.             |
| Sulphate (as $SO_4$ ) | 400mg/ltr.              |
| Chloride (as Cl)      | 2000mg/ltr. (for P.C.C) |
| Chloride (as Cl)      | 500 mg/ltr. (for R.C.C) |
| Suspended matter      | 2000mg/ltr.             |

The PH value of water shall be between 6 to 8.

### 13. SAMPLES AND TEST:

Every facility shall be provided to enable the Corporation's Engineers to obtain samples and carry out test on the materials of construction, if these tests show that any of the materials of construction do not comply with the requirements of this specification, the Contractor will be responsible for the cost of the tests and the replacement of the defective materials and/or construction.

### 14. REJECTED MATERIALS:

All materials which have been damaged contaminated or have deteriorated or do not comply in any way with the requirements of the specifications shall be rejected and shall be removed immediately from the site at the Contractor's own expense.

### 3. BRICK WORK

- Nominal Size of brick shall be 250 x 125 x 75 mm. from approved source. Bricks shall be well burnt first quality, having regular shape with sharp corners, edges and should stand all tests as required by I.S.I. specification. One brick wall shall be considered as 250 mm thick, half brick thick shall be 125 mm thick and brick on edge shall be 75 mm thick.
- The brick should have minimum crushing strength of 75 kg per sq.cm.
- The rates quoted shall include for all work like those in walls, jambs, pillars, mullions, steps, kerbs or thresholds, corbels, nibs and raking out joints, cutting, scaffolding and curing.
- The rates quoted shall also include for recesses, cutouts etc., in brick work for electrical/plumbing works if required.
- Sand for masonry mortars shall be as per I.S. 2116-1965 as applicable to unreinforced brick work.
- For exposed brick work, selected and approved facing, bricks shall be used having uniform colour, size and sharp edges. Faces of bricks shall be protected from staining by cement mortar splashing.

**4. STEEL AND IRON WORK**

1. Rates for M.S. Door and window frames shall include for fabrication, cutting and bending to required size and shape, drilling, punching, counter sinking, welding, filling etc. finishing, erecting, fixing in position and all concrete work for grouting/ embedding wherever required including painting. Concrete for grouting/embedding shall not be considered in the measurement of the weight and shall not be paid separately also.

**SPECIFICATION FOR PRESSED STEEL DOOR FRAMES:****I. MATERIAL:**

- a. Steel door framed shall be manufactured from commercial mild steel shall be 1.25mm thickness conforming to I.S.:435±-1976.
- b. Steel door framed with or without fan light shall be made in the profiles described which may be manufactured to suit doors of either and, opening inwards or outwards as directed by Engineer-in-Charge.

**II. CONSTRUCTION:**

Each door framed shall consist of hinges, jamb, lock jamb, head and if Required, angle threshold. The whole shall be welded or rigidly fixed together by mechanical means. Where no angle threshold is required, temporary bar tie shall be screwed to the feet of frames in order to form rigid unit. Where no specified base ties shall be pressed mild steel 1.25mm thick adjustable to suit floor thickness of 35 or 40 mm and removable, or alternatively, threshold shall be provided for external frames

**FABRICATION:**

The fixing lugs there shall be 3 adjustable lugs with the split and tail to each jamb without fan light, and 4 for jamb with a light. The head of the fixing lugs shall be of one of the following lengths.

- i. 95mm long for use with profile A.
- ii. 120mm long for use with profile B.
- iii. 160mm long for use with profile C.

The head shall be made from flat steel strip 25mm wide and not less than 1.6 mm thick. The tail of the locks shall be 200mm long and shall be made to steel strips not less than 40mm wide and not less than 3mm thick.

Hinges 100mm mild steel butt thickness shall be used. For frames for door shutters width less than 90 cm. 3 hinges shall be welded to one jamb for single shutter. For frames for door shutters width more than 90 cm. 4 hinges shall be welded to one jamb for single shutter. 3 hinges of each jamb of framed shall be welded for double shutters.

In all cases the hinges, shall be fixed, that the distance from inside of the head rivet to the top of the upper hinges and the bottom of the lower, to floor is about 175 mm.

Hinges shall be made of steel 2.5 mm thick with a zinc coated removable pin of 6mm dia. The space between the two leaves of the hinge when closed shall be 3 mm and the leaf that is not welded to the frame shall have for counter sunk holes to take No. 10 wood screws.

#### **MORTAR GUARDS:**

Mortar guards as instructed by Engineer-in- charge shall be provided. These shall be welded to the frame, at the head of the frame for double shutter doors to make provision for bolts.

#### **LOCKS STRIKE PLATE:**

There shall be an adjustable lock strike plate of Steel, complete with mortar guard, to make provision for locks or latches complying with the relevant Indian Standards. Lock strike plate shall be of galvanized mild steel and fixed at 95 cm from the head of the frame.

#### **SHOCK ABSORBERS:**

For side hung door shutters, there shall be not less Than buffers of rubber suitable material inserted in the holes in the rebate and one shall be located on the CENTRE line of the lock strike plate and other two at least 45 cm. above and below the centre line of the lock strike plate. For double shutter doors, there shall be two buffers of rubber or similar suitable material inserted in holes in the rebate in the lock jamb only at the head and spaces 15 cm. at either side of the centre line of the door.

#### **FINISH :**

The door frame shall be either hot drip galvanized or painted or as specified. The surface shall be thoroughly cleaned, free of dust, mill-scale dirt, oil etc. Either by mechanical means, for example, sand or shot blasting or by chemical means such as picking and then painted or galvanized as directed by Engineer-in-charge.

After pre treatment of the surface one coat of steel primer (Zinc Chromate) and two coats of enamel paints as directed by Engineer-in-charge shall be applied to the exposed surface.

#### **MEASUREMENT:**

The length shall be measured in running meter correct to a cm. out to out of the frames.

#### **RATE:**

The rate shall include the cost of labour and material involved in all the operation described above including one coat of approved steel primer (Zinc Chromate) and two coats of enamel paint etc., complete as directed.

## **5. WOOD WORK AND JOINERY**

1. Unless otherwise specified, rates quoted shall include for cost of copper oxidized iron butt hinges heavy quality extruded section, 3 nos. 100 mm size per shutter of doors and 2 Nos. 75 mm size per shutter of windows and ventilators with mild steel pins and copper oxidized screws. Hardware other than the hinges shall be paid separately.
2. Unless otherwise specified, rates quoted shall include for clear sheet waveless glass of approved make such as Triveni, Modi, Asahi or other Equivalent.
3. Doors shall be painted with 3 coats of synthetic enamel paints (First quality) of approved colour and shade including suitable primer. Although 3 coats of paints are specified, Contractor will have to do additional coats of paint, if well finished surface is not obtained to the satisfaction of the Superintending Engineer, Executive Engineer and there shall be no extra payment on account of this.
4. Panel inserts for door shall be both side commercial veneered particle water proof quality bonded with phenol formaldehyde synthetic resin adhesive and conforming to I.S./3097:1980.
5. Timber in contact with masonry or concrete shall be coal tarred or creosoted before fixing and rates quoted shall include for the same.
6. Rates quoted for wood work and joinery shall include for rebates, joints, chamfers, molding, grooves, beads laps, rounded angles, notches, nails, screws, pins, anti-termite treatments etc.
7. Hardware for doors and windows shall be of approved make, all hardware shall be fixed with screws to match the hardware and rates quoted shall include for the same.
8. For factory made door shutters B.W.R. ply used as panel insert should confirm to I.S.: 303-1989.
9. All internal doors shall be provided 2 coats/or more if necessary at Synthetic enamel painting over a coat of primer.
10. Rate quoted by the contractor shall allow for above factors, all labour charges, all taxes and conveyance excluding cost of fixtures only.
11. Prime cost of item : Contractor shall purchased in the open market at competitive rates and fix in position hardwares, fixtures and fittings for doors etc., such as door handles, tower bolts, aldrops, night latches, door stopper, safety chain, magic eye etc., of quality size and make approved by the Chief Engineer or his authorised representative, Contractor shall quote in item the percentage

amount he would charge over the actual cost of the material and fixing them in position (Contractor will be paid the actual cost of materials, supported by vouchers plus percentage amount over it as per the quotation in this item.

A set of the approved samples shall be lodged with the Chief Engineer until the completion of the work. The rates for the purchase of materials must be competitive. In case the Chief Engineer is able to obtain the quotation in the open market for any material similar in specification to the one obtained by the Contractor as per vouchers produced by him, then the Contractor will be paid only according to the competitive rates obtained by the Chief Engineer plus percentage amount over it as per this item and not according to the Contractor's claim. Hardwares for doors and windows shall be approved make and shall be fixed with required screws to match the hardware and rates quoted shall include for the same.

12. Flush doors shall be solid core ISI marked.
13. Factory makes panel door shutters as per IS: 1003 made from approved hard wood duly kiln seasoned as per IS-1141, chemically treated as per IS-401.



## 6. FLOORING AND FINISHING

1. Plain or colour cement tiles and terrazzo tiles shall be manufactured as per latest version of I.S.:1887/195<sup>1</sup> using gray or white cement and pigments and marble chips of sizes as required. Tiles shall be of size 250 X 250 X 20mm (10" X 10" X 7/8") or any other approved size. Thickness of wearing layer of the tiles shall not be less than 8 mm. Tiles shall be of approved colour, shade and make. A few approved samples of tiles is to be used shall be deposited by the Contractor in the office of the Corporation's Engineer.

2. White Glazed earthen ware tiles shall be of first quality as per our approved material list enclosed:-

|            | <u>Minimum</u> | <u>Maximum</u> |
|------------|----------------|----------------|
| a. Glazed  | - 5 mm. :      | 7mm            |
| b. Ceramic | - 6 mm. :      | 8mm            |

3. **KOTA STONE** : Kota Stone specified in the item shall be got approved from Chief Engineer. At its thinness part, no stone shall be thinner than minimum thickness specified in the tender item. Kota Stone used in the work shall be hard, sound, durable, resistant to wear. It shall be cut to shape and size as directed. Rough Kota stone shall have plain surface.

For machine polish Kota Stone, the exposed surface of the stone slab shall be machine polished, having smooth even and true plane. The stone slab shall be without any soft veins, cracks or flaws and shall have uniform colour. Kota stone for flooring, skirting, trade and risers shall have even natural surface free from broken flakes on top and shall be machine cut, edges shall not be marred by careless dressing of slab.

### **TOLERANCE:**

The thickness or slab shall be as specified in the description of item. Tolerance of plus minus 2mm shall be allowed for the thickness. In respect of length and breadth of slabs, a tolerance of plus minus 5 mm. is allowed.

4. Cement Waterproofing Compound wherever mentioned shall be " IMPERMO" manufactured by M/s Snowcem (India) Ltd., 2% by weight of cement or CICO water proofing compound manufactured by M/s. Structural Water roofing Company Pvt. Ltd., Kolkata, 3% by weight or Cement or other equal and approved as per manufacturer's specification. The rates quoted shall include for the same.
5. Terrazzo / Marble mosaic/Ceramic/Kota/Kudappa/Shahabad/Tandur Stone/ Glazed tile in flooring, skirting, dado, treads and risers shall be laid as described in the schedule.
6. Rate quoted in the tender shall allow for above factors with all cost of labour, materials, taxes, conveyance, royalties, T&P etc., complete.

7. Internal Cement plaster to brick walls, columns, beams, lintels etc., shall be 12mm thick. R.C.C. slab soffits shall have cement plaster not less than 6mm thick. External cement plaster shall be 20mm thick in two coats (Under coat 12mm thick and finishing coat 8mm thick. except for R.C.C. members not flush with brick work which shall be 12mm thick in 2 coats (Under coat 8mm thick and finishing coat 4mm thick) such as R.C. facials, chajjas, canopies, drop walls, beam ribs, projected slabs etc. the rates quoted for plastering and finishing items shall include for Jambs, sills, drip moulds, bands, forming grooves, chambers, curved Angles, arises etc., and such other projections, which shall not be measured separately and paid for.
8. Rates quoted for painting and colour washing etc., shall include for providing shade or approved colour.

In case of painting, white washing and colour washing items, although number of coats are specified, Contractors will have to do additional coats if well finished surface is not obtained to the satisfaction of the Executive Engineer and there shall be no extra payment on account of this.

Sand for mortar bedding for floors shall be from approved source and shall conform to I.S. 2216-1965 as applicable to unreinforced masonry works.

Sand for plaster shall be from approved source, and shall conform to I.S. 1542-1977 as applicable to internal walls and ceiling plastering and external wall plastering.

**SPECIFICATION FOR SAND FOR PLASTER (IS:1542-1977):-**

Table - I Grading of sand for internal wall or external wall or ceiling plaster:

| SIEVE OF NOMINAL APPERTURE SIZE<br>[See IS:460 (Part-I)-1978*] | <u>PERCENTAGE PASSING</u> |
|----------------------------------------------------------------|---------------------------|
| 9.50mm                                                         | 100                       |
| 4.75mm                                                         | 95-100                    |
| 2.36mm                                                         | 95-100                    |
| 1.18mm                                                         | 90-100                    |
| 600 micron                                                     | 80-100                    |
| 300 micron                                                     | 20- 65                    |
| 150 micron                                                     | 00- 15                    |

NOTE : For crushed stone sands, the permissible limit on 150 micron nominal aperture size sieve is increased to 20% allowance permitted in

4.1 applying to other sieve size.

\* specification for test sieves: part - I wire cloth test sieve (second revision).

## **7. WATER PROOFING**

### **GENERAL :**

Specifications, as applicable for the trades and as given elsewhere in the tender are applicable in Toto except where otherwise mentioned in following pares or in the working of items. The rates quoted shall cover for complying with the same. Respective Trade Preambles wherever applicable shall apply to this section also.

**The water proofing work shall be got executed from one of the specialist agency, names of which are given below or any other agency as approved by the competent authority, as per their specification under the overall supervision of the main builder's contractor. Rates quoted by the main Builder's contractor shall include for the waterproofing treatment through the water proofing agency and will cover for all over heads and profits.**

**Name of Specialized agencies:**

**a) M/s Kolkata Water proofing Co (b) M/s Asian Water Proofing Co, Ranchi (c) M/s New Asia Co. (Bangalore), Chennai & (d) M/s A.K Associates, Cuttack.**

### **7.1 CRAZY MARBLE MOSAIC FLOORING/TOPPING ON TERRACES :**

Work of Crazy Marble Mosaic tile topping on terraces shall be as given in the specification for Builders' work. Rates quoted shall include for the following factors also:

- a) Tile pieces shall be laid on screed of lime mortar 1:3 (1 lime: 3 sand) or Cement mortar 1:6, 20 mm thick (average) and floated in neat Cement slurry in required levels and slopes in crazy fashion.
- b) The joints between the pieces shall not exceed 3 mm. In width and shall be solidly filled with Cement mortar 1:3 mixed with waterproofing compound and finally flush pointed on top with neat Cement mixed with waterproofing compound.
- c) Cement waterproofing compound shall be as manufactured by one of the manufacturer/s as per the attached list and as per manufacturer's specification and shall be added to mortar bedding and Cement floating coat.
- d) The junctions of the topping/paving and the parapet wall shall be rounded/coved to be 75 mm radius and the topping/paving shall be extended up to the parapet wall for 15 cm. The top edge shall be finished in a neat horizontal line and tucked in a groove in a groove in the wall. Bell mouths around rain water pipe inlets etc. wherever required for effecting drainage, shall be formed in crazy marble mosaic tile-piece finish. Necessary channels/ dishing as required shall be also formed.
- e) After the toping/paving has been lad as required or the day's fixing work is completed, the surplus Cement grout that may have out of the joints on compacting shall be cleaned off.
- f) Proper slopes shall be imparted to the finished surface to drain off the rain water easily without any stagnation anywhere on the finished surface.
- g) Bitumen painting of slab shall extend upto parapet/curb/up stand for 150 mm.

- h) Necessary rounding/coves near parapet/curb/up-stand shall be done and junction made leak proof
- i) Dishing near rain water outlets.
- j) Preparation of channels as required.

## 7.2. **MEASUREMENTS :**

Measurements for Lime Concrete as well as for crazy marble mosaic flooring/topping on terrace shall be only the respective flat area in plan of the terrace between the exposed internal faces of parapet walls/curbs/up stand portions. Cover/rounding etc. shall not be measured. While measuring the average thickness mentioned in the item, thickness of rounding/coves near the parapet walls/curb and the portion carried over the in the parapet wall shall not be considered.

- 7.3. Wherever the R.C.C. and brick corbelling courses are required to be provided on the same terrace floor, they shall be in line and level with each other.
- 7.4. The Contractors shall ensure water tight/leak proof construction. The Contractors, if they so desire may carry any further (in addition to the waterproofing treatment specified above) for waterproofing of surfaces as considered necessary by them, however the rates quoted by them for the items shall be amount shall be paid for the same.

## 7.5. **WATERPROOFING- "CETROOF" TREATMENT:**

### **(CEMENT BASED WATERPROOFING TREATMENT THROUGH SPECIALIST AGENCIES )**

#### **I. TERRACE WATERPROOFING :**

Terrace waterproofing shall be "CETROOF SURFACE TREATMENT" (Permanent waterproofing treatment) by one of the Specialized Agencies mentioned in the list attached and shall be as per their Specification and shall be under Guarantee of 10 years against leakage.

This treatment shall start directly over R.C.C. slab and shall include for providing and laying of brick bat coba with necessary gradient for the easy flow of water. This coba shall be done in special waterproof mortar and shall be finally covered with "CETROOF" waterproof joint less plaster, finished smooth with trowel in grey cement colour, marked into 30 X 30 cms. False squares. The treatment shall be carried along the inside of parapet or other adjoining walls upto a height of about 300 mm. In the shape of round vata (rounding off). The surface provided shall be hard; and tough, suitable for all normal domestic purpose. Rate quoted shall include for making round vata and also for tucking the treatment on the vertical face of the parapet at required height including making necessary groove in the parapet for tucking. Rate quoted by the Contractor shall include for the above waterproofing treatment of Specialized Agencies, with all overhead and profits.

**MODE OF MEASUREMENT FOR CETROOF TREATMENT OVER TERRACE:**

Unless otherwise specified in the item in Schedule of Quantities, flat area covered between inside of the parapet wall (unfinished) shall be measured.. To this the area of the vertical surface treatment calculated by taking the inside perimeter of the parapet wall and the height of treatment over parapet wall measured from finished horizontal "CETROOF" treatment shall be added. In case the treatment is continued over the horizontal portion of the parapet on top, the same shall also be added to the areas calculated as above.

**II. TOILET WATERPROOFING:**

Toilet waterproofing by approved specialist firm under guarantee of 10 years.

- a) The main contractor shall while the concrete is still green, carry out smooth cement punning in thin layer to the bottom of side of sunk portions at the time of concreting of the slab.
- b) The brick bats from well-burnt bricks of about 40 mm. Size completely saturated with water shall be used for filling in sunk portion of toilets including space around W.C. pan.
- c) The surface of sunk portion where waterproofing is to be done shall be thoroughly cleaned with wire brushes. All loose scales shall be removed and dusted off. The cleaned surface shall be treated with neat cement slurry admixed with acrylic waterproofing compound to penetrate into services and fill up all porosities in the surface. The cracks observed, if any, in the slab shall be appropriately treated.
- d) After treatment at II (c) above, brick bats fully saturated with water shall be laid in position within layers of cement mortar 1:1 duly admixed with acrylic water proofing compound. The topmost layer of brick bat shall not be covered with cement mortar.
- e) Treatments at and II (g) shall follow except that top layer will be 12 mm. Thick and finished.
- f) This item shall be carried out after nahani traps, W.C. pan, all pipes are laid in position and are duly jointed. The treatment shall be worked well around the nahani taps. "P" or "S" traps, pipes and their joints, holes made in the walls shall also be treated suitable.
- g) 12 mm. Thick waterproof plaster in cement mortar 1:4 with acrylic waterproofing compound shall be carried out upto proposed height of dado in the toilets. Before carrying out waterproofing treatment on the wall, the wall surface shall be thoroughly cleaned and the joints of brick work shall be raked out if required treatment of Cement slurry admix with acrylic waterproofing compound be carried out to the wall. Junction of wall and top of slab/beam shall be treated with cement slurry with acrylic, W.P. compound by injection method.

**h) MODE OF MEASUREMENT :**

- a) The filling of waterproof brick bat coba in sunk floors of toilet blocks shall be measured in Cu.M. as actually laid at site to the required level.
- b) Waterproofing plasters treatment to floor and walls of toilet block above the sunken slab/beam shall be measured separately in Sq.M. as actually provided at site over the required areas.

**III. RATES TO INCLUDE:**

- a) Contractor shall obtain a guarantee for a period of 10 years from the Specialist Agency carrying out the work and shall be jointly responsible for any defects noticed in the work during the above period. Rate quoted shall include for the same.
- b) Rates quoted by the Main Builder Contractor shall include for the above water proofing treatment by one of the Specialized Agencies with all overheads and profits to execute the work and no extra will be paid.
- c) Rates quoted by the Contractor shall also allow for the leakage test to be carried out as stated below. Any leakage/dampness noticed shall be rectified by the Contractor at his won cost.

IV. Waterproofing work shall be guaranteed for then years in approved proforma (see Annexure "R" attached herewith) acceptable to the Employer, on a stamp paper of required denomination. This guarantee will be given by the Specialist agency carrying out the work directly to LIC of India and counter signed by the Main Builder's Contractor and furnished to LIC of India as soon as the work is virtually completed and before the final bill is settled.

Although the waterproofing work is guaranteed by the Specialist Agency for 10 years, the Main Builders' Contractor shall be responsible, if at any time during the defects liability period, the surfaces treated for waterproofing by the Specialist Agency given way to the inadequacy of the work carried out or used or for any other reason what so ever relating to materials, workmanship etc. and shall be liable without any extra cost and inconvenience to the Employer or the occupants to carry out the necessary remedial measures as and when required during Defect Liability Period.

**V. LEAKAGE TESTS:**

( Applicable to all types of waterproofing treatments to terrace and toilet blocks).

After completion of waterproofing work of terraces as well as toilet blocks, the leakage test shall be carried out by impounding the water 75mm. to 150 mm. deep, over the surfaces treated for a period of 10 days, without any extra cost.

"Joint inspections shall be carried out by the Contractor daily with LIC of India's representative to find out leakage/dampness of the surface if any. In case, any leakage/dampness is noticed, the same shall be rectified by the Contractor without any extra cost to LIC. Rates quoted by the Contractor shall allow for the above test also.

## 8. ALUMINIUM DOORS, WINDOWS AND VENTILATORS

1. Aluminium alloy section shall be as per LIST OF PRINCIPAL/APPROVED MAKES
2. All aluminium work shall be free from defects impairing strength, appearance and shall be of the best available quality for the purpose specified. All aluminium alloy sections used in the fabrication shall be of heavy quality, sturdy, extruded sections to withstand wind pressure of high intensity, other forces and day to day handling and shall be free from rattling, leakage, etc-all conforming to latest versions of IS-733-1956 and IS-1285-1958 for "Specifications for wrought Aluminium, Anodised Aluminium alloys, bars, rods and sections and extruded round, tube and hollow sections (for General Engineering Purposes only)."
3. Anodic coating shall be of minimum thickness of 15 microns. Anodising shall be of mat finish natural/coloured as specified, conforming to latest version of IS-1868-1968. Anodising shall be carried out on all exposed faces. Surfaces in contact with masonry, concrete, plaster or any other dissimilar materials shall be coated with Zinc chromate primer conforming to IS-104-1950. Further the contractors shall cover all anodised, finished work with a thick layer of clear, transparent laquer, based on methacrylates or cellulose butyrate to protect the surfaces from wet cement during installations. This lacquer coating shall be removed on completion. if necessary, the contractors shall provide for visits to his workshops where the manufacture of members, anodising, etc are being carried out by him.
4. Contractors shall commence manufacturing Doors, windows, ventilators, etc. only after the shop drawings showing full size sections, thickness of metal, detail of construction, hardware, etc. are approved by the Chief Engineer.
5. In case any modification in size, thickness and weight are required to any members of Doors, windows, ventilators, etc. same shall be carried out by the contractors and suitable adjustment shall be made on the basis of relevant tender items.
6. The Chief Engineer reserves the right to delete any or all items of this trade and allot the work under this head to any specialized agency/agencies. No claim whatsoever shall be entertained on this account.
7. **HARDWARE :**

Hardware shall be of best quality extruded section and shall be of anodised Aluminium with natural/Bronze finish. Hinges shall be of heavy pattern with stainless Steel pins and nylon/stainless steel washers. Contractor's rate shall include for necessary Screws, Bolts and other devices for neat and secure hardware arrangement. The bolts and wood screws etc. shall be cadmium plated brass, sheet metal screws wherever used shall be GKW or equivalent approved, of required size to securely and permanently fix the hardware in place. No steel or iron screws shall be used.



8. **GENERAL :**

All the manufactured Doors, windows, ventilators, etc. shall be stacked on site under cover. Damaged surfaces with defects like scratches, etc on finished work shall not be accepted. Fabricated materials shall be created in an approved manner to protect the material against any damage during transportation. Loading and unloading shall be carried out with utmost care. The Doors, windows, ventilators, etc. on arrival at site shall be carefully examined to detect any damaged pieces. Arrangements shall be made for expeditious replacement of damaged pieces/parts. Materials found to be acceptable on inspection only shall be used.

9. The frames shall be square and flat and corners of the frames being fabricated to true right angles. Both the fixed and opening frame shall be of sections which have been cut to length, mitered and mechanically jointed and/or electrically welded at corners as required for satisfactory performance. Subdividing bars shall be toned and riveted into the frames. All frames shall be accurately machine milled and fitted to form hair fine joints. The jointing accessories such as cleats, brackets, etc., shall be of such material as not to cause any bimetallic action and as per approved samples.

Dimensions shown in the drawings and tender are overall heights and widths to the outside of the frames of Doors, windows, ventilators, etc. and shall be considered as approximate, structural dimensions, only. Contractors are advised to verify the dimensions before fabricating and fixing the Doors, windows, ventilators, etc. in position after allowing the margins for sub frames (40 to 50 mm) as well. Payment shall be based on actual size provided.

10 **METHOD OF FIXING :**

- a) Aluminium members coming in contact with masonry shall be fixed by means of slotted steel lugs, not less than 100 mm x 16 mm, 3mm with counter sunk galvanized machine screws and nuts 19x 6.3 mm and to concrete works by means of 45 mm No.10 galvanized wood screws.
- b) Fixing screws and lugs

Outer frame/sub frame shall be provided with fixing holes centrally in the web of the section at approved intervals. Any steel lugs coming in contact with Aluminium should be either galvanized or given one coat of bituminous paint. After fixing the members in position as stated above, the space between the concrete surface and the frame of Doors, windows, ventilators, etc. shall be pressure grouted with CM 1:4 so as to achieve absolute water tightness between the frame and inside surface. Care shall be taken that exposed surface of opening is not damaged while fixing Doors, windows, ventilators, etc.

Further, all vertical, horizontal members of Doors, windows, ventilators, etc. shall be provided with Neoprene/ EPDM weather stripping.

The contractors shall design, fabricate and fix in position, sub frames, Doors, windows, ventilators, etc. in such a way that water penetration is totally and effectively sealed and any dampness on inner surfaces is totally eliminated. The shop drawing submitted by the contractor shall show the method of sealing the water penetration also.

Doors, windows, ventilators, etc. shall be fixed to sub frames by means of screws of adequate size and numbers, which shall be cadmium plated brass.

The method of fixing as above shall generally be followed and members used in the manufacturing of units shall be designed accordingly. However, contractors are free to adopt any other equivalent, approved method of fixing. In no case, fixing shall be allowed over wooden runners.

Doors, windows, ventilators, etc. shall be designed not only for their strength, stability, stiffness against all odds but also for easy operation, water tightness, easy replacement of glass and cleaning from inside.

#### 11. **GLASS & GLAZING :**

Glass shall be of specified thickness and shall be ASAHI or MODI float waveless glass or equivalent, approved, clear sheet glass or tinted as specified in schedule of quantities.

Before installation of glass, contractor shall ensure the following:-

- a) All glazing rebates shall be square, plumb, true in plane, clear, dry and free of dust.
- b) Glass edges shall be clear and cut to exact size, glass with chipped or damaged edges shall be rejected.
- c) Glass shall be set in glazing clips and so installed as to achieve proper water tightness.
- d) Suitable Neoprene, EPDM gaskets shall be used for fixing glass so as to prevent rattling.
- e) Beading shall be of anodised Aluminium section as per schedule of quantities.
- f) Putty shall be applied to beading face in contact with glass and if necessary also filled at back-conforming to the latest version of IS-420-1953. On completion of job, all glass shall be thoroughly cleaned and freed from dirt, putty or other adhering material.
- g) Wastage in cutting shall be to contractors' account. Frosted/Ground glass shall be set with smooth surface outside.

12. Contractors shall submit detailed drawings showing various members of Aluminum Doors, windows, ventilators, etc. which they propose to use, along with their filled in tender.

**13. MODE OF MEASUREMENTS:**

Aluminium Doors, windows, ventilators shall be measured in Kg. Any fixture or projection embedded in concrete/masonry work shall not be measured. Samples of all sections, accessories, beadings, etc. shall be got approved, weighed and preserved at site.

Rate shall include for fittings and fixtures shown on the shop drawings approved by the Chief Engineer.

**14. RATE TO INCLUDE:**

Part from other factors mentioned elsewhere in this tender document, rates for the items for supplying and fixing aluminium doors, windows and ventilators shall also include for the following:

- a) All accessories, for fixing doors, windows and ventilators to concrete/masonry surface as described in the trade.
- b) Filling sealants as per details to ensure water tightness. All the sealants must be permanently resilient and of non-bleeding nature.
- c) EPDM weathering strips as directed.
- d) Drip strip to drain out water falling on the members of the frame.
- e) Pressure grouting in CM 1:4 the space between the concrete surface and the frame of windows and ventilators, or sub frames, as per site conditions.
- f) EPDM gaskets for fixing glass.
- g) Cadmium plated brass wood screws wherever specified.
- h) Galvanized/ Aluminum channels pieces, coach screws, raw plugs, etc. of required size and nos. for fixing doors, windows and ventilators frames in position.
- i) Necessary scaffolding/cradle for erection of aluminum doors, windows and ventilators in position.
- j) Rates for sliding/ doors/ windows and ventilators to include for adequate arrangements for draining out water collected in the channels of the outer frame.
- k) For all Doors, windows, ventilators, etc. openings, contractor shall prepare MS retrieval template frames with necessary tolerance for obtaining correct dimensions of openings in masonry/concrete works.
- l) Suitable, approved cleats, etc. at every joint of outer frame.

**15. VARIATION OF WEIGHTS:**

The contractors shall base their quoted rates on total weight of Aluminium content for Doors, windows, ventilators units excluding hardware and glass, proposed by LIC in the items

## **SEWERAGE TREATMENT PLANT**

### **GENERAL TERMS & CONDITIONS:**

The contractor shall accommodate the sewage treatment plants in the stipulated space as available in the site. Hence, it is required on the part of the contractor to visit the site before participating in the tender.

#### **Design Basis:-**

##### **Inlet Parameter**

|       |              |
|-------|--------------|
| BOD   | : 800 mg/lit |
| COD   | : 600 mg/lit |
| SS    | : 300 mg/lit |
| O & G | : 50 mg/lit  |
| PH    | : 7 to 8     |

##### **Outlet Parameter**

|       |              |
|-------|--------------|
| BOD   | < 20 mg/lit  |
| COD   | < 100 mg/lit |
| SS    | < 80 mg/lit  |
| O & G | < 10 mg/lit  |
| PH    | : 7 to 8     |

It is to be noted that Sewage Treatment Plants shall be installed for housing project; the inlet parameter as mentioned above may vary. Further, the treated water coming out of STPs shall either be re-used or discharged to storm water drain, hence disinfection through chlorination should be carried out and therefore outlet parameter shall satisfy the norm of Central Pollution Control Board. The stipulation of outlet parameter as prescribed by Central pollution Control Board shall supersede the outlet parameter mentioned above.

Location : Entire system shall be located underground so that space occupied by STP can be used for parking/vehicular movement.

#### **Process:**

1. The process should be aerobic i.e. in presence of oxygen.
2. The system should not generate foul gases like Mithene, Hydrogen Sulphide in the treatment process.
3. There should not be any chemical requirement in the process except that required for disinfection.
4. The hydraulic retention time of sewage in the process shall not exceed 2-3 hours.
5. The treatment process should not involve, monitoring MLSS, MLVSS, SVI etc. to ensure that the performance is not affected even in the absence of qualified staff.
6. Sludge generation should not exceed more than 3% of the total designated flow.
7. The plants should not have any moving parts except pumps and blowers.
8. Air blower installed should have a standby one.
9. Any pump used should consist of one working and one standby one. If standby one is not required the contractor must justify the same technically in writing while submitting the tender.

**GENERAL REQUIREMENTS:**

1. The tender should quote the price for STP inclusive of everything.
2. Rate quoted should be inclusive of all type of Civil works, Electrical Works, Mechanical Works including the supply of materials. In other words the tender should carry out everything to supply, install, test, commission and run the sewage treatment plants. The contractor should carry out necessary tests at its own cost to prove that outlet parameter satisfies Central Pollution Control Board norms for treated water fit for re-use or to drain to the storm water drain.

During the visit of representatives of Orissa Pollution Control Board, Bhubaneswar Municipal Corporation, Bhubaneswar Development Authority and Ministry of Environment of Forest, Government of India, the contractor shall be present to explain in details about the STP to the representative. Any test as required by the aforementioned Authorities shall be carried out by the contractor at its own cost and if any NOC is required to be obtained from above mentioned authorities pertaining to STP, it shall be the responsibility of the contractor to obtain the same.

3. The defect liability period shall be one year from the date of virtual completion of work. During the defect liability period the contractor shall rectify any defects or malfunctioning of the sewerage treatment plant. In addition to above the contractor shall test the outlet parameter in every three months during the defect liability period to ensure that treated water coming out of STP is satisfying the Central Pollution Control Board norms for water to be re-used or to be drained to the storm water drain. It is to be noted that during defect liability period the contractor shall promptly attend to the defect so that nuisance due to malfunctioning of STP can be avoided. The contractor has to train regarding operational aspect of the STP to the person nominated by LIC of India.
4. The contractor shall be responsible for the true and proper setting out of the works and for the correctness of the position, levels, dimensions and alignment of all part of the works.

## **TECHNICAL SPECIFICATION FOR ELECTRICAL WORKS**

### **SPECIFICATION FOR ELECTRICAL INSTALLATION WORKS IN L.I.C.I. BLDGS.**

#### **SUBJECT TO THE GENERAL CONDITION OF CONTRACT IN FORCE**

#### **(A) GENERAL**

1. The installations shall generally be carried out in conformity with the Code of Practice for electrical wiring installation (system voltage not exceeding 650 V. viz I.S. 730. 1963 or the latest revision thereof.
2. **Definition:**  
As given in I.S. Code of Practice shall apply.
3. **Pressure and frequency of supply** :  
All current consuming devices shall be suitable for 433 V., 3phase, 50cycle A.C. supply.
4. **System of wiring** :
  - i) The wiring shall be carried out as per schedule. Power wiring must be in separate PVC conduit and shall be kept separate and distinct from lighting wiring. All wiring must be done on the distribution system with main and branch distribution board at convenient centers and without isolated fuses. All conductors shall run as far as possible along the walls and ceilings so as to be easily accessible and capable of being thoroughly inspected. The contractor shall arrange beforehand the balancing of circuits in consultation with Electrical Engineer of L.I.C.I.
  - ii) Within one month of taking over of the installation, the contractor shall submit to L.I.C.I. 3sets of completion drawings of the Electrical Installation in corpora ting all modifications made from time to time including cable & conduit lay-outs to the satisfaction of the Electrical Engineer of L.I.C.I. & the wiring plans shall be deemed to be "Drawings" within the meaning of the term as used in the general conditions of contract.
5. **Conductor** :  
The conductors shall be of copper or otherwise stated in tender and shall be either PVC insulated or PVC insulated PVC sheathed. The minimum sections of conductors used for wiring of light and plug points shall be 1.5 sq mm. Single core wires shall only be used.
6. **Cables:**
  - i) All cables including flexible cables used shall be ISI approved and confirming the ISI specifications.
  - ii) Twin flexible cable shall be of minimum section area of 14/0.0076 and PVC insulated.
  - iii) Wires as per specification of materials.

**7. Fall of Potential:**

The cross sectional area of all conductors inside buildings shall be so proportioned to their lengths that the drop in pressure between the main fuses and their furthest point shall not exceed two percent, with all the consuming devices in use.

**8. Rating of Lamps and Fans:**

In estimating the current to be carried by any conductors glow lamps are to be rated, as of 4 and 1.25 watts per candle power for carbon and metallic filament lamps respectively where the conditions are known, otherwise at 40 watts except in the case of gas filled lamps. Ceiling fans are to be rated 60 watts; table fans at 60 watts unless actual values, are known or specified.

**9. Test :**

The installation with fittings complete shall before current is switched on satisfactorily pass the following tests:

The whole of the lamps and appliance having been connected to the conductors and all switches and fuses being on a pressure not less than twice the intended working pressure subject to a limit of 500 volts shall be applied and the insulation resistance of the whole or any part of the installation to earth must not be less in Mega ohms than 25 divided by the number of points as defined above. With all lamps and appliance removed from the circuits a similar test between poles may be demanded, provided that during the rainy season half the above test value will be accepted. Where any appliance referred to is a motor larger than one-half B.H.P. the insulation resistance of that particular circuit must be greater than one Meg ohm.

**10. Joints and Looping Back:**

No joints shall be allowed in conductors. Neutral shall be looped from point to point whereas the live wires shall be looped in the switch board only from switch to switch.

**11. Switches:**

- i) All main switches (other than those of iron clad pattern) carrying over ten amperes shall be fitted for back connections.
- ii) All switches and circuit breakers shall be constructed in accordance with the I.E.E. wiring rules 8<sup>th</sup>, edition no 67, or its latest version, provided also that springs shall be either of phosphor bronze, or if of steel, shall be copper or nickel plated; & that handles shall be so fastened that do not tend to unscrew or become loose (see clause 16).

**12. Control at point of Entry of Supply:**

There shall be one main switch and one main fuse on each pole of each main circuit (other than the neutral conductor of a 3-wire circuit) at the point of entry of the supply. The switches must be linked.

**13. Distribution Boards:**

- i) Main distribution board shall be metal clad and shall be provided with an iron clad switch and fuse on each pole of the circuit (MCCB / Switches).
- ii) Branch distribution board shall be provided with one fuse/ MCB for each circuit and one common neutral bar. Maximum number of points to be wired on each circuit shall be 6.
- iii) Switches and fuses of opposite polarity shall be mounted on separate bases with a shield of non-ignitable insulating material between the bases when placed one above the other.
- iv) In wiring a branch distribution board the total number of points shall be divided as far as possible evenly between the numbers of ways of the board. A spare circuit shall be left for future extensions.
- v) MCB / Fuses shall be of approved materials and each circuit shall be clearly numbered from left to right in conspicuous figures to correspond with the wiring plans.
- vi) Two spare fuse carriers / MCB per main branch board shall be supplied for replacements.

**14. Passing through the walls**

- i) Except as laid down in clause 87 where conductors pass the walls, one of the following alternative methods shall be used.  
A hole of suitable area shall be made in the wall through which the casing or conductor shall be carried so as to allow of an air-space of not less than one inch on three sides of the casing or conductors as the case may be or the conductors shall be carried in approved heavy gauge solid drawn or lap welded conduit tube on porcelain ducts. Where the supply is alternating current, the conductors of the circuit must be bunched.
- ii) Where a wall tube passes outside a building so as to be exposed to the weather, the outer end shall be bell mounted and turned downwards.

**15. Branch Switches** (see clause ' 11) ' In installation supplied from a three wire system, all branch switches shall be placed on the outer wires, switches (Other than those for multiple control) controlling not more than 10 amperes shall be of the Modular type switches shall be ON when knob is down. Where the specified position of branch switches is altered, any such alterations of position after fixing will be paid for.

**16. Ceiling Rose and Wall Sockets** ' Three pins Ceiling roses, and wall sockets shall not contain fuse terminals. Wall sockets shall comply with the requirements of the Bureau of Indian Standards.

**17. Fittings.** Where conductors are required to be threaded through tubes or channels formed in the metal work of fittings, these must be free from sharp angles or projecting edges and of such a size as will enable them to be wired with the conductors used for the final sub-circuits without removing the braiding taping or outer covering. As far as possible all tubes or channels should be of sufficient size to permit of looking back. Where with approval of the Electrical Engineer of L.I.C. Electrolytic



copper wire is used for wiring fittings. The sub-circuit leads must terminate in a ceiling rose or connector from which this wire will be carried into the fittings. Flexible wire must not be used for wiring fittings, except portable fittings. All fittings must have not less than a half inch male nipple. Fittings and lamp holders for gas fitted lamps shall be adequately ventilated.

**18. Lamp holders**-Lamp holders for use on brackets, etc. shall have not less than a half inch female nipple and all those for use with flexible pendants shall be provided with cord grips. All cases must be solid and substantial thin case export type not being admissible. Edison screw holders will not be accepted for lamps below 100 watts.

**19. External and Road lamps** ; External and Road Lamps shall have weather proof fittings of approved design so as to effectually prevent the admission of moisture. An insulating distance piece of moisture proof materials must be inserted between the lamp holder nipple and that of the fitting. Flexible cord conductors and cord grip lamp holders must not be used where exposed to the weather. In verandahs and similar exposed situations rod pendants or ceiling plates shall be used.

**20. Lamps:** All glow lamps unless otherwise specified in the special conditions of contract shall hung at a height of nine feet above the floor level. Metal filament lamps shall be made of drawn wire only.

**21. Fans and Regulators**

- (i) (a) All ceiling fans shall be suspended from a hook or shackle and insulated from the same. All joints in the suspension rod shall be screwed and all joints or bolts in connection therewith shall be additionally secured by means of split pins.
- (b) The canopy and wood block at the top of the suspension rod shall effectually hide the suspension.
- (c) The leading in wire shall be not smaller than 3/22 S.W. G. and shall be protected from being cut.
- (d) All fans shall be free from sparking, noise oil throwing and excessive heating.
- (ii) (a) All fans shall be hung nine and half feet above the floor or as directed by the supervising officer.
- (b) All fans shall be capable of running at full speed for one month without additional oiling and shall not overheat after eight hours continuous run at full speed.
- (c) Each fan shall have a speed regulator of Electronic type.

**22. Attachment of Fittings and Accessories :**

- i) In other than conduit wiring all ceiling roses, wall sockets, switches, regulators, brackets, pendants and accessories attached to walls or ceiling shall be mounted on suitable PVC Base plate.

**23. Interchangeability :**

Similar parts of all the switches, lamp holders, distributing boards, ceiling roses, brackets, pendants fan and all other fittings of the same type shall be interchangeable.

## **B. CONDUIT SYSTEM**

- 1) **Conduit to be continuous** ĩ Conduit shall be of approved pattern and manufacture and in accordance with the specification of the Bureau of Indian Standards & relevant IE rules.
- 2) **Bunching of Wires** ĩ The wires of a circuit may be bunched together in a conduit, and if the supply is alternating current, they must be bunched
- 3) **Junction in Conduit** ĩ The lengths of conduit shall be joined by means of push fit joints or other approved joints. The greatest care shall be taken in preparing the conduit that no sharp edges or burrs are left which could damage the Insulation. The Elec. Engineer with a view to ensuring that the above proviso has been carried out, may require (if he should consider if necessary) that the separate lengths of conduit etc. after they have been prepared shall be submitted for inspection before being fixed.
- 4) **Fixing of Conduit** – The PVC conduit shall be fixed to the surface of walls, secured to plugs, arranged as in clause 15 by saddles and round-headed screws. No conduit shall be buried beneath the surface of the masonry unless so specified or approved by the Electrical Engineer, L.I.C.
- 5) **Bends of Conduit** – The conduits shall be brought round the angles of walls by means of bends or elbows as may be directed.
- 6) **Outlets**- All outlets for fittings, switches, etc. shall be equipped with an approved outlet box.
- 7) **Conductors** – All conductors used in conduit wiring shall be stranded
- 8) **Erection and Earthing of conduit** ĩ The whole system of conduit shall be erected and completed before the conductors are drawn in. In conduit system, the pipe must be continuous when passing through walls or floors, and no other form of insulating or protecting tube is required.

**Specifications for the Concealed Conduits in slab /wall columns etc. for electrical main / sub main / point wiring; will be as under :**

- i. Rigid PVC conduit of Medium class ISI marked and corresponding PVC conduit accessories.
- ii. Special deep junction boxes 75 mm deep to be laid in the slab / ceiling.
- iii. The rectangular junction boxes wherever provide shall be made out of 16 gauge M.S. Sheets and painted with two coats of ready mixed oil paint of approved shade over a coat of red oxide primer.
- iv. Make of conduits to be used should be of ISI marked and as per list of Electrical Materials.
- v. **The electrical installation work shall be carried out through a Licensed Electrical Contractor. The name of licensed electrical contractor shall be get approved from the competent authority well in advance before commencement of the work.**
- vi. **INSTALLATION OF CONDUIT:**

All conduits including bends, unions, junction boxes, etc. shall be cleaned before they are fixed in position. Conduits which are to be taken in the ceiling slab shall be laid on the prepared shuttering work of the ceiling slab before concrete is poured. The conduits shall be properly fixed into the sockets, bends, junction boxes, outlet boxes and shall be made watertight by using proper sealant recommended by the manufacturer. The conduits in ceiling slab shall be straight as far as possible, to facilitate easy drawing of wires through them. Before the conduits are laid in the ceiling, the positions of outlet points, point control junction boxes shall be set out clearly so as to minimize offsets and bends.

Conduits recessed in walls shall be secured rigidly by means of steel hooks/staples at not more than 0.6 meter intervals before conduit is concealed in the walls. All chases, grooves shall be neatly made to proper dimensions to accommodate the required number and size of conduits. The outlet boxes, point control boxes, inspection and draw boxes shall be fixed as and when conduit is being laid. The recessing of conduits in walls shall be so arranged as to allow at least 12 mm plaster to cover the same. All grooves, chases, etc. shall be refilled with cement mortar and finished up to the wall surface before plastering of walls is taken up by the Contractor. Where conduits pass through expansion joints in the buildings, adequate expansion fittings or other approved devices shall be used to take care of any relative movement. Wherever conduits terminate into points control boxes, distribution boards, etc, conduits shall be rigidly connected to boxes, boards, etc. Running joints in conduits wherever necessary shall be rigidly held in aligned position. After conduits, junction boxes outlet boxes, etc. are fixed in position their outlets shall be properly plugged with PVC.

Stoppers or with any other suitable materials so that water, mortar, vermin or any other foreign material do not enter into the conduits system.

Draw box junction box, point control boxes, etc, shall be provided with bushes of PVC or rubber, after the conduit ends are properly filed to remove the burrs and sharp edges. Concealed conduit laying above false ceiling shall be executed in a similar manner described above. Wherever called for, surface conduit system shall be adopted with PVC conduits being fixed on to the wall surfaces, ceilings, etc., with saddles, clamps and screws.

Conduit shall be run in square and symmetrical lines with proper drawing and ventilation. Before surface conduits are installed, the exact route shall be marked at site and the approval of the Employer's Engineer shall be obtained.

Conduit shall be concealed wherever specified in ceiling, walls, etc. as required. The conduits shall be laid in ceiling slab before pouring of Concrete. Care shall be taken to ensure that conduits are not displaced during the process of pouring and consolidating the Concrete.

The following precautions shall be observed while installing the conduits:-

- a. As far as possible bending shall be done at site in a proper manner.
- b. Where a number of conduits converge, a large M.S. box shall be used to avoid crossing of conduits. Where conduits are installed in straight runs, draw boxes will be provided at centers not greater than 15 meters on straight runs and at every change in direction. No boxes will be provided in voids where access cannot be readily obtained.

The rate for rigid P.V.C. conduit sleeves shall include for recesses and holes, etc. in brick work for electrical conduits as shown on drawings and as directed on site and making good the same.

## **Section-I**

### **Specifications for LT (1.1 KV Grade) Cables**

**1 Scope:**

This specification covers supply, testing at works, supply at site, installation, termination, jointing, connection, testing at site, commissioning and handing over of 1.1 KV grade Cables.

**2 System :**

The 1.1 KV grade cables are to be used in under ground distribution system with normal system voltage of 415 V, 50 Hz, 3 phases, 4 wire systems.

**3 Applicable standards:**

Cables to be supplied under this specifications shall be with Copper or Aluminum conductor as specified, in drawings or Bill of Quantities, PVC insulated and PVC sheathed, armored and with an outer PVC protective sheath, heavy duty type and shall conform to,

IS 1554 (Part I) 1976: PVC insulated electric cables.

IS 1753: Aluminum conductors for insulated cables.

IS 3961: Recommended current ratings for cables.

**4 General requirements:**

4.1 All cables shall be new without any kinks or visible damage. The manufacturers name, insulating material, conductor size and voltage class shall be marked on surface of the cable at distance not exceeding 1 M.

4.2 Procurement of cables shall be on the basis of the actual site measurements and the quantities given shall be regarded as a guide. Before procurement of the cables, the contractor shall submit the detailed measurement sheet, based on site measurement showing the various cable lengths and after approval of the same place orders for the cables.

4.3 Cables shall be tested at factory as per IS requirement. The tests shall incorporate routine tests, type tests and acceptance test. The Contractor shall produce the certificate for type test.

4.4 The cables shall be of one of the makes mentioned in the list of approved materials and with ISI mark.

4.5 The cables shall be supplied and delivered at site in original cable drums with manufacturer's name, cable size, type and length all clearly indicated on each drum.

- 4.6 The unit rate shall include loading, unloading, transport, storage, handling, unwinding the cable from cable drums and laying in the cable trench or erected on cable trays etc.
- 4.7 The cables shall be laid by skilled and experienced labour.
- 4.8 Where the cable route intersects roads, streets or pathways, RCC spun pipes shall be laid in the trenches to serve as cable ducts. The pipes shall be joined by RCC spun collars. The RCC pipes shall project at least 150 mm on either side of road crossing.
- 4.9 The cable loops shall be kept at both ends of the cable length. Minimum 3 meters long loop shall be provided.
- 4.10 The contractor shall take care to see that the cables received at site are apportioned to various locations to ensure maximum utilization and cable joints are avoided. This apportioning shall be got approved before the cables are cut to lengths. Straight joints are permitted only under exceptional circumstances.

**5 Storage and loading, unloading of cables. :**

- 5.1 Cable drums shall not be stored one above the other. Sufficient space between cable drums shall be left for air circulation and the drums shall stand on battens placed directly under the flanges.
- 5.2 Cable drums shall be stored preferably on a plain ground without having any hard stones or any other sharp materials projecting above the ground surface. The drums shall be stored preferably in the shed or otherwise they shall be covered by tarpaulin.
- 5.3 Drums shall be stored and kept in such a way that bottom cable end does not get damaged.
- 5.4 Drums shall be rotated only in the direction marked on the drum.
- 5.5 Loading and unloading shall be done with material handling equipments only.

## **6 Erection and laying of cables:**

### **6.1 General:**

- 6.1.1 All cables shall be adequately protected against any risk of mechanical damage to which they may be liable in normal conditions of service.
- 6.1.2 When cables pass through holes in metal work, precautions shall be taken to prevent abrasion of the cables on any sharp edge. Cables passing through walls, ceiling or floor shall run through sleeves of Hume pipes of adequate dia. & after pulling of the cables both ends of the sleeve shall be sealed with fire resistance material to prevent spread of fire.
- 6.1.3 In every vertical channel, duct, trucking or cable trench, containing cables and exceeding three meters in length, internal barriers shall be provided so as to avoid heating of the air at the top of the unit.
- 6.1.4 In every vertical cable shaft, cable trench or any passage of cable through wall, ceiling, floor etc. Barriers against spread of fire and smoke shall be provided.
- 6.1.5 In fire hazard areas extra care shall be taken to prevent spreading of fire in case of cable failure. Cables in these areas shall be covered by glass wool or embedded in sand in appropriate trenches. The cabling in such areas shall be done as per FIA approval and IEE regulations.
- 6.1.6 Communication cables should be laid away from the power cables to avoid electromagnetic interference. Minimum clearance of 300 mm shall be maintained.
- 6.1.7 Control and power cables shall be laid on separate trays.
- 6.1.8 The maximum number of power cables on a tray should be limited to six.
- 6.1.9 Every cable shall be installed where it will not be exposed to direct sunlight, rain, dripping water, oil or any corrosive substance.
- 6.1.10 The cables shall be erected and laid by either of the following methods and as specified in Bill of Quantities or specifications or drawings.



## **6.2 Cables laid in excavated trenches:**

- 6.2.1 The cables for external electrification work shall be laid in specially prepared cable trenches as specified under the section for cable trenches.
- 6.2.2 While laying cable in the trench the cable end shall be pulled with pulling eye only after mounting the drum on the jacks.
- 6.2.3 Care shall be taken in laying cables to avoid forming kinks. The drums shall be unrolled and cables run over wooden rollers, placed at intervals not exceeding 2 Mts.
- 6.2.4 High voltage cables are to be laid separately from other cables. HV, MV cables shall not be laid in the same trench and /or alongside of water main.
- 6.2.5 The cables shall not be laid directly in such soil, which is corrosive, and having components, which react with the insulating layer or amour of the cable. In such case it should be laid in pipes or concrete trenches.

## **6.3 Cables laid in built-up trenches:**

- 6.3.1 For the cable route passing through the area which is proposed to be covered with concrete/tiles etc. the cables shall be laid in the R.C.C./brick masonry cable trenches as specified in the items. This arrangement shall be generally inside the building.
- 6.3.2 For the area outside the building but covered with concrete /tiles etc. the cables shall be laid through R.C.C. pipes laid in ground with brick chambers at both ends. The chambers shall be covered with C.I. heavy-duty covers if the area is prone for vehicular traffic otherwise medium duty C.I. covers should be provided.
- 6.3.3 Cables laid in the built-up cable trenches within the building shall be raised so as not to lay at the trench bottom. Cables shall be either secured to the wall by saddles or laid on hot dip galvanized angle iron brackets or cable trays, ladder, rack, trough etc.
- 6.3.4 Where cables are clamped to the wall a minimum clearance of 100 mm shall be maintained between wall and cable and minimum 150 mm vertical clearance shall be maintained between two cables. Where cables are laid on cable brackets, the brackets shall not be fixed more than 500 mm apart to avoid sag in the cables. Where cables are laid on cable tray /ladder /troughs /racks, minimum 300 mm distance shall be observed between adjacent tier of tray/ladder /troughs /racks, and cable shall be fixed minimum 25 mm away from wall and minimum 150 mm distance shall be observed between two adjacent cables. Cable shall be properly fixed with the tray /ladder /troughs /racks with cable tie or saddles.

- 6.3.5 The dimensions of the trenches shall be determined depending upon the maximum number of cables that is expected to be accommodated. Wherever specified, trenches shall be filled with fine sand and covered with RCC or steel chequered trench covers.
- 6.3.6 Where cables are to be installed under floors or above suspended ceilings or below ceiling, they shall be laid on a cable tray and shall be run in such positions that they are not liable to be damaged by contact with the floor or the ceiling or their fixture. The cable tray shall be properly fixed with tie rod to the ceiling. The concrete inserts for fixing the tie rod shall be put in place while casting the slab. The cable tray route shall be co-coordinated with other services. While laying the cables on the tray minimum 150 mm distance shall be observed between two adjacent cables. At least 25 % space shall be kept spare for any future installation.
- 6.3.7 The cable reaching for the motors in the mechanical room or plant room or machine room or service area shall be laid on cable tray. The cable reaching to motors shall be protected by rigid galvanized conduits up to a height of 300 mm above the floor. Above that height, the cable shall be protected by means of oil tight flexible metallic conduits fixed to the terminal box of the motor. The connection between the rigid conduit and the flexible conduit shall be done by a screwed coupling of an approved type. The flexible conduit shall be properly fixed with the terminal box of the motor by means of double hexagonal check nut.

#### 6.4 **Duct System:**

Wherever specified cables shall be laid in underground ducts. The duct system shall consist of a required number of reinforced Hume pipes with simplex joints. Wherever asbestos cement pipes are used, the pipes shall be encased in concrete of 75 mm thick. The ducts shall be properly anchored to prevent any movement. The top surface of the cable ducts shall not be less than 60 cm below the ground level. The duct shall be at a gradient of at least 1:300.

The ducts shall be provided with inspection manholes at all direction changes and at required regular intervals for drawing the cables. The manholes shall be of reinforced concrete either cast-in-situ or precast. The manhole covers shall be cast iron and machine finished to ensure a perfect joint. The manhole covers shall be installed flush with the ground or paved surface. The ducts shall be properly plugged at the ends to prevent entry of water, rodents etc. Suitable duct markers shall be placed along the run of the cable ducts. The duct markers shall at least be 15 cm square embedded in concrete, indicating the voltage, number of ducts and the direction of run of the cable duct. Suitable cable supports made of angle iron shall be provided in the manholes for supporting the cables. Proper identification tags shall be provided for each cable in the manholes.

## **6.5 Cables on Trays / Racks:**

6.5.1 Cable shall be laid on cable trays/racks wherever specified. Cable racks/trays shall be of ladder, trough or channel design suitable for the purpose. The nominal depth of the trays/racks shall be 150 mm. The width of the trays shall be as per the design shown on drawing.

The cable trays shall be made of steel or Aluminum as specified. The trays/racks shall be completed with end plates, tees, elbows, risers, and all necessary hardware. Steel trays shall be hot dip galvanized. Cable trays shall be erected properly to present a neat and clean appearance. Suitable cleats or saddles made of Aluminum strips with PVC covering shall be used for securing the cables to the cable trays. The cable trays shall comply with the following requirements.

- a. The tray shall have suitable strength and rigidity to provide adequate support for all contained cables.
- b. It shall not present sharp edges, burrs or projections injurious to the insulation of the wiring/cables.
- c. If made of metal, it shall be adequately protected against corrosion or shall be made of corrosion resistant material.
- d. It shall have side rails or equivalent structural members.
- e. It shall include fittings or other suitable means for changes in direction and elevation of runs.

### **6.5.2 Installation of cable trays/racks:**

- a. Cable trays shall be installed as a complete system. Trays shall be supported properly from the building structure. The entire cable tray system shall be rigid.
- b. Each run of the cable tray shall be completed before the installation of cables.
- c. In portions where additional protection is required, non-combustible enclosures to be used.
- d. Cable trays shall be exposed and accessible.
- e. Where cables of different system are installed on the same cable tray, non-combustible, solid barriers shall be used for segregating the cables.
- f. Cable trays shall be grounded by two nos. earth continuity wires. Cable trays shall not be used as equipment grounding conductors.

## **7 Cable trenches (excavated):**

7.1 The cable trenches shall be excavated 60 cms below the finished ground level and shall have a minimum width of 300 mm for laying of single cable. When more than one cable are laid in the same trench, the width of the trench shall be increased such that the spacing between the cables is 200 mm and the end cables are at minimum 100 mm from the side of the trench. At the turning of the cable route the trench shall be dug with radius equal to 15 times the cable diameter.

- 7.2 The trenches shall be cut square with vertical sidewalls and with uniform depth. Suitable shoring and propping may be done to avoid caving in of trench walls. The floor of the trench shall be rammed and leveled. The bottom of the cable trench shall be prepared with 100 mm sand bed for laying the cables.
- 7.3 The cables shall be laid in trenches over the rollers. After the cable is laid and straightened it shall be covered with sand, and bricks shall be placed on top and at the side of the cable.
- 7.4 Wherever specified, half round RCC pipes shall be placed above the cables.
- 7.5 The cable trench then shall be refilled with excavated materials after removing the stones and other sharp materials and the refilled materials shall be compacted with light ramming.
- 7.6 Approved Cable markers made of Aluminum or CI with 15 cms crown shall be provided along the route of cables at a spacing of 25 - 30 meters and also at both ends of crossings or at the cable turning point. The class, type, No. of cables shall be indicated on markers.
- 7.7 Cable shall be laid in Hume pipes at all road crossings and in GI pipes at the wall entries or at the crossing of the drains/gutters.

**8. Cable jointing:**

- 8.1 The straight joint in cable shall be avoided as far as possible by correctly apportioning the cable lengths. If unavoidable following precautions shall be taken while jointing.
- 8.2 Cable jointing shall be done as per the recommendations of the cable manufacturer. Jointing shall be done by qualified cable jointer. The location of the cable joint shall not be where the cable takes a bend also where the soil is loose and shows signs of subsidence.
- 8.3 Cable jointing boxes shall be of appropriate size suitable for PVC insulated cables of particular voltage ratings and shall be of approved make.
- 8.4 Jointing of cables in the joint boxes and the filling of the compound shall be done in accordance with the manufacturer instructions and in an approved manner. All straight or T joints shall be done in epoxy mould boxes. All terminal leads of conductors shall be heavily soldered up to at least 50 mm length.
- 8.5 All cables shall be joined colour-to-colour and tested for insulation resistance and continuity before commencing the jointing. The seals of cables shall not be removed until preparations for jointing are completed. Joints shall be finished on the same day, as commenced and sufficient protection from the weather shall be arranged.

- 8.6 Joints shall be made by means of suitable solder for conductor, the conductors being firmly bolted into the connections or ferrule and the whole end soldered with proper solder and flux or resin. Conductors shall be properly insulated with high voltage insulating tape and by using separators of approved size and pattern. The joints shall be completely filled with epoxy compound (with necessary tapping) to ensure proper filling of the box.
- 8.7 Epoxy compound shall be prepared as per manufacturer instructions. Oil, water or any other liquid shall not be added to the mixture and which shall be used within 30 minutes of mixing. The surface on which epoxy is to be used shall be free from dust, rust, oil, grease and shall be dry. Joint shall not be moved or disturbed until the epoxy has completely hardened.

## **9 Cable Termination. :**

- 9.1 All cable terminations for conductors upto 4 sq.mm may be insertion type and all higher sizes shall have tinned copper compression lugs.
- 9.2 Cable termination shall be done in cable end box or in terminal box or in pillars etc. The end terminations shall be insulated with a minimum of six half lapped layers of PVC tape.
- 9.3 Cable terminations are to be made with flange type brass cable glands so as to grip inner and outer PVC sheaths and also the cable armour. Cable gland shall be bonded to earth.
- 9.4 The cable conductor ends are to be connected by crimping tinned heavy-duty copper lugs. Hydraulic crimping tool shall be used.
- 9.5 Every connection at a cable termination shall be mechanically and electrically sound and protected against mechanical damage and any vibration liable to occur shall not impose any harmful mechanical damage to the cable conductor.

## **10 Testing of cable before laying and commissioning:**

All tests shall be carried out in accordance with relevant IS codes of practice, IE rules and specifications.

- 10.1 100% cable drums shall be checked for continuity and cross continuity tests to ensure that there is no internal damage to the cable during transportation.
- 10.2 Prior to burying of cables, insulation resistance shall be measured with 500 V megger between the cores and all the cores to earth (armour) and results shall be recorded.
- 10.3 On completion of cable laying work, all the tests such as insulation resistance test, continuity test, sheathing continuity test, earth test etc. shall be conducted in the presence of the Architects.

- 10.4 After the cables are installed, before commissioning it shall be tested for high DC voltage test. The recommended volts and duration of the test between each core and metallic armour (earth) at 3 KV DC is for 5 minutes. During high voltage test all electrical equipments related to the cable installation must be earthed and adequate clearance shall be maintained from the other equipments and from work to prevent flash over.

## **SECTION – II**

### **Specifications for Earthing and Lightning Protection**

#### **1 Scope:**

This specification covers supply of necessary materials, and erection at site, of complete earthing system including earth pits at the locations indicated, earth conductors from earth pit to the respective equipments, switchgears, pillars etc. and making connections, testing at site, commissioning and handing over.

#### **2 Applicable standards:**

The entire work of earthing system, shall confirm to IS 3043, Indian Electricity Act and Rules and relevant regulations. The work of Lightning protection shall conform to IS 2309.

#### **3 General requirements:**

- 3.1 The earthing shall generally be carried out in accordance with the requirements of Indian Electricity Rules 1956 as amended from time to time and relevant regulations. Following IE rules are particularly applicable. IE Rule Nos. 32, 51, 61, 62, 67, 69, 88(2) & 90.
- 3.2 All earth connections shall be carefully made, visible for inspection, and the testing of individual earth electrode shall be possible.
- 3.3 All materials, fittings etc. used in earthing shall conform to IS specifications and in the absence of which the approval of competent authority shall be obtained.
- 3.4 The earthing electrode shall be at a minimum distance of 2 metres away from the outer face of the building wall. A minimum clearance of twice the depth of the electrode shall be maintained between two earthing stations.
- 3.5 A brick masonry chamber to facilitate easy identification and for carrying out periodical tests and inspection shall be constructed on top of the earth pit.
- 3.6 All metal conduits, trunkings, cable sheaths, HT and MV switchgears, Transformers, distribution boards, meters, light fixtures, fans, and all other metal parts forming part of the work shall be bonded together and connected to earthing network as specified.
- 3.7 Earthing system shall be mechanically robust and the joints shall be capable of retaining low resistance even after passage of fault currents.

3.8 Joints shall be soldered, tinned and double riveted. All the joints shall be mechanically, electrically continuous and effective. Joints shall be provided against corrosion.

#### **4 Earth Electrodes:**

4.1 The materials of earth electrode and earth conductors shall be galvanised iron unless specified otherwise in Bill of Quantities, specifications or drawings.

4.2 The earth electrodes shall be free from paint, enamel, grease etc.

4.3 The earth electrode shall be embedded as far as practicable in a moist soil and below permanent moist level.

4.4 The earth electrode shall not be installed in the proximity of a metal fence.

#### **5 Types of earth electrodes:**

The earth electrodes shall be either a pipe electrode or plate electrode, the details of which are as given in the following sections of specifications, drawings and BOQ.

#### **6 Pipe electrode:**

6.1 Pipe electrode shall consist of 2.5 meter long single piece G.I. pipe of min. 40 mm dia. as specified and shall be cut tapered at the bottom. 12 mm dia. holes shall be drilled with 75 mm spacing between the holes and in a staggered manner as indicated in IS 3043.

6.2 The electrode shall be buried vertically in a specially prepared earth pit of size 35 cm x 35 cm and the earth pit shall be filled with alternate layers of charcoal, salt and fine washed sand for a minimum thickness of 150 mm. A funnel with wire mesh inside shall be fixed to the top of the GI pipe for watering purpose.

6.3 The earth conductor of 25 x 3 mm GI strip shall be connected to the electrode just below the funnel with proper terminal lugs and check nuts and the other end of earth conductor shall be connected to the equipotential bus of the equipments.

6.4 A masonry chamber with a cast iron cover hinged to the cast iron frame embedded in the top portion of the masonry shall be constructed on top of the GI pipe to house the funnel and the earth connection. The approximate size of the chamber shall be 300 mm x 300 mm and 300 mm deep.

6.5. The earth conductor from electrode shall be taken out of the masonry chamber through a protecting pipe embedded in the masonry.

6.6 The top of the masonry chamber shall be 50 mm above the finished ground level.



**7 Plate Electrode:**

- 7.1 The plate electrode shall consist of either copper plate of size 60cm x 60 cm x 3.15 mm or GI plate of size 60 cm x 60 cm x 6.3 mm, and as specified in the BOQ or drawings.
- 7.2 The electrode shall be buried vertically in a specially prepared earth pit, which shall be dug up to required depth, from the ground level. The earth plate shall be placed in the earth pit with its face vertical and embedded in the alternate layers of coal and salt for a minimum thickness of 15 cms.
- 7.3 The earth conductor shall be of same material as of the earth electrode. For copper earth electrode copper strips shall be provided as conductor and for GI earth electrode GI strips shall be used as earth conductor. The size and material of the earth conductor shall be as specified separately in the Bill of Quantities or drawings. The earth conductors shall be connected to the earth electrode (plate) with G.I. nut bolts, check nuts and washers and welded at the edges and shall be brought up in the masonry chamber at the ground level.
- 7.4 The earth conductor shall be extended via the earth link provided in the masonry chamber. This link shall be connected to earth conductors from the earth plate and earth conductor going to equipments with two Nos. of nut bolts, check nuts and washers (all of GI) to make secured connections. This link can be removed for testing the earthing.
- 7.5 A 20 mm dia. G.I. pipe shall be provided from the masonry chamber to the top of the earth plate for watering purpose. The G.I. pipe shall be provided with a funnel at the top with wire mesh inside.
- 7.6 A masonry chamber with a cast iron cover hinged to the cast iron frame embedded in the top portion of masonry shall be constructed on top of GI pipe to house the funnel & the earth connection. The approx. size of the chamber shall be 300mmx300mmx300mm deep.
- 7.7 The earth conductor from electrode shall be taken out of the masonry chamber through a protecting pipe embedded in the masonry.
- 7.8 The top of the masonry chamber shall be 50 mm above the finished ground level.

**8 Earth conductor:**

- All earthing conductors shall be of high conductivity copper and or GI as specified and shall be protected against mechanical injury or corrosion. The connection of earth continuity conductors of earth bus and earth electrodes shall be strong and sound and shall be rigidly fixed to the walls, cable trenches, cable trays or conduits and cables by using suitable clamps made of non ferrous metals.
- 8.1 The cross-sectional area of earthing conductor shall not be smaller than half that of the largest current carrying conductor, subject to the minimum size being not less than 1.5 sq.mm for copper and 2.5 sq.mm for Aluminium conductors and the upper limit being 70 sq.mm for copper and 120

sq.mm for Aluminium. The size of the galvanised iron earth continuity conductors may be equal to the size of the current carrying conductors with which they are to be used.

8.2 As a guideline the following sizes of earth continuity conductors shall be used for earthing installation

**8.2.1 Size of earth conductors for lighting and power circuits.**

| Cross sectional area of<br>current carrying<br>Cu conductor | cross sectional area of<br>earth continuity<br>Cu conductor |
|-------------------------------------------------------------|-------------------------------------------------------------|
| Size in sq.mm                                               | Size in Sq.mm                                               |
| 1.5                                                         | 1.5                                                         |
| 2.5                                                         | 1.5                                                         |
| 4.0                                                         | 2.5                                                         |
| 6.0                                                         | 4.0                                                         |

8.2.2 Size of earth conductors from main switchboard to sub main switches or distribution boards.

| Cross sectional area of<br>current carrying conductor<br>Copper/Alum. | Cross sectional area of<br>earth continuity conductor<br>Copper/Alum. |
|-----------------------------------------------------------------------|-----------------------------------------------------------------------|
| Size in sq.mm                                                         | Size in sq.mm                                                         |
| 4                                                                     | 2.5                                                                   |
| 6                                                                     | 4                                                                     |
| 10                                                                    | 6                                                                     |
| 16                                                                    | 10                                                                    |
| 25                                                                    | 16                                                                    |
| 35                                                                    | 16                                                                    |
| 50                                                                    | 25                                                                    |
| 70                                                                    | 35                                                                    |
| 95                                                                    | 50                                                                    |
| 120                                                                   | 70                                                                    |

8.2.2 The size of an earth continuity conductor contained in a flexible cable or flexible cord shall be equal to that of the current carrying conductor.

## **9 Earth connection:**

- 9.1 All metal clad switches and other equipment carrying single-phase current shall be connected to earth by a single connection. All metal clad switches carrying three-phase medium voltage and high voltage shall be connected with earth by two separate and distinct connections.
- 9.2 The earthing conductors inside the building, wherever exposed shall be properly protected from mechanical injury by running the same in G.I. pipe of adequate size. Earthing conductors outside the building shall be laid 600 mm below the finished ground level.
- 9.3 The over lapping of strips at joints where required shall be minimum 75 mm. The joints shall be revetted in an approved manner. Lugs of adequate capacity and size shall be used for all termination of wires above 6 sq.mm size and bare copper wire above 2.5 mm dia. Lugs shall be bolted to the equipment body to be earthed after the metal body is cleaned of paint and other oily substance and properly tinned.

## **10 Connection of earthing conductor:**

The earthing conductors are broadly divided in the following categories:

- 10.1 Main earthing conductor shall be taken from the earth electrode to the earth bus/connection at the main switchboard.
- 10.2 Sub-main earthing conductor shall run from the main switchboard to the sub-distribution boards.
- 10.3 Final earthing conductor shall run from the sub distribution boards to the final distribution boards.
- 10.4 Circuit earthing conductor shall run from the final distribution board to the exposed metal of the equipment to be earthed. This may run directly from final distribution boards or through earth leakage circuit breaker.
- 10.5 Metal conduits, cable sheathing and armouring shall be earthed at the ends adjacent to switch boards at which they originate or at the commencement of the run by an earthing conductor.
- 10.6 Earthing conductor enclosed with the current carrying conductors within the flexible cord shall be used only in case of equipments connected by flexible cord.
- 10.7 Lighting fittings, switches and accessories shall also be provided with an earthing conductor even though they may be rigidly secured / fixed with metallic conduit.
- 10.8 The electrical resistance of earthing conductors shall be low enough to permit passage of fault current necessary to operate a fuse, protective device or a circuit breaker.

**11 Prohibited Connection:**

Use of following as earth conductor is not recommended, and strictly prohibited for earthing an installation or even as a link in an earthing system. Neutral conductor, sprinkler pipes or pipes conveying gas, water or inflammable liquid, structural steel work, metallic enclosures or armour of cables and conductors, metallic conduits and lightning protection system conductors are all prohibited to be used as earth conductor.

**12 Earth Resistance:**

The earth resistivity of the soil where the earthing stations are located shall be submitted to the Architect before the earthing work starts and the approval shall be taken. If the earth resistance is too high and multiple electrode earthing does not give adequate low resistance to earth, then the soil resistivity immediately surrounding the earth electrodes shall be reduced by adding sodium chloride, calcium chloride, sodium carbonate, copper sulphate, salt and soft coke or charcoal in suitable proportions.

**13 Testing:**

On completion of the entire installation, the earthing network shall be tested for their resistance to earth in accordance with IS 3043. The contractor shall provide all meters, instruments & labour required for the test. The test results shall be submitted in triplicate to the Architects for approval. The following tests shall be conducted.

- a. Earth resistance of electrodes
- b. Impedance of earth continuity conductors.
- c. Effectiveness of earthing.

**14 Lightning Protection:**

Lightning protection network shall be provided for the specified buildings and locations for protection against lightning strikes. The network shall essentially consist of Air-termination units, down conductors, roof conductors, test terminals and earth electrodes etc. The entire system shall conform to IS requirements.

**14.1 Air-terminations:**

- a) An air-termination shall consist of a 1200 mm long, 25 mm dia 14 SWG Cu tube with 100 mm dia Cu sphere fixed at the top of the tube. The Cu sphere shall be fixed with 5 nos. 125 mm long and 12.5 mm dia threaded Cu spikes.
- b) The complete assembly shall be fixed at a highest possible location and shall project at least 1500 mm above the network on which it is fixed.
- c) All air termination shall be effectively secured against overturning by means of rod brackets and additional supports as required, which shall be permanently and rightly attached to the building.

The method and nature of fixing should be simple, solid and permanent.

#### **14.2 Down Conductors and Roof Conductors:**

- a) GI strip of specified size shall be used as down / roof conductors and the conductors shall be without sharp bends, upturns and kinks.
- b) As far as possible, the joints shall be avoided in down/roof conductors. In down conductor below ground level there shall be no joint. However in a total system where joints are unavoidable, the jointing shall be with approved method only. The joints shall be mechanically and electrically effective. The joints may be clamped, screwed, bolted, but preferably welded. The length of overlap at the joints shall not be less than 200 mm. Contact surface at joint shall be cleaned and then inhibited from oxidation with suitable non corrosive compound.
- c) The conductors shall be adequately protected against mechanical damage but for which metal pipes shall not be used.

#### **14.3 Test Links and Testing:**

Each down conductor will be provided with a testing point in a position convenient for testing but inaccessible for interference. No connection other than one direct to an earth electrode shall be made below a testing point. Testing points shall be with Copper. The ohmic resistance of the lightning protective system with air termination but without earth connection shall be measured and should be a fraction of an ohm. Earth resistance shall be measured in accordance with IS: 3043.

#### **14.4 Earth Terminations and Electrodes:**

Each down conductor shall have an independent earth termination. It should be capable of isolation for testing purposes. Earth electrodes shall be constructed and installed in accordance with IS: 3043.

### **SECTION – III**

#### **Specifications for MCB DB, MCB and RCCB**

##### **1 Miniature Circuit Breaker Distribution boards:**

- 1.1 Miniature circuit breaker distribution boards shall conform to IS 2675, IS 8623 and shall be suitable for operation on three phase, 4 wire, 415 V, 50 Hz, AC supply or single phase, 2 wire, 230 V, 50 Hz, AC supply.
- 1.2 The MCB distribution board shall be in sheet steel enclosures with removable type cover with additional door for protecting accidental operation.
- 1.3 Enclosure and door shall be made out of 16 SWG CRCA sheet steel and powder coated and of approved shade. The interior shall be off white finish. The DB shall be totally enclosed with dust and vermin proof construction and shall be of double door type. The DB boxes shall be as supplied by the original manufacturer.
- 1.4 Where distribution boards are specified to be complete with an isolator as incomer, the isolator shall be double pole for SP and N distribution boards and 4 pole for TP and N distribution boards.
- 1.5 Where distribution boards are specified to be complete with MCB + ELCB as incomer, the MCB + ELCB shall be double pole for SP and N distribution boards and 4 pole for TP and N distribution boards.
- 1.6 Bus bars shall be tinned copper. The internal connections in the DB shall be by using stranded copper conductor, PVC insulated wire with copper lugs crimped at both ends. Neutral busbar and earth busbars shall also be provided in the enclosure. Neutral busbar shall have equal rating of phase busbars.
- 1.7 Distribution boards shall be provided with circuit identification by means of directory on the front cover. Upon completion of the works, the contractor shall provide and fix accurate framed circuit lists for all distribution boards. These shall consist of perspex envelopes, fixed securely by an approved method on the inside face of each distribution board front cover into which shall be inserted a neatly typed list of circuits, indicating the number of circuits, phase, cable, size, number of points connected, circuit rating and the loading. The contractor, shall also provide and fix by means of brass screws tapped into the D.B. cover, labels, with black letter on a white background for all distribution boards, MCB + ELCB, Isolators etc. The engraving on the labels and the inscription on the circuit lists shall be approved by the Architects before the work is carried out.

- 1.8 All incoming terminals shall be fully shrouded.
- 1.9 The conduit entry plates shall be removable type and shall be provided at top and bottom. All the conduits shall be properly terminated using glands, grips, checknuts, female adapters with bush etc.
- 1.10 Wiring shall be terminated properly using crimping type copper lugs/sockets. Identification ferrules shall be provided on all wires. Each circuit shall have an independent neutral.
- 1.11 Two No. Earth terminals shall be provided on each Distribution Board.
- 1.12 Distribution boards shall be installed surface mounted or recessed mounted as specified and erected at the locations shown.

Surface mounted DB shall be mounted on a suitable size frame made out of GI ZED section. The hole fasts of the frame shall be grouted in the wall with cement mortar and the frame shall be painted with two coats of red oxide and two coats of enamel paint of approved shade. The DB shall be mounted on this frame with proper size nut bolts.

Recessed mounted DB shall be erected in the chase/cut portion of the wall. The cutting of the walls shall be done while constructing the wall and shall be of adequate size to comfortably accommodate the DB. The cut portion shall be smoothened and made plain and shall be fine finished. The DB shall be fixed in this chased portion with suitable clamps and bolts. The top cover of the DB cabinet shall be projecting out of the wall surface and free from any obstruction so as to open the same smoothly.

## **2 Miniature Circuit Breakers:**

- 2.1 MCB's shall be manufactured in accordance with IS 8828 having a short circuit breaking capacity category 10 kA at both 240 volts 50 Hz. and 240/415 V, 50 Hz and complying with the test requirements for both reference calibration temperatures of 20 degree C and 40 degree C.
- 2.2 All miniature circuit breakers shall be rated to withstand the fault currents of the circuits they protect without causing any interference in any other protective device associated with the distribution system. At the same time the design of the circuit breakers shall be such that, it will protect the circuit for which it is intended and not cause or allow other protective devices to operate when fault conditions apply.
- 2.3 Miniature circuit breakers shall be capable of carrying its full rated current continuously without tripping out.
- 2.4 All the miniature circuit breakers shall be fitted with a magnetic undelayed tripping mechanism. These shall have overload and short circuit elements.
- 2.5 Time current characteristic of the MCB shall match with that of HRC fuses..

**3 Residual current operated circuit breakers (RCCB)**

- 3.1 RCCB shall be manufactured in accordance with IS 12640 and IS 8828 having a short circuit breaking and earth fault protection up to 9 KA at both 240 Volts 50 Hz and 240/415 V, 50 Hz and complying with the test requirements as per IS 2640.
- 3.2 RCCB shall be designed to interrupt the circuit during an earth fault, overload or short circuit. All RCCB shall be high sensitive and calibrated to trip the power supply when the residual current is more than 50 % of its calibrated rating. This means that a 30 mA sensitivity RCCB should trip when the residual current is in the range of 15 to 30 mA and a 300 mA RCCB should trip when the residual current is in the range of 150 to 300 mA.
- 3.3 The RCCB shall be truly current operated, which means that it shall be totally independent of the main voltage for tripping. RCCB must operate for nominal voltage well below the maximum safe value of 10 volts. RCCB shall interrupt the circuit within 30 milisec at a leakage current of 30 mA.
- 3.4 RCCB shall be provided with a neutral advance mechanism. RCCB shall be functioning even in the event of failure of neutral and/or any one or two of phase supply conductor. RCCB shall be provided with trip free mechanism ensuring that the device cannot be reclosed / reset if the fault persists. RCCB shall be functioning even in the case of interchange of load and supply side connections.
- 3.5 Test button shall be provided to check the correct operation of the unit.
- 3.6 RCCB shall be designed for a very long life of a minimum of 20,000 operations and shall be capable of withstanding inrush current of 4 to 8 times the rated current. For the proper functioning the RCCB should not require any connection of earthing on the device.
- 3.7 The device should have high tripping accuracy of less than 5% of rated tripping current. The RCCB shall be provided with clear indication to show whether the tripping is due to current leakage or overload/short circuit.
- 3.8 The MCB section of RCCB shall be provided with arc chambers and vents are also to be provided to release the arcing products in the atmosphere, so as to increase contact life and to prevent damage to the insulation. The self-extinguishing thermoset plastic material shall be used for body and shall have a modular construction. The device should be vibration proof.

**4 Moulded Case Circuit Breakers (MCCB)**

MCCBs used shall be suitable for 440 V, AC, 50 Hz supply and shall be capable of withstanding electrical and mechanical stress due to short circuit capacity as specified for individual requirement. The MCCB shall be compact in size, dust and vermin proof with quick make and break operating mechanism. The construction shall be such as to ensure maintenance and current setting adjustment without removing the MCCB from the panel. The MCCB shall be suitable for interlock with panel door on which it is mounted.



**SECTION - IV****Specifications for Medium Voltage Distribution Panel Boards****1 Scope:**

This section shall cover supply, assembly, installation, connection, testing and commissioning of medium voltage distribution panel boards as described in this specifications, drawings and schedule of quantities.

**2 System:**

All the medium voltage distribution panel boards shall be suitable for operation on three phase, 4 wire or single phase, 2 wire with normal system voltage of 415/240 volts, 50 Hz, A.C. supply with solidly grounded neutral system.

**3 Weather condition at site:**

The panel boards shall be suitable for continuous operation and designed to withstand heaviest conditions at site.

- a) Temperature range: 40 to 45 ° C
- b) Relative humidity: 50 to 80 %
- c) Weather: Dusty

**4 Applicable IS Standards:**

The panel boards to be supplied under this specification shall confirm to latest editions of relevant Indian Standards and Indian Electricity rules and regulations. The following Indian Standards shall be complied with.

**IS 4237:** General requirements for switch gear and control gear for voltage not exceeding 1000 V.

**IS 2208:** HRC cartridge fuse links upto 610 V.

**IS 2705:** Current transformers

**IS 1248:** Electrical Indicating Instruments.

**IS 375:** Switch gear bus-bars, main connection and auxiliary wiring, marking and arrangement for.

**IS 2147:** Degree of protection provided by enclosures for low voltage switchgear and control gear.

**IS 2675:** Enclosed distribution fuse boards and cutouts.

**IS 2557:** Danger notice plates.

**IS 1567/4047:** Specifications for switch fuse units.

**IS 3072 (I):** Installation and maintenance of switchgears.

## **TECHNICAL CONDITIONS ELECTRICAL**

### **5 General:**

#### **5.1 Shop drawing:**

Prior to fabrication of the panel boards, the contractor shall submit for the approval of the Architect, the shop / vendor drawing and design calculations indicating type, size, short circuit rating of all the electrical components used, busbar size, internal wiring size, panel board dimension, colour, mounting detail etc. The contractor shall submit manufacturer's catalogues of the electrical components installed in the panel boards.

#### **5.2 Inspection:**

At all reasonable times during production and prior to transport of the panel boards to site, the contractor shall arrange and provide all the facilities at manufacturer's plant for inspection and testing and any stage inspection agreed upon.

#### **5.3 Test certificates:**

Testing of panel boards shall be carried out at factory or at site as specified in Indian Standards in the presence of Architect. The test results shall be recorded on prescribed forms. The test certificates for the test carried out at factory or at site shall be submitted in duplicate to the Architect for approval.

### **6 Cubical type Panel boards:**

#### **6.1 Construction:**

##### **6.1.1 Structure**

The panel board shall be metal enclosed sheet cubical, compartmentalised suitable for indoor or outdoor installation having dead front, floor mounting type. All M.S. sheets used in the construction of panel boards shall be 16 SWG (1.6 mm) thick unless specified otherwise in the item and shall be folded and braced as necessary to provide a rigid support for all components. Joints of any kind in sheet steel shall be seam welded, all welding slag ground off and welding pits wiped smooth with plumber metal.

The panel boards shall be totally enclosed, completely dust and vermin proof. Gaskets between all adjacent units and beneath all covers shall be provided to render the joints dust proof. All doors and covers shall be lockable and fully gasketed with foam rubber or neoprene rubber strips.

All panels and covers shall be properly fitted and secured with the frame, and holes in the panel correctly positioned. Fixing screws shall enter into holes tapped into an adequate thickness of metal or provided with bolt and nuts. Self-threading screws shall not be used in the construction of panel boards. Suitable base channels (min size 75 mm x 75 mm x 5 mm thick) shall be provided at the bottom. A Clearance of 300 mm between the floor of the panel board and the bottom of the lower

most units shall be provision Panel boards, if necessary shall be preferably arranged in multitier formation. The panel boards shall be of adequate size with a provision of spare space (as jointly decided with the Architect) to accommodate possible future additional switchgear. The size of the panel boards shall be designed in such a way that the internal space is sufficient for hot air movement, and the electrical component does not attain temperature more than 40 degree Celsius. Opening for natural ventilation shall be provided and shall have screens or grills made of brass or stainless steel wire mesh.

The panel boards shall be provided with removable sheet steel plates at top and bottom with knockout holes of appropriate size and number in conformity with the number, and size of incoming and outgoing conduits /cables.

The panel boards shall be designed to ensure maximum safety during operation, inspection, connection of cables, maintenance and repairs etc. with busbar system energised. Means shall be provided to prevent shorting of power and /or control terminals due to accidental drop of maintenance tools etc. inside the panel board. Partitions between feeder compartments, busbar chamber, cable alleys, vertical panels etc. shall be provided to take care of this aspect. The panel boards shall be sufficiently rigid to support the equipment without distortion under normal and short circuit condition; they shall be suitably braced for short circuit duty.

For buses and cables, access shall be limited from front and top only. All other equipment shall be mounted on the front side, (unless specified otherwise for any specific panel) and shall be accessible from the front. All joints and connections shall be made by cadmium plated high tensile steel bolts, nuts and washers secured against loosening.

It shall be possible to insert any new cable and to connect all load side wiring with the busbar energized, without any special precautions. Opening of the busbar chamber shall be possible with special tools only.

#### 6.1.2 **Protection clause:**

All the outdoor panel boards shall have protection clause of IP 55. The complete board shall be double jacketed with insulation material to withstand outdoor temperature. All the indoor panel boards shall have protection clause IP 52.

#### 6.1.3 **Powder coating:**

All sheet steel work shall undergo a seven tank process of degreasing pickling in acid, cold rinsing, phosphatising, passivating and then treated with powder coating treatment. The finishing shall be of shade as approved by the Architect. The interior surface shall have similar finish.

#### 6.1.4 **Circuit compartments:**

Each switch fuse units and meters shall be housed in a separate compartment and shall be enclosed on all sides. Sheet steel hinged lockable door shall be duly inter locked with the breaker/switch fuse units in "ON" and "OFF" position. However it shall be possible to bypass this interlock for inspection purpose.

#### 6.1.5 **Instrument compartment:**

Separate and adequate compartment shall be provided for accommodating instruments, indicating lamps, control contactors /relays, and control fuses etc. These components shall be accessible for testing and maintenance without any danger of accidental contact with live parts of the circuit breaker/switch fuse units busbar and connections.

#### 6.1.6 **Busbars and wiring:**

The busbars shall be of three-phase four wire system with separate neutral and earth bar. The busbar and interconnection between busbars and various components shall be with high conductivity, hard drawn, electrolytic copper strips.

The busbar shall be of rectangular cross section designed to withstand full load current for phase busbars and full rated current for neutral busbars and shall be extensible on either side. The busbar shall have uniform cross-section through out the length. The rating of the busbars shall be as specified in BOQ and/or drawings.

The busbars and interconnections shall be insulated with color coded insulation tapes/covers. The busbars shall be supported on unbreakable, non-hygroscopic insulated supports at sufficiently close intervals to prevent sagging and shall effectively withstand electromagnetic stresses in the event of short circuit. The busbars shall be housed in a separate compartment. The busbar shall be isolated with 3 mm thick hylum sheet to avoid any accidental contact. All busbars connection shall be done by drilling holes in busbars & connecting by chromium plated brass bolt and nuts. Additional cross section of bus bars shall be provided in all distribution boards to cover up the holes drilled in the busbars. Spring and flat washers shall be used for tightening the bolts. All interconnections between busbars and circuit breakers/switches and between circuit breakers/switches and cable terminals shall be through solid copper strips of proper size to carry full rated current. These strips shall be insulated with insulating tapes/covers.

All interconnections in the panel shall be with Cu busbars for switchgears of ratings 63 A and above. For switch gears below 63 A, flameproof Cu wires to be used with lugs crimped at both ends.

All busbars shall be tinned copper strips of the given cross section. Unless otherwise specified all bus bars are to be designed taking maximum current density of 800 Amp per sq inch.

All busbars are to be covered with heat shrinkable PVC sleeves of red, yellow, blue and black colours to indicate various phases and neutral bar clearly.

#### 6.1.7 **Terminals:**

The outgoing terminals and neutral link shall be brought out to a cable alley suitably located and accessible from the panel front. The current transformers for instruments metering shall be mounted on the terminal blocks. No direct connection of incoming or outgoing cables to internal components of the panel board is permitted. Only one conductor may be connected in one terminal. Adequate no of spare terminals of required size shall be left in each compartment.

#### 6.1.8 **Wire ways:**

A horizontal wire way with screwed covers shall be provided at the top to take interconnecting control wiring between different vertical sections.

#### 6.1.9 **Cable compartments:**

Cable compartments of adequate size shall be provided for easy termination of all incoming and outgoing cables entering from bottom or top. Adequate proper supports shall be provided in the cable compartments to support cables. All outgoing and incoming feeder terminals shall be brought out to terminal blocks in the cable compartment.

#### 6.1.10 **Earthing:**

Tinned copper earth bars of suitable size shall be provided for the entire length of the panel. Provision shall be made for connection from this horizontal earth bar to the earth pit on both side of panel board. The earth continuity conductor of each incoming and outgoing feeder shall be connected to the vertical earth bar.

All non-current carrying parts and the framework of panel board shall be connected to this earth bar. All doors and movable parts shall be connected to earth bus with flexible copper connections. Armour of the cable shall be properly connected with earthing clamp, and the clamp shall be bonded with the earth bar.

#### 6.1.11 **Name plate, labels and directory:**

A nameplate with switchgear designation shall be fixed at the top of the panel board. A separate nameplate giving feeder details shall be provided for each panel.

Engraved nameplates shall be of 3-ply (red-white-red or black-white-black) lamicaid sheets. Size of the letters shall be 5 mm. Nameplates shall be fastened by screws and not by adhesive. Size of letter for Main nameplate shall not be less than 20 mm.

Engraved PVC labels shall be provided on all incoming and outgoing feeders. Single line circuit diagram showing the arrangements of circuit inside the panel board shall be pasted on inside of the

panel door and covered with transparent laminated plastic sheet. PVC labels shall be provided for spare circuits also.

Panel boards shall be provided with a directory indicating the area or loads served by each circuit breaker, the rating of breakers, size of conductors, etc. The directory shall be mounted in metal holder with a clear plastic sheet on inside surface of the front door.

#### 6.1.12 **Danger notice plates:**

Danger notice plates with symbol as per IS shall be provided on panel boards.

#### 6.1.13 **Fuse puller etc:**

One set of fuse puller (for various amps of fuses), panel keys and special tools etc. shall be supplied with each panel board.

#### 6.1.14 **Internal components:**

The panel boards shall be equipped complete with all type of required number of circuit breakers, switch fuse units, contactors, relays, fuses, meters, instruments, indicating lamps, push buttons, equipment, fittings, busbars, cable boxes, cable glands etc., and all the necessary internal connections/wiring as required and as indicated on relevant drawings.

Components necessary for proper complete functioning of the panel boards, but not indicated on the drawings and specifications shall be supplied and installed.

All part of the panel board carrying current including the components, connections, joints and instruments shall be capable of carrying their specified rated current continuously, without temperature rise exceeding the acceptable values of the relevant specifications at any part of the panel boards.

The derating of the different items resulting from the prevailing conditions like room temperature shall be allowed for while selecting the components.

All units of the same rating and specifications shall be fully interchangeable.

### 1. **Switches:**

Switches shall be air break type as per IS 4047. The switch operating handle shall be front mounted and interlocked with the door when the switch is in ON position. The live parts shall be shrouded with suitable insulating barrier so as to prevent accidental contact with the live parts after opening the cubicle front door.

**2. Fuses:**

All power and control fuses shall be link type. Screw type fuses are not acceptable. All fuse links shall be HRC type and shall generally conform to IS 2208. Rewirable fuses are not acceptable. All fuses shall be readily accessible for replacement. It shall not be necessary to remove any piece of equipment or to disconnect wiring before replacing fuses using fuse puller.

**3. Control switches:**

Ammeter selector switches shall have make before break feature on its contacts. The selector switches shall generally have four positions for reading three phase currents and neutral. The voltmeter selector switch shall also have four positions and the fourth shall be OFF position. Remote trip /off selector switch shall be lockable in OFF position.

**4. Indicating lamps:**

The indicating lamps shall be LED type.

**5. Measuring and Indicating instruments:**

All measuring and indicating instruments shall be Digital type, in square pattern moving from 90 deg. scale, 96mm x 96mm, flush mounting type. Instrument shall be of accuracy class 1 as per IS 1248. Ammeters for motor and other feeders shall be graduated for full load current of motor with a compressed scale at the end for at least 6 times full load current. The KW meter and PF meter shall be suitable to measure unbalanced loads on 3-phase 4 wire system. PF meter shall be in 0.5 - 1 - 0.5 range. CTs shall be resin cast, with class 1 accuracy and 15 VA burden. The energy meters shall be CT operated electrolytic type.

**6. Push buttons:**

Push buttons shall be suitable for panel mounting type and comprise of a contact element and an actuator. The contacts shall be of silver alloy and of 10 A continuous current rating. Each push button shall be provided with 1 NO + 1 NC contacts, but if required 2 NO + 2 NC contacts be provided. Colour of the knob shall be as per IS.

**7. Packing and transport:**

The bigger size panel boards shall be shipped to site in wooden crates. They shall be wrapped with polythene sheets before being placed in crates to prevent damage to the finish. Crates shall have skid bottoms for handling. All panels shall have one set of two silica gel bags, which shall be checked periodically both while in storage and while in service. The smaller size panel boards shall be transported to site with polythene sheets wrapped all along and wooden frame to cover the same.

**8 Storage at site:**

The panels shall be stored in a well ventilated, dry place and suitable polythene covers shall be provided for necessary protection against moisture.

**9      Installation:**

The panel boards shall be installed at the location as indicated in the drawings. The contractor shall submit for approval a shop drawing indicating room size, panel size and method of installation prior to installation.

The cubicle type panel board shall be installed on suitable foundation. Foundation shall be as per the dimensions supplied by the panel manufacturer. The foundation shall be flat and level. Suitable grouting holes shall be provided in the foundation. Suitable MS base channel shall be embedded in foundation on which the panel can be directly installed. If the panel is provided with an angle iron pedestal or base plate the same shall be grouted firmly in the floor. The panel boards shall be properly aligned and erected in plumb and bolted to the foundation by bolt parallel to the walls.

After installation of the panel boards, various components of the boards shall be checked and be put in working order. The cables laid through cable trench or on cable trays/racks etc. shall be terminated on the bottom plate or top plate as the case may be, by using siemens type brass compression glands. The individual cables shall then be led through the panels to the required feeder compartments for necessary terminations. The cables shall be clamped to the supporting arrangement. The switchboard earth bus shall be connected to the local earth grid. Connection of cables shall be by crimping type Cu lugs using hand operated or hydraulic crimping tool as per cable sizes.

**10     Testing:****1)     Testing at factory:**

Panel boards shall be inspected at factory at pre-assembly stage and any modifications or changes as suggested shall be incorporated. The panel boards shall be again inspected and tested at the factory after assembly of all components and completion of all inter-connections and wiring. The tests shall include all routine and type tests as per relevant ISS.

**2)     Testing and pre-commissioning checks at site:**

Panels shall be commissioned only after the successful completion of the following tests. The tests shall be carried out in the presence of the Architect.

**2.1    Precommissioning checks:**

- 1) Check all panels are aligned in line and properly erected in plumb.
- 2) All withdrawals portions shall be capable of smooth extraction and isolation.
- 3) All main and auxiliary bus bar connections shall be checked and tightened.
- 4) All wiring terminations and bus bar joints shall be checked and tightened.
- 5) Wiring shall be checked to ensure that it is according to the drawing.



- 6) Before fitting the covers, all chambers, compartments, cable alleys etc. shall be checked for complete cleanliness and removal of foreign matter if any, particularly the tools used for erection, cut pieces of cable armour etc. Covers shall be properly fixed with all fixing screws in places.
- 7) All mechanical interlocks shall be checked and all fuses and links shall be inserted.
- 8) Earthing connections shall be checked.
- 9) Operational checks on all circuit breakers or switchgear shall be carried out, both mechanically and electrically to check that correct indications are provided for closed and open positions.
- 10) The panels shall be checked to ensure that moisture ingress has not taken place during transit and storage.

## **2.2 Testing at site:**

- 1) Insulation of the main circuit, that is, the insulation resistance of each pole to the earth and that between the poles shall be measured.
- 2) All wiring shall be tested for insulation resistance by a 1000 volts megger.
- 3) All relays and protective devices shall be tested for correctness of settings and operation by introducing a current generator and an ammeter in the circuit.
- 4) Insulation test shall be carried out both before and after high voltage test.
- 5) A high voltage test with 2.5 KV for one minute shall be applied between the poles and earth. Test shall be carried out on each pole in turn with the remaining poles earthed, all units racked in position and the breakers closed. Original test certificate shall be submitted along with panel.

## **TECHNICAL SPECIFICATIONS FOR SITC OF FIRE FIGHTING SYSTEMS**

### **SECTION-1:: BASIS OF DESIGN**

#### **1. BASIS OF DESIGN :**

The fire fighting system for the project is designed keeping in view the following:

- 1.1 Provision of fire fighting systems such as fire hydrants, hose reel, portable fire extinguishers and manual fire alarm system.
- 1.2 Layout: The execution of works and materials used shall be as per the latest relevant I.S. specifications. Wherever reference has been made to Indian Standard or any other specifications, the same shall mean to refer to the latest specification irrespective of any particular edition of such specification being mentioned in the specifications below or schedule of quantities.

#### **2. CONCEPT OF THE SYSTEM :**

The following services have been envisaged for the complex:

- 2.1 Fire fighting system for the complex comprises of hydrant system connected with down comer, Hose Reels, Portable Fire Extinguishers and Fire Alarm system.
- 2.2 Following components shall be included in the water supply system for efficient functioning.
  - i) Automatic air vent at convenient locations.
  - ii) Drain valve.
  - iii) Flow meter.
  - iv) Pressure gauge.

#### **3. WORKMANSHIP:**

The workmanship shall be best of its kind and shall conform to the relevant IS specifications mentioned below and elsewhere in this document in every respect or latest trade practices and shall be subject to approval of the owner's site representative. All materials and/or workmanship which in the opinion of the site representative of LIC of India is defective or unsuitable shall be removed immediately from the site and shall be substituted with proper materials and /or workmanship forth with.

#### **4. MATERIALS:**

All materials shall be best of their kind and shall conform to the latest Indian Standards. The materials to be used at site shall be of approved quality as per samples and approved by the LIC of India.

As and when required by the site representative of LIC of India, the contractor shall arrange to test the materials and / or portions of works at his own cost to prove their soundness and efficiency. If after tests any materials or portion of work are found to be defective or unsound by the site representative of LIC of India, the contractor shall replace the defective materials from site, pull down and re-execute the works at his own cost to the satisfaction of site representative of LIC of India. In order to substantiate that, the materials used are as specified the contractor shall furnish the site representative of LIC of India with original invoice on demand.

## **SECTION-2 : FIRE PROTECTION SYSTEM**

### **1. SCOPE:**

The scope of this section consists of but is not limited to supply, installation, testing and commissioning of the fire protection system. The philosophy of the system is as mentioned below.

- a) The fire suppression system shall comprise of fire hydrant system, hose reel, connected to down comer being pressurized through independent terrace pumps on individual blocks.
- b) Water from terrace tank shall feed water to the hydrant landing valves & hose reels on each floor through down comer.
- c) The fire hydrant system shall remain pressurized under gravity all times and during emergency situation the terrace pump shall start automatically at a pre set pressure to boost the pressure for fire fighting.
- d) Each of the down comers shall be provided with an electric driven terrace pump. The starting of the pump shall be both manual and automatic and stopping shall be manual.
- e) Contractor shall ensure Hydro Testing for the complete system.
- f) The contractor shall obtain necessary approval of the drawings and the schemes from Local Fire Prevention Officer without any cost to the LIC of India.
- g) The contractor shall design and after approval of site representative of LIC of India display near each staircase landing at all floors a glass covered framed floor plan clearly showing the locations of all landing valves, hose reels, manual alarm points & hand appliances (fire extinguishers), as well as the Do's and Don'ts for the personnel. The routes to reach the EXITS shall be clearly marked and directional sign posted to guide the population of the concerned floor for escape to safe locations. EXIT signs shall be of auto glow type which shall glow during dark. The dimensions, lettering size and color code etc shall be directed by the site representative of LIC of India.

### **2. PIPING WORK::**

#### **2.1 GENERAL REQUIREMENT:**

- a) All materials shall be of the best quality conforming to the specifications and sample subject to approval of the site representative of LIC of India.
- b) Pipes shall be routed in such a manner as to provide easy accessibility for repair and maintenance and shall not cause obstruction in shafts, passages etc.
- c) Pipes shall be securely fixed to walls and ceilings by suitable clamps and supports (galvanized) at intervals specified elsewhere in this document.
- d) Valves and other fittings shall be so positioned that they are easily accessible for operation and maintenance.
- e) Pipes and fittings shall be fixed truly vertical, horizontal or in slopes as required in a neat workmen like manner.

- f) Pipe accessories such as gauges, meters, control devices etc shall have the same working pressure rating as the associated pipe work.
- g) All pipe work shall be free from burrs, rust and scale and shall be cleaned before installation.
- h) All personnel engaged on welding operations must possess a certificate of competence issued by appropriate authority.

## 2.2- PIPING:

- a) Pipes of following types viz, 100 mm nb, 80 mm nb, 65 mm nb, 50 mm nb, 25 mm nb are to be used for the fire suppression net work.
- b) Mild steel black pipes as per IS:1239, part-II, heavy grade (for pipes of sizes 100 mm nb and below) shall be used and suitably lagged on the outside to prevent soil corrosion. Wherever pipes are crossing floors and wall or the like suitable tape coat of 3 mm thick shall be provided.
- c) Pipes required to be hung shall be by means of expandable anchor fastener of approved make and design. The hangers and clamps shall be fastened by means of galvanized nuts and bolts. The size / diameter of the anchor fastener and the clamps shall be suitable to carry the weight of water filled pipe and dead load normally encountered.
- d) The selection and design of the hanger & support shall be capable of carrying the sum of all concurrently acting loads. They shall be designed to provide the required supporting effects and allow pipe line movements as necessary. All guides, anchor braces and structural steel to be attached to the building/structure trenches etc shall be provided. Hangers and components for all piping shall be approved by the owner's site representative/ consultant.
- e) The entire piping system shall be hydro tested for leakages at 2 times the operating pressure or 1.5 times shut-off pressure, whichever is highest including testing for water hammer effects.

## 2.3 –PIPING INSTALLATION AND SUPPORT:

- a) Piping shall be properly supported on, or suspended from, on stands, clamps, hangers as specified and as required. The contractor shall adequately design all the brackets, saddles, anchor, clamps and hangers and be responsible for their structural stability.
- b) Pipe work and fittings shall be supported by hangers or brackets so as to permit free expansion and contraction.
- c) Down comers shall be supported by hangers or brackets so as to permit free expansion and contraction.
- d) Down comers shall be supported at each floor with galvanized steel clamps.
- e) To permit free movement of common piping support shall be from a common hanger bar fabricated from galvanized steel sections.
- f) Pipe hangers shall be provided at the following maximum spacing.

| PIPE DIA (MM) | HANGER ROD DIA (MM) | SPACING BETWEEN SUPPORTS (M) |
|---------------|---------------------|------------------------------|
| Up to 25      | 6                   | 2                            |
| 32 to 50      | 10                  | 2.7                          |
| 80 to 100     | 12                  | 2.7                          |
| 125 to 150    | 16                  | 3.6                          |

- g) The end of the steel rod shall be threaded and not welded to the threaded bolt.
- h) All pipe work shall be carried out in a proper workman like manner, causing minimum disturbance to the existing services, buildings, roads and structure.
- i) Pipes passing through walls & floor shall be provided with 3 mm thick wrapping and coating of tape coat. The contractor shall make sure that the clamps, brackets, saddles and hangers provided for pipe supports are adequate or as specified / approved by LIC of India.
- j) All pipes shall be accurately cut to the required sizes in accordance with relevant BIS codes and burrs removed before laying. Open ends of the piping shall be closed to avoid entry of foreign materials. Where reducers are to be made in horizontal runs, eccentric reducers shall be used for the piping to drain freely. In other locations concentric reducers may be used.
- k) Automatic air valves shall be provided at all high points in the piping system for venting.

### 3. FIRE BRIGADE CONNECTION:

- a) Two way fire brigade connections shall be fitted to each down comer with two 63 mm instantaneous inlets in a glass fronted wall box at a suitable position at street level, so located as to make the inlets accessible from the outside of the building.
- b) The size of the wall box shall be adequate to allow hose to be connected to the inlets, even if the door cannot be opened and the glass has to be broken.
- c) Each box shall have fall of 25 mm towards the front at its base and shall be glassed with wired glass with FIRE BRIGADE INLET painted on the inner face of the glass in 50 mm size block letter.
- d) Each such box shall be provided with steel hammer with chain for breaking the glass.

### 4. SYSTEM DRAINAGE:

The system shall be provided with suitable drainage arrangement with drain valves complete with all accessories.

### 5. VALVES:

#### Sluice Valve:

- a) Shall conform in design and materials of construction to PN 1.6 of IS : 780-1984
- b) Shall be ISI marked.
- c) Shall be installed in a masonry pit with C.I. cover.

**Non-return Valve :**

- a) Shall be conforming in design, dimensions and materials to PN 1.6 of IS : 5312(Part I)-1984.
- b) Shall be ISI marked.

**Landing Valve :**

- a) Shall be single headed conforming to IS : 5290 type A.
- b) Shall be ISI marked.

**6. Hoss Reel Assembly :**

- a) Shall be conforming to type A of IS : 884-1985
- b) Shall be consisting of following components :
  - i) HUB
  - ii) Swinging type.
  - iii) Pipe with fitting.
  - iv) Wall bracket.
  - v) Hose reel.
  - vi) Nozzle
  - vii) Stop valve.

**7. Hose Pipe :**

Shall be 63mm dia. Reinforced rubber lined hose conforming and tested to IS : 636 ĩ 1988 and a pair of GM coupling wired on to each length of hose. For indoor control percolation type.

**8. Branch Pipe & Nozzle :**

- a) Shall be conforming to IS : 2871 ĩ 1983
- b) Shall be ISI marked.

**9. Hose Boxes :**

Shall be made of 16G MS sheet with glass front hinged door with lock and key of adequate size and shall be capable of accommodating two lengths of hose and one branch pipe with nozzle.

**10. MANUAL FIRE ALARM SYSTEM:**

- a) Manual Fire alarm system shall be provided in each floor of the buildings conveniently to alarm the occupants in case of fire.
- b) The system includes manual call points break glass type or pull type which when actuated will trigger dual tone electronic hooter to alert the occupants of the building.
- c) Manual call points shall be installed in such a way that one shall not travel more than 22.5 mtr to actuate the same during fire emergency. These shall be looped together and then connected to the fire alarm panel located in the security room.
- d) The address of each detector shall be indicated on the fire alarm panel.
- e) Supply and installation of the earthing conductors, control and power cabling for the complete fire alarm system shall be in the contractor's scope.
- f) Performance tests shall be conducted at site for manual call points and hooters to prove that the individual components shall satisfy all specific requirements

## 11. Hand Held Fire Extinguishers:-

- a) Work under this section shall consist of furnishing all labour, materials, appliances and equipment necessary and required to install fire extinguishing hand appliances conforming to IS-15683-2006 and distribution of fire extinguishers shall conform to IS-2190.
- b) Contractor shall install fully charged and tested fire extinguishers of following type :
  - (i) Co2 type-4.5 kg capacity,(body conforming to IS-7285, control valve conforming to IS-3224.
  - (ii) ABC type Dry Powder extinguishers -5 kg capacity.
  - (iii) Water Co2 type -9 ltr capacity.
- c) Hand appliances shall be installed in easily accessible locations with the brackets fixed to the wall by suitable anchor fasteners.
- d) Each appliance shall be provided with an inspection card indicating the date of inspection, testing, date of refilling, due date of refilling and date of hydro test and other relevant data. All appliances shall be fixed in a true workman like manner truly vertical and at correct locations.

## 12. ELECTRIC FIRE PUMP:

The electric booster pump shall be motor driven, mono block type capable of discharging 900 LPM water giving pressure of 2.0 kg / cm sq. The pump shall be coupled to TEFC motor of 5 HP (3.7 KW) and complete set shall mounted on common base frame (KIRLOSKAR) Model: KDI -527++ Mono block Pump shall be preferred. It shall be provided with pump controller for auto & manual start with provision of manual stop. Supply installation testing and commissioning of control & power cabling as required for establishing automation of the pumping system shall be in the scope of the contractor.

## 13. SPEAKERS :

In each floor there should be a speaker which shall be connected to the amplifier in the stilt floor control room of respective building. Connections of each floor cable shall be connected with the split switch box of the amplifier system to make all zones/floors independent. In case of any emergency the security person will announce either to particular floor or to the total building selecting respective/all switching device.

## SECTION-3: COMMISSIONING AND GUARANTEE:

### 1. Scope:

Work under this section shall be executed without any additional cost. The rates quoted in this tender shall be inclusive of the works given in this section. Contractor shall provide all tools & plant required for execution of the works in this contract.

### 2. Pre commissioning:

On completion of the installation of all pump, piping, valves, pipe connections, fire alarm systems, the contractor shall proceed as follows :

- a) Prior to start-up and hydro testing entire installation shall be cleaned, flush the pipe lines to clear of dirt and debris.
- b) Check all clamps, supports and hangers provided for holding pipes.
- c) Check all hydrant valves dry and wet for their proper functioning and then close those.

- d) Fill up the pipes with water to conduct hydro test and hold the pressure for 24 hours to detect any leakage.
- e) Operate the pump continuously for 30 minutes (with temporary piping back to the tank)
- f) Test auto operation of the pump.
- g) Operate the fire alarm system and reset those to normal.

### 3. Final Acceptance tests:

Following commissioning and inspection of the entire installation, and prior to issue of completion certificate, the contractor shall carry out final acceptance tests in accordance with a programme to be agreed with the representative of LIC of India.

If the results of the acceptance tests show that systems and equipment fail to perform to the efficiencies or other performance figures as given in the specification, the contractor shall adjust, modify and if necessary replace the equipment to obtain required performance without further payment.

### 4. Warranty & Handover:

The contractor shall warrant that all plants, materials and equipment supplied and all workmanship performed by him to be free from defects whatsoever nature before handing over to LIC of India and submit the guarantee certificate.

The contractor shall also hand over all maintenance and operation manuals, all certificates and all other documentation as per the terms of the contract to the site representative of LIC of India.

**Besides the works mentioned above, the contractor will obtain “No objection Certificate” from the Fire Service Authority, Govt. of Odisha, on behalf of L.I.C. of India for the above fire fighting installation of the building and quoted amount to include to carry out this work..**



## **TECHNICAL SPECIFICATION FOR SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF 06 PASSENGERS LIFT.**

| SL. NO. | HEAD                                 | DETAILS                                                                                                                                                                                                                                                                                                                                                                                                      |
|---------|--------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1       | NO & TYPE OF LIFT                    | 01 No Passenger Lift.                                                                                                                                                                                                                                                                                                                                                                                        |
| 2       | CAPACITY                             | 408 Kg, 06 Passengers.                                                                                                                                                                                                                                                                                                                                                                                       |
| 3       | SPEED                                | 1.0 Meter per Second.                                                                                                                                                                                                                                                                                                                                                                                        |
| 4       | TRAVEL                               | Stilt & Four upper floors.                                                                                                                                                                                                                                                                                                                                                                                   |
| 5       | STOP & LANDING                       | 5 Stops & 5 Landings. All five openings are on same side.                                                                                                                                                                                                                                                                                                                                                    |
| 6       | SIZE OF THE LIFT WELL AND CAR INSIDE | 1900 mm (W) X 1700 mm (D).(MINIMUM SIZE OF LIFT WELL AFTER FINISHING)<br>1100mm X 1000mm(MINIMUM SIZE OF CAR INSIDE)                                                                                                                                                                                                                                                                                         |
| 7       | POWER SUPPLY                         | 415 $\pm$ 10% Volts. 3 phase, 4wire, 50Hz. terminated in machine room.                                                                                                                                                                                                                                                                                                                                       |
| 8       | OPERATION /CONTROL                   | As per latest I.S. and latest technology.                                                                                                                                                                                                                                                                                                                                                                    |
| 9       | MACHINE                              | As per latest I.S. and latest technology.                                                                                                                                                                                                                                                                                                                                                                    |
| 10      | DRIVE                                | As per latest I.S. and latest technology.                                                                                                                                                                                                                                                                                                                                                                    |
| 11      | INDICATORS IN LIFT LANDING           | Digital (7Segments) Position & Direction Indicator.                                                                                                                                                                                                                                                                                                                                                          |
| 12      | DETAILS OF CAR ENCLOSURE             | The gauge of stainless steel sheet for car enclosure and door will be of 18 SWG. Car frame shall be of M.S. Car panel will be of stainless steel hairline finish.                                                                                                                                                                                                                                            |
| 13      | CAR DOOR / GATE                      | Automatic Power Operated, Centre Opening Door of 800mm. Stainless Steel with Hair line finishes both Car & Landing Door Entrance/Car Opening.                                                                                                                                                                                                                                                                |
| 14      | Travel Height                        | Approximately 15 Meter.                                                                                                                                                                                                                                                                                                                                                                                      |
| 15      | INTER COMMUNICATION SYSTEM           | Two station Press & Speak Hands Free Intercom. The intercom facility will be in between car & machine room or ground floor.                                                                                                                                                                                                                                                                                  |
| 16      | LANDING DOOR                         | Centre opening door of clear size 800mm x 2000 mm, power operated for every lift, there shall be access to a landing, be fitted with a landing door. Such door shall be fitted with efficient inter-locking or other devices so as to secure that the door cannot be opened except when the lift car is at landing & the lift car cannot be moved away from the landing until the door is closed and locked. |
| 17      | DOOR OPERATION                       | Fully Automatic Power Operated VF / D.C. Closed loop Double Door, Centre Opening with Vision Panel & Infra red Screen.                                                                                                                                                                                                                                                                                       |

|    |                                  |                                                                                                                                                                                                                                                           |
|----|----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 18 | SIGNAL                           | Digital Luminous Button & Indicators at Floors. Digital Car Position in the Car. Car Operating Panels with Luminous Buttons. O/L Warning Alarm with Luminous Indicator in Car. If Over Loaded. Alarm Bell operated on Dry (SMF) Battery. Fire man switch. |
| 19 | BUFFER FOR CARS & COUNTER WEIGHT | Heavy Duty Spring Loaded Buffers as per latest I.S.                                                                                                                                                                                                       |
| 20 | SAFETY / PROTECTION              | <b>SMF Battery Operated ARD. The Rescue operation should function in the event of a power failure.</b>                                                                                                                                                    |
| 21 | OTHER PROVISION                  | Supply & fixing MS Tee Section & MS Channel for fixing Brackets etc.                                                                                                                                                                                      |
| 22 | EMERGENCY ALARM & LIGHT          | Dry cell battery (SMF) operated emergency alarm and 1 battery operated emergency light in car with rechargeable compact unit.                                                                                                                             |
| 23 | OVER LOAD ALARM                  | Facility to be provided so that door cannot be closed due to overloading.                                                                                                                                                                                 |
| 24 | FIREMAN'S SWITCH                 | To be provided at main landing terminal.                                                                                                                                                                                                                  |
| 25 | Attendant Key                    | To be provided in car.                                                                                                                                                                                                                                    |
| 26 | Infra Red Screen                 | To be provided.                                                                                                                                                                                                                                           |
| 27 | Voice Announcement System        | This system is to be provided in the car to announce the position of the elevator in the hoist way as the car passes or stops at a floor served by the elevator.                                                                                          |

**TECHNICAL SPECIFICATION FOR SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF HOSPITAL LIFT.**

| SL. NO. | HEAD                                  | DETAILS                                                                                                                                                                                                                                                                                                                                                                                                       |
|---------|---------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1       | NO & TYPE OF LIFT                     | 01 No of Hospital Lift having size to accommodate stretcher in time of need.                                                                                                                                                                                                                                                                                                                                  |
| 2       | CAPACITY                              | 1020 Kg, 15 Passengers.                                                                                                                                                                                                                                                                                                                                                                                       |
| 3       | SPEED                                 | 0.5 to 1.0 Meter per Second.                                                                                                                                                                                                                                                                                                                                                                                  |
| 4       | TRAVEL                                | Stilt & Four upper floors.                                                                                                                                                                                                                                                                                                                                                                                    |
| 5       | STOP & LANDING                        | 5 Stops & 5 Landings. All five openings are on same side.                                                                                                                                                                                                                                                                                                                                                     |
| 6       | SIZE OF THE LIFT WELL AND CAR INSIDE. | <b>1800 mm (W) X 3000 mm (D). (MINIMUM SIZE OF LIFT WELL AFTER FINISHING)</b><br><b>1100mm X 2400 mm (MINIMUM SIZE OF CAR INSIDE)</b>                                                                                                                                                                                                                                                                         |
| 7       | POWER SUPPLY                          | 415 $\pm$ 10% Volts. 3 phase, 4 wire, 50Hz. terminated in machine room.                                                                                                                                                                                                                                                                                                                                       |
| 8       | OPERATION /CONTROL                    | As per latest I.S. and latest technology.                                                                                                                                                                                                                                                                                                                                                                     |
| 9       | MACHINE                               | As per latest I.S. and latest technology.                                                                                                                                                                                                                                                                                                                                                                     |
| 10      | DRIVE                                 | As per latest I.S. and latest technology.                                                                                                                                                                                                                                                                                                                                                                     |
| 11      | INDICATORS IN LIFT LANDING            | Digital (7 Segments) Position & Direction Indicator.                                                                                                                                                                                                                                                                                                                                                          |
| 12      | DETAILS OF CAR ENCLOSURE              | The gauge of stainless steel sheet for car enclosure and door will be of 18 SWG. Car frame shall be of M.S. Car panel will be of stainless steel hairline finish.                                                                                                                                                                                                                                             |
| 13      | CAR DOOR / GATE                       | Automatic Power Operated Centre Opening <b>Door of 1000mm.</b> Stainless Steel with Hair line finishes both Car & Landing Door Entrance/Car Opening.                                                                                                                                                                                                                                                          |
| 14      | Travel Height                         | Approximately 15 Meter.                                                                                                                                                                                                                                                                                                                                                                                       |
| 15      | INTER COMMUNICATION SYSTEM            | Two station Press & Speak Hands Free Intercom. The intercom facility will be in between car & machine room or ground floor.                                                                                                                                                                                                                                                                                   |
| 16      | LANDING DOOR                          | Centre opening door of clear size 1000mm x 2000 mm, power operated for every lift, there shall be access to a landing, be fitted with a landing door. Such door shall be fitted with efficient inter-locking or other devices so as to secure that the door cannot be opened except when the lift car is at landing & the lift car cannot be moved away from the landing until the door is closed and locked. |
| 17      | DOOR OPERATION                        | Fully Automatic Power Operated VF / D.C. Closed loop Double Door, Centre Opening with Vision Panel & Infra red Screen.                                                                                                                                                                                                                                                                                        |

|    |                                  |                                                                                                                                                                                                                                                           |
|----|----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 18 | SIGNAL                           | Digital Luminous Button & Indicators at Floors. Digital Car Position in the Car. Car Operating Panels with Luminous Buttons. O/L Warning Alarm with Luminous Indicator in Car. If Over Loaded. Alarm Bell operated on Dry (SMF) Battery. Fire man switch. |
| 19 | BUFFER FOR CARS & COUNTER WEIGHT | Heavy Duty Spring Loaded Buffers as per latest I.S.                                                                                                                                                                                                       |
| 20 | SAFETY / PROTECTION              | <b>SMF Battery Operated ARD. The Rescue operation should function in the event of a power failure.</b>                                                                                                                                                    |
| 21 | OTHER PROVISION                  | Supply & fixing MS Tee Section & MS Channel for fixing Brackets etc.                                                                                                                                                                                      |
| 22 | EMERGENCY ALARM & LIGHT          | Dry cell battery (SMF) operated emergency alarm and 1 battery operated emergency light in car with rechargeable compact unit.                                                                                                                             |
| 23 | OVER LOAD ALARM                  | Facility to be provided so that door cannot be closed due to overloading.                                                                                                                                                                                 |
| 24 | FIREMAN'S SWITCH                 | To be provided at main landing terminal.                                                                                                                                                                                                                  |
| 25 | Attendant Key                    | To be provided in car.                                                                                                                                                                                                                                    |
| 26 | Infra Red Screen                 | To be provided.                                                                                                                                                                                                                                           |
| 27 | Voice Announcement System        | This system is to be provided in the car to announce the position of the elevator in the hoist way as the car passes or stops at a floor served by the elevator.                                                                                          |

## **TECHNICAL SPECIFICATION FOR SUPPLY, INSTALATION, TESTING AND COMMISIONING OF SOLAR WATER HEATING SYSTEM**

### **FLAT PLATE SOLAR WATER HEATING SYSTEM**

The solar water heating system of 1500 LPD capacity at 60 °C will be installed at LIC Office Quarters of Suryanagar at Bhubaneswar District.

### **STANDARDS**

The details of the standard which contain minimum performance requirement along with the test method are as follows.

#### **1. Solar Flat Plate Collector**

- a) IS12933 ( Part-1) : 2003, Solar flat plate collector i Specification, part 1-Requirement
- b) IS12933 ( Part-2) :2003, Solar flat plate collector-Specification, Part-2-Components
- c) IS12933(Part-3) :2003,Solar flat plate collector i Specification, part-3- Measuring Instruments
- d) IS 12933 ( Part-5) :2003 , Solar flat plate collector-Specification, part-5- Test Method

#### **2. MNRE Specification for test procedure**

Test procedure for Thermo-symphonic solar water heating systems are available on MNRE web site [www.mnre.gov.in](http://www.mnre.gov.in) should be followed.

### **Test Report & Testing laboratory /center**

The Solar Collector must be tested at any test centers in the country which is recognized by BIS for carrying out certification testing for solar water heating system as per Indian Standard. Only Collector as per BIS specification No- 12933 solar flat collector and also BIS marked will be supplied.

### **Other requirement of water heating system**

#### **1. Overall dimension of collector**

| Size | Length ( in mm) | Height( in mm) | Width( in mm) |
|------|-----------------|----------------|---------------|
| A    | 1860± 10        | 100±10         | 1240± 10      |
| B    | 2120 ± 10       | 100± 10        | 1040± 10      |
| C    | 2050± 10        | 100± 10        | 930± 10       |

2. **Cover plate :-** The cover plate shall be single piece tempered / toughened glass and minimum of 4 mm thick, free from bubbles and rough surface as per the latest BIS specification (IS: 12933 part-2: 2003) The solar transmission of the cover plate shall be minimum 82% at near normal incidence.

3. **Collector Box: -** The collector box shall be made of aluminium section only. Type, grade, size, workmanship and finish of the material used shall be as per latest BIS specification. The minimum thickness of Aluminium shall be as under.

|                             |       |
|-----------------------------|-------|
| Channel Section for sides   | 1.6mm |
| Sheet for bottom            | 0.7mm |
| Support for glass retaining | 1.2mm |
| Sheet for entire body       | 1.0mm |

**4. Absorber:-** The absorber consists of risers, headers and sheet for absorber.

- (a) Material :- Copper sheet and copper tubes
- (b) Thickness :- 34 SWG ( IS-191)
- (c) Copper tubes ( Riser) : Diameter = 12.7 mm( $\pm$  .5mm)  
Thickness =24 SWG (IS-2501)

- (d) Header  
Diameter = 25.4 mm ( $\pm$ .5mm)  
Thickness = 22 SWG

Projection = 40mm ( $\pm$  .5mm) outside the collector box including the flanges.

- (e) Space between riser tubes: Maximum 12 cm from centre to centre of the riser.
- (f) Bonding between riser and sheet.- Full length of all risers shall be welded with absorber sheet. In case of brazing / soldering / TIG welding of continuous nature, unbrazed / unsoldered portion should not exceed more than 10 % of the length of the riser. For brazing / soldering, minimum 60% tin solder or suitable brazing material shall be used. The flux used for soldering / brazing shall be non greasy.
- (g) Header- riser joints:- The assembly of riser with the header shall ensure the tube protrusion inside the header not exceeding 3mm. The riser shall be brazed / welded with header.
- (h) Absorber coating: - ***In all systems selective coating shall be used. The selective coating shall have emissivity <0.2 and absorbitivity > 0.92.***
- (i) Absorber area:- 2 sqm per 100 LPD at 60 °C.

**Testing of riser –Header:** - Riser and header assembly designed for working pressure up to 245 kPa (2.5 Kg/cm<sup>2</sup>) shall be tested for leakage at a minimum hydraulic pressure of 490 kPa (5Kg/cm<sup>2</sup>). The system designed for higher pressure than 245 kpa, the assembling shall be tested at a pressure twice the designed pressure.

**Collector box installation:-**

- (a) Back & side insulation: - Minimum 50mm thick insulation of rock wool / glass wool / mineral wool shall be provided. Thermal resistance of insulation materials shall be minimum 0.96 square meter °C /W for back insulation and minimum 0.48 square meter °C /W for side insulation. The collector box insulation shall conform to latest BIS specification. (IS 3346).
- (b) Aluminium foil of thickness of .016 mm  $\pm$  0.005 mm shall be used for covering the back as well as side insulation.
- (c) Back and side insulation shall withstand at 175°C.

**Gaskets and grommets:** - The load of the absorber should not be on the insulation. It should be taken by the collector box. Insulation should not be allowed to slide. Gasket used for sealing the glass with collector box may be of Neoprene / Silicon / EPDM rubber channel section. Grommets for sealing the collector box and the header joint may be one of the following types and shall fit properly so that no dust can pass through the joints:

- a) Neoprene rubber,
- b) EPDM,
- c) Silicon rubber

Grommet and gaskets shall be capable of withstanding temperature up 125° C and shall conform to thermal shock test.

**Header flanges:** - Copper / brass flanges of 62mm  $\pm$  3mm diameter and minimum thickness of 4mm with provision for 4nos of brass nut and bolts with diameter of 5mm -6mm shall be used. Flanges shall be brazed to header and brazing tested for leakage to test pressure. In no case crude solder flanges shall be used. Assembly of the flanges should be at right angle to the header area to ensure proper assembly at the side of the insulation.

### **Assembly of the Collector:-**

- The collector shall be assembled in such a way that the weight of the absorber is distributed uniformly on the side wall of the collector box.
- The entire assembly shall be free from surface defects. All sharp edges and corners shall be rounded off. The exposed surfaces shall be properly made corrosion resistant.
- The air gap between the cover plate bottom and the absorber surface shall be within 20mm to 40mm.
- The glass should be firmly held, without strain taking in to account the expansion of glass. Top surface along with the edge between the glass and the aluminium angle shall be caulked with suitable sealant such as zinc oxide based or rubber based or silicon rubber based or epoxy based compound.

**Gasket for Flanges:-** 3m thick compressed asbestos fiber or Neoprene rubber gasket shall be used for sealing the joints between flanges.

**Collector Support frame:** - The structure shall be in a position to withstand wind velocity of 200 Km/hr. The structure shall be made with angle iron stronger than 35mm X 35mm X 3mm and shall have the vertical support at top and bottom edge of the inclined plane of the collector at a distance of 2.5 m or less. The vertical support shall be firmly grouted to the roof or in the ground in case of ground mounted system. The grouting blocks shall be minimum 25cm X 25cm X 15cm and finished properly. In case of grouting is carried out on a roof already water proofed with asphalt, the back support of the collector may be anchored to the parapet or the size of the grouting block shall be increased to provide for a dead load weight anchoring of 75 Kg per leg of the vertical stand.

The collector support frame shall be rectangular shape i.e. having all four sides touching the collector edge. The cement pedestals should be made after chipping of the existing rooftop to provide proper gripping and strength. Structure should be such that collector's bottom side is at least 30 cm above the ground/roof level. In case of inclined roof, the collector housing frame along with the vertical angle shall be mounted & fixed using suitable necessary structure keeping in view the load bearing capacity of the roof top ensure the stability against storm. The collector should be properly clamped and tightened with frame and supporting structure at both the ends by 20mmX 2mm size MS strip consisting rubber packing to avoid chemical reaction between the collector bodies and clamp. Last row of collector supporting structure should be grouted throughout its length opposite to collector facing with c.c. work ratio 1:2:4 of size 25cm X 30cm (d x h i.e. height X width) and then plaster with cement.

**Painting of stand:** - Proper cleaning and degreasing of the surface should be done before painting. Two coats of zinc chromate red oxide primer shall be applied followed by one coat of enamel paint. Suitable anticorrosion paint should be applied after proper treatment.

### **Storage tank**

**Materials:** - The storage tank should be stainless steel SS304/316. The thickness of 1500 LPD system it should be 18 gauge (1.2mm). Socket and internal fittings should be stainless steel.

**Insulation:** - Insulation should withstand temperature of 100 ° C. Thin polythene sheet shall be used as covering between the glass wool and the cladding sheet besides the retaining materials such as chicken mesh etc. Aluminium sheet of thickness, 22 SWG / GI sheet of minimum 24 SWG shall be used for cladding the tank insulation. External of the tank should be properly insulated so that hot water temperature does not decrease by more than 5 degree C in about 16 hours times.

The storage tank shall be properly installed at site using enameled coat appropriate size angle iron stand, girder cement pedestals of 1:2:4 ratio or any other specific provision suitable to site to ensure the stability against heavy storm etc.

**Piping:-**

½ inch to 2 inch dia ISI marked GI pipe, medium class of IS 1239 shall be used for piping. 50 mm thick rock wool insulation of 48 Kg/cum density be used for hot water pipes. Thin plastic sheet shall be used as covering between rock wool and aluminum cladding besides other retaining materials like chicken mesh etc. 26 SWG thick aluminum sheet shall be used for cladding the insulated pipe. The pipe line should be properly supported and fixed with clamp with the help of suitable size stand/civil structure (cement concrete ratio 1:4). ISI mark gunmetal strainer of standard make should be fitted in the main cold water supply line before the system.

**Valves/Nipple/tees/bend/taps:-**

Gunmetal valve as per ISI specification shall be used. Nipple / tees and bends shall be of medium class G I (B-class) / brass or copper. Gunmetal valve in each row shall be provided. TAPs of stainless steel ISI mark or reputed make shall be provided.

**Temperature gauge:-** Temperature gauge (ISI mark) :- one for hot water storage tank / outlets in dial type in duly calibrated and suitable for temperature ranges ( 0 to 120 ° C)

**Cold water tank: -**

- a) Only Syntax or equivalent materials and it should be as per the capacity of the solar water heating system. Supply of cold water tank is not within the scope of the supplier. The same is to be provided by LIC of India. The supplier should install / grouted on suitable stand and do necessary connection for proper function of the system.

Make up tank: - A suitable make up water tank should be provided with the system. Materials may be syntax or equivalent.



**TECHNICAL SPECIFICATION FOR SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF SOLAR STREET LIGHTING SYSTEMS.**

**DUTY CYCLE:**

The LED solar street lighting system should be designed to operate for dusk to dawn, under average daily insolation of 5.5 kWh / sq.m. on a horizontal surface.

**LIGHT SOURCE:**

1. The light source will be 12W LED type Lamp, minimum 15 LUX when measured at a periphery of 4 meter diameter from a height of 4 meter. Higher light output will be preferred.
2. The illumination should be uniform without dark bands or abrupt variations, and soothing to the eye.
3. Single lamp or multiple lamps can be used. The luminous performance of individual LED used should not be less than 90 lumen/watt when measured luminaire as whole.
4. The color temperature of LEDs used in the system should be in the range of 55000 K to 65000 K.
5. Use of LEDs which emits ultraviolet light will not be permitted.
6. The light output from the LED light source should be constant throughout the duty cycle.
7. The lamps should be housed in an assembly suitable for outdoor use. The temperature of LED should increase not more than 15 degree above ambient temperature. This condition should be complied even after two hours of operation at its maximum operation voltage ( ie. Just before over voltage cut off).
8. The LED should be of high quality and should stand for minimum 50000 hours. If the luminaire fails/ need repair in LED/ electronics the whole should be replaced with the new one within the defect liability period.
9. The make, model number, country of origin and technical characteristics of LED used in the lighting system must be furnished.

**PV MODULE:**

1. The PV module (s) shall contain 100wp mono/ multi crystalline silicon solar cells with IEC 61215(revised) certification or equivalent National or International Standards. The manufacturer should have the required certification for at least one of their regular modules. Further, the manufacturer should certify that the submitted module is also manufactured using same design and process.
2. The power output of the PV module must be reported under standard test conditions (STC) at 16.4 Volt loading voltage. I \_ V curve of the each module should be submitted at the time of installation.
3. The open circuit voltage of the PV modules under STC should be at least 21.0 Volts.
4. The terminal box on the module should have a provision for opening for replacing the cable, if required.
5. A strip containing the following details should be laminated inside the module so as to be clearly visible from the front side:
  - A) Name of the Manufacturer or distinctive logo.
  - B) Model or Type No.
  - C) Serial No.
  - D) Year of make.

## BATTERY :

1. The battery should be 12V i 40AH Tubular gel type Lead acid VRLA battery and should conform to latest BIS standards. A copy of the test certificate for the battery (including its make, country of origin and model number) used in the system should be provided.
2. At least 75 % of the rated capacity of the battery should be between fully charged & load cut off conditions.

## ELECTRONICS :

- (i) The total electronic efficiency of DC-Dc converter should be at least 85 %.
- (ii) Electronics should operate at 12 V and should have temperature compensation for proper charging of the battery throughout the year.
- (iii) The light output should remain constant with variations in the battery voltages.

## ELECTRONIC PROTECTIONS :

1. The system should have protection against battery overcharge and deep discharge conditions. The numerical values of the cut off limits must be specified, while submitting the samples for the testing purposes.
2. Fuses should be provided to protect against short circuit conditions.
3. A blocking diode should be provided as part of the electronics, to prevent reverse flow of current through the PV module(s), in case such a diode is not provided with the PV module.
4. Full protection against open circuit, accidental short circuit and reverse polarity should be provided.
5. Adequate protection is to be incorporated under no load conditions, e.g. when the lamps are removed and the system is switched ON.
6. Electronics should operate at 12 V and should have temperature compensation for proper charging of the battery throughout the year.
7. The LED driver circuit should be based on constant voltage, constant current, high frequency technology. The component used in LED driver circuitry should be highly reliable of reputed make and efficient.

Efficiency : The total electronic efficiency should be at least 80%.

LED Life : Lumen output of LED should remain same throughout the warranty period.

Charge Controller : The unit should have the following feature:-

1. This unit should be designed for charge regulation of storage battery and safe guard the battery against over charge & deep discharging.
2. The voltage cut-off should be set in such a way to utilize the 75% of the fully charged battery capacity.
3. The lower limit of cut off voltage should not be less than 11.4 volts.
4. The charge controller should reconnect the load when battery gets fully charged. The difference in these two voltage set point should be neither too small nor too large to avoid the relay chattering.

5. A reverse blocking diode should be provided to prevent discharge of battery in rainy season and in night.
6. The various functions should be displayed through LED indicator indicating the operations being carried out by the controller such as low battery warning sign (yellow), load current off (red) battery charging (green). The light indicator of lower voltage should be lower at 11.6 volts. However the unit with red and Green shall also be accepted.
7. The indicator should be fixed on front side of the battery box / Luminary.
8. A switch & fuse should be provided with the controller.
9. The unit should have protection against short circuit, lightening, reverse polarity surge etc.
10. The PCBs of controller should be glass epoxy.
11. All the connector indication should be covered with transparent hard plastic sheet screened properly.

#### **MECHANICAL COMPONENTS :**

- (a) The SPV module should be fixed on a rigid pole. The pole should be of minimum 50 mm dia GI pipe (B Class) of at least 03 mm thickness.
- (b) The pole should be made of GI steel pipe with approx height of 4.5 meters. The pole should have the provision to hold the weather proof lamp housing. The pole along with base plate should have suitable cement concrete foundation to assisted local worst climate conditions. The base plate shall be connected with the foundation with holding down bolted.
- (c) SPV panel shall be mounted on pole. The mounting structure (with corrosion resistance paint) shall be fixed in the center of pole made flat at fixing end, square angle adjusting plate of 115 mm size 3 mm thick shall be provided. So that SPV panel can be fixed at inclination of 15 or 30 degree from horizontal.
- (d) It should be possible to mount the light source on a metallic arm attached to the pole. The metallic arm for holding the light assembly should be extended at least 1.5 meters from the pole and set at a suitable angle to maximize uniform illumination of desired level over the specified area.

#### **BATTERY BOX :**

- (i) The battery box should be made of suitable polymer or 20 SWG, MS sheet. The battery box shall be painted with acid proof corrosion resistant paint (in case of metal) with LIC of India written on at least two faces. The box shall be properly painted after chemical cleaning & primer coating.
- (ii) The size of box should be as per battery size providing sufficient clearance on all sides. Lovers for proper ventilation should be provided on each side and back of the battery box. No vent shall be providing on top of battery box.
- (iii) Box should be provided with proper locking arrangement. The edges of box should be turned properly to give smooth edge and good strength.
- (iv) Two wooden battens should be fixed inside the battery box to avoid the electrical contract between battery and box.

- (v) The quality should be of high standards to withstand the life period. If defect arises in the DLP period, same is to be (mandatory) replaced.

#### OTHER FEATURES :

- (i) The system should be provided with 2 LED indicators: a green light to indicate charging in progress and a red LED to indicate deep discharge condition of the battery. The green LED should glow only when the battery is actually being charged.
- (ii) There will be a Name Plate on the system body, which will give:
- (a) Name of the Manufacturer or Distinctive Logo.
  - (b) Model Number
  - (c) Serial Number
  - (d) Year of manufacture
- (iii) Necessary lengths of wires / cables, switches suitable for DC use and fuses should be provided.

Components and parts used in the solar street lighting system should conform to the latest BIS specifications, wherever such specifications are available and applicable. Other hardware such as clamp, nut bolt etc should be as per requirement of system. The material should be of good quality.

#### DOCUMENTATION :

An Operation, Instruction and Maintenance Manual, in English should be provided with the solar street lighting system. The following minimum details must be provided in the Manual:

- (a) About Photovoltaic.
- (b) About LED solar street lighting system - its components and expected performance.
- (c) About PV module.
- (d) About LED Lights. The make, model number, country of origin and technical characteristics of LEDs should be stated in the product data sheet and furnished to LIC of India.
- (e) About battery and electronics used.
- (f) Clear instructions about mounting of PV module.
- (g) About charging and significance of indicators.
- (h) DO's and DONT's.
- (i) Clear instructions on regular maintenance and trouble shooting of solar street lighting system.

#### INSTALLATION OF SYSTEM:

The system should be properly installed at site. The SPV module mounting structure along with pole should be properly grouted depending upon the location and requirement of the site. The grouting should be such that it should withstand the maximum wind speed /storm. The pole should be grouted with CC mixture of 1:2:4 of radius of 300 mm having depth of 900mm. adequate space should be provided behind the PV module/array for allowing unobstructed air flow for passive cooling. Cables of appropriate size should be used to keep electrical losses to a bare minimum. Care should be taken to ensure that the battery is placed with appropriate leveling on a structurally sound surface. The control electronics should not be installed directly above the battery. All wiring should be in a proper conduit or capping case. Wire should not be hanging loose. Any minor item, which is not specifically included in the scope of supply but required for proper installation and efficient operation of the SPV systems, is to be provided by the manufacturer.

**SPECIAL CONDITIONS REGARDING INSPECTION OF WORK****1. INSPECTION OF WORK :**

All works in course of execution or after execution in pursuance of the Contract, shall at all times be open to the inspection and supervision of the Executive Director (Bldg.) or his authorized representatives and the Contractor or his responsible agent, duly accredited in writing, shall at all such times, be present to receive writing, shall at all such times, be present to receive instructions/orders. The work during the progress or any time before settlement of the final bill, is also liable to be inspected by Chief Technical Examiner of the Central Vigilance Commission, New Delhi, on behalf of the Employer and this shall be also considered as an inspection by the Employer for all purpose.

**2. PRECEDENCE FOR ACCEPTANCE :**

If the contradiction or variance is observed in different components of the tender's the details clearly given in -

- a) "General Preamble" shall have the precedence over the relevant details given in General "Specifications".
- b) "Trade Preambles" shall have the precedence over the relevant details given in "General Specifications"
- c) The description of an item of the "Schedule of Quantities" shall have the precedence over the relevant details given in "General preambles", General "Specification" and "Trade preambles".

**GENERAL CONDITIONS FOR SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF  
AIRCONDITIONING SYSTEM.**

**GUARANTEE:**

The contractor shall be responsible for any manufacturing defect or defects in installation & performance and the same will be rectified immediately at his own cost to the entire satisfaction of Engineer-in-charge during Defect Liability Period of 12 months, reckoned from the date of virtual completion.

**TRAINING TO STAFF:**

During the erection and testing the contractor will have to train personnel of LICI regarding operation and preventive maintenance of the AC units. Operating & maintenance instructions shall be supplied at the time of delivery of equipment at site without any extra charges.

**MISCELLANEOUS:**

The price quoted shall also be inclusive of followings :-

- i) MS angle support for holding the AC units as per standard installation.
- ii) Minor civil works like cutting holes, minor modification of extg pockets of ACs, etc. and throwing away any debris coming out of this work as per direction-in-charge of LICI and making good the same.
- iii) Ducting Layout drawing shall be prepared by the vendor after visiting the site & to be got approved from LICI before installation of the ducting work where required.
- iv) Layout drawing shall be prepared by the contractor after visiting the site & to be got approved from LICI before delivery of materials/execution at site.

### **GENERAL CONDITIONS FOR SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF LIFT**

The work shall be carried out in accordance with the Prevalent Lift Act, Code of Practice for Supply, Installation, and Testing & Commissioning of Lift for Passenger use as per latest IS/IE Rules.

#### **PROVISION OF LIFT MACHINE:**

Directly on the top of the lift shaft.

#### **SOUND REDUCTION ARRANGEMENT:**

Suitable sound reducing rubber pads/cork pads shall be provided under the machine bedplate to reduce the transmission of the vibrations.

#### **CARS & COUNTER WEIGHT BUFFERS:**

Heavy-duty spring loaded buffers for both car & counter weight shall be provided.

#### **GUIDES FOR CAR & COUNTER WEIGHTS:**

New guide rails shall be provided.

#### **GATES/DOORS FOR CAR & LANDING:**

Doors for Car & Landing to be Stainless Steel with Hair Grain finish are to be provided and the doors of both Car & Landing should be Power Operated Centre Opening.

#### **GEARS:**

Gears shall be provided as per standard requirements.

#### **ELECTRIC MOTORS:**

New motor of ample capacity with high torque and low starting current designed for lift service and suitable for 400/433/440V, 50 Hz, AC Supply and of Squirrel Cage Induction type and suitable for Variable Voltage & Variable Frequency drive to suits the frequent starts and stoppages and silent in operation shall be provided.

#### **BRAKES:**

Brakes shall be provided as per standard requirements.

#### **REVERSE PHASE RELAY:**

This shall be provided on the controller to protect the lift equipment against phase reversal, low voltage and phase failure.

#### **CONTROLLER:**

The controller shall be Microprocessor Based of the latest design incorporating all modern safety devices and should function on a variable voltage and phase failure.

#### **DRIVE & DRIVING SHEEVE:**

It shall be provided according to the specifications to suit the main hoist way ropes and should be Micro processor based single automatic push button / duplex, Collective Selective on either direction and with or without attendant.

#### **HOISTWAY ROPES:**

The ropes shall be made of best quality high tensile steel wire and shall confirm to latest IS Specifications.

#### **COUNTER WEIGHT GUARD:**

New Counter Weight and Guard are to be provided.

#### **GUIDE SHOES:**

These shall be Spring Loaded and shall be of Phosphor Bronze.

#### **SAFETY DEVICES:**

- a) Latest type Safety Devices shall be provided to prevent Car from falling in the event of slackening or rupture of suspension on ropes.
- b) Speed Governor, Limit Switches, Final Limit Switches and automatic Electromagnetic Locks shall be provided as per latest design and requirements.
- c) ARD SYSTEM :

Automatic Rescue Device operated on SMF batteries should be provided to enable the lift to reach the nearest floor and open the door in case of any failure of Electricity.

#### **OVERLOADING:**

Audio Visual Signal "OVER LOADED" should be provided in the car & the lift should not start when the car lift is overloaded.

#### **INFRA RED SENSOR SCREEN:**

Infra Red Sensor Screen should be provided to the doors to avoid closing of doors when the passenger move in or move out from the lift car.

#### **LIFT CAR:**

Lift Car should be of the followings:-

- Stainless Steel with Hair Grain Finish on all four sides
- PVC Flooring,
- False Ceiling with plain acrylic diffuser. The frame of suspended false ceiling shall be powder coated aluminum.
- Recessed type CFL Fittings, pressure fan with anodized aluminum grill.
- Control Panel with or without Attendant Mode operation,
- Overload Warning Signal with display and sound etc as per standard.
- Fireman's Switch



#### **WIRING:**

All wiring shall be carried out in ISI Marked PVC/ M.S. Conduits. The wires to be used for the wiring shall be PVC insulated Copper Conductor FRLS wire of ISI approved makes. The wiring shall confirm to the latest relevant I.E Act & Regulations.

#### **DESIGN STANDARD:**

All materials, plant, equipment in the lift system shall confirm to the highest standard & latest design.

#### **SCAFFOLDING:**

The contractor shall make his own arrangement for necessary scaffolding required for execution of this lift work.

#### **TRAILING CABLE:**

The controlling cable of reputed make & ISI marked shall be flexible and shall be suitably suspended to relieve strain in the individual conductor.

#### **TEST AFTER INSTALLATION:**

After the completion of the lift work and before the same put into operation, the test as follows shall be carried out by the Contractor :-

- i. To determine Insulation Resistance between various wiring and the Earth.
- ii. To determine Earth Continuity of Electrical Installation.
- iii. To determine that the Motor Brake, Door Locking Devices etc.
- iv. To determine that the Motor attains the rated speed at the rated load.
- v. To determine that the speed gear stops the lift car while carrying the rated load.
- vi. Two tests shall be carried out i one with contract load and the other with empty car with ropes attached and all electrical apparatus attached.
- vii. Dead Load test shall be carried out by subjecting the equipment to the maximum dead load for half an hours. The equipment to the capable of retaining this load for the specific period without signs of permanent distortion.

**The entire tests shall be carried out to the satisfaction of the LIC of India as well as the Electrical Inspector and other authorities associated with lift and all arrangements including test instruments and electricity shall be arranged by the Contractor and necessary clearance /test certificate for operation of lift shall be obtained from the concerned Authority/Authorities and submitted to LIC of India prior to commissioning of the lifts and the quoted amount to include for the same.**

Requisite inspection charges as required by the inspection authorities are to be deposited with the state treasury. This amount shall only be reimbursed on submission of the copy of the treasury challans.

**GENERAL CONDITIONS FOR MAINTENANCE OF FIRE FIGHTING SYSTEMS DURING DEFECT LIABILITY PERIOD.**

- i. Quarterly checking up keeping and replacement of the any component or sub-components of the system for proper operation of the system.
- ii. During the Defect liability period the contractor will responsible to keep the Fire Fighting & Fire Alarm system in perfect running condition including fitting of parts accessories, repair etc,
- iii. In case of any defect cropped up, it shall be attended within 04 hours of getting information over telephone as and when is required.
- iv. The contractor has to give proper authorization of engineer / supervisor responsible for maintenance of units and has to provide their contact number so that we can contact them as and when required.
- v. In case the services rendered by the contractor are not found satisfactory, during any time of defect liability period, LIC will engage some other agency to carry out the work at contractorsôrisk & cost and the amount spend shall be recovered from Security Deposit.
- vi. Safety controls should be tested and replaces in case of malfunctioning.
- vii. Arranging demonstration at least once in every six month.
- viii. Any defect in electrical items and control wiring of fire fighting systems should be attended.
- ix. The replacement of all the parts if any should be original, genuine make and old replaced should be shown or handed over to LIC Maintenance Engineer-in-charge. The material whichever needs to replace, should take prior approval from the Competent Authority.
- x. Ensuring proper working entire Fire Fighting & Fire Alarm systems.

Agreed and confirmed

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Signature of company with seal and date

**GENERAL CONDITIONS FOR MAINTENANCE OF AIR CONDITIONING UNITS DURING DEFECT LIABILITY PERIOD**

- i. A.C. units shall be serviced once in three months.
- ii. In case any defect cropped up, it shall be attended within 04 hours of getting information over telephone as and when is required. If defect requires machine to be shut down for more than three days or to be taken to factory, a stand by machine has to be provided.
- iii. Company has to give proper authorization of Engineer/Supervisor responsible for maintenance of units and has to provide their contact number so that we can contact them as and when required.
- iv. A.C. units are to be left operative every time in summer/winter and all components including compressor to be checked properly.
- v. Compressor if found defective shall be replaced with new compressor of same make without any extra charges.
- vi. Entire refrigeration system to be checked if required gas will be charged as and when necessary.
- vii. In case the services rendered by the contractor are not found satisfactory, during any time of defect liability period, LIC will engage some other agency to carry out the work at contractors risk & cost and the amount spend shall be recovered from Security Deposit.
- viii. Safety controls should be tested and replaced in case of mal functioning.
- ix. Air filters to be cleaned and if required to be replaced.
- x. Cleaning coil to be inspected and cleaned if necessary.
- xi. Blower motor to be checked and defects noticed will be attended.
- xii. Any defect in electrical items and central wiring to be attended.
- xiii. At least one overhauling of units to be carried out during DLP period.

Agreed and confirmed

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Signature of company with seal and date

**GENERAL CONDITIONS FOR MAINTENANCE OF LIFTS DURING DEFECT LIABILITY PERIOD.**

- i. Monthly checking up keeping and replacement of the any component or sub-components of the system for proper operation of the system.
- ii. During the Defect liability period the contractor will responsible to keep the Lifts in perfect running condition including fitting of parts accessories, repair etc,
- iii. Apart from attending monthly services, the contractor shall promptly attend within three hours all breakdown calls as & when needed.
- iv. In case the services rendered by the contractor are not found satisfactory, during any time of defect liability period, LIC will engage some other agency to carry out the work at contractorsôrisk & cost and the amount spend shall be recovered from Security Deposit.
- v. The contractor has to give proper authorization of engineer / supervisor responsible for maintenance of units and has to provide their contact number so that we can contact them as and when required.
- vi. Safety controls should be tested and replaces in case of malfunctioning.
- vii. Any defect in electrical items and control wiring of Lift should be attended.
- viii. The replacement of all the parts if any should be original, genuine make and old replaced should be shown or handed over to LIC Maintenance Engineer-in-charge. The material whichever needs to be replaced, should take prior approval from the Competent Authority.

Agreed and confirmed

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Signature of company with seal and date

**GENERAL CONDITIONS FOR MAINTENANCE OF SOLAR WATER HEATER DURING DEFECT LIABILITY PERIOD.**

- i. Quarterly checking up keeping and replacement of the any component or sub-components of the system for proper operation of the system.
- ii. During the Defect liability period the contractor will responsible to keep the Solar Heater system in perfect running condition including fitting of parts accessories, repair etc,
- iii. The scope of work includes repairing/replacement of parts to make the system functional within Defect liability period whenever a complaint is lodged by the user. The contractor shall attend the same within a reasonable period of time and in any case of breakdown shall be corrected within a period not exceeding 3 days.
- iv. The replacement of all the parts if any should be original, genuine make and old replaced should be shown or handed over to LIC Maintenance Engineer-in-charge. The material whichever needs to replace, should take prior approval from the Competent Authority.
- v. The contractor has to give proper authorization of engineer / supervisor responsible for maintenance of units and has to provide their contact number so that we can contact them as and when required.
- vi. Ensuring proper working of all components of units.
- vii. In case the services rendered by the contractor are not found satisfactory, during any time of defect liability period, LIC will engage some other agency to carry out the work at contractors risk & cost and the amount spend shall be recovered from Security Deposit.

Agreed and confirmed

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Signature of company with seal and date

**GENERAL CONDITIONS FOR MAINTENANCE OF SOLAR LIGHTS DURING DEFECT LIABILITY PERIOD.**

- i. Quarterly checking up keeping and replacement of the any component or sub-components of the system for proper operation of the system.
- ii. During the Defect liability period the contractor will responsible to keep the Solar Light in perfect running condition including fitting of parts accessories, repair etc,
- iii. The scope of work includes repairing/replacement of parts to make the system functional within DLP period whenever a complaint is lodged by the user. The contractor shall attend the same within a reasonable period of time and in any case of breakdown shall be corrected within a period not exceeding 3 days.
- iv. The replacement of all the parts if any should be original, genuine make and old replaced should be shown or handed over to LIC Maintenance Engineer-in-charge. The material whichever needs to replace, should take prior approval from the Competent Authority.
- v. The contractor has to give proper authorization of engineer / supervisor responsible for maintenance of units and has to provide their contact number so that we can contact them as and when required
- vi. During every servicing dust should be blown from solar street lights and cleaned. Battery charger parameters should checked and adjusted to required level.
- vii. Connections of batteries terminals to be checked \ cleaned and necessary applying of petroleum jelly to be carried out. Ensuring proper working of all components of units.
- viii. In case the services rendered by the contractor are not found satisfactory, during any time of defect liability period, LIC will engage some other agency to carry out the work at contractorsôrisk & cost and the amount spend shall be recovered from Security Deposit.

Agreed and confirmed

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Signature of company with seal and date

## TIME AND PROGRESS CHART

### COMPLETION TIME: 24 MONTHS.

| S<br>I.<br>N<br>O | ITEM OF<br>WORK                                                                                         | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 |
|-------------------|---------------------------------------------------------------------------------------------------------|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 1                 | <b>PRELIMINARIES :</b>                                                                                  |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
|                   | Layout and excavation of foundation, including Anti termite treatment.                                  |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| 2                 | <b>CARACAS :</b>                                                                                        |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
|                   | All structural monolith structural concrete work and brick work, staircase room etc.                    |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| 3                 | <b>FINISHING:</b>                                                                                       |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| 4                 | <b>INSTALLATION :</b>                                                                                   |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| A                 | Including stair railing, Waterproofing, grill, Painting work, Electrical Conduits wiring & plumbing     |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| B                 | Lift                                                                                                    |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| C                 | Fire Fighting                                                                                           |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| D                 | Solar Heater                                                                                            |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| E                 | A.C.                                                                                                    |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| F                 | Solar Light                                                                                             |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| 5                 | <b>ANCILLARIES:</b>                                                                                     |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
|                   | Includes ancillary works, pavements, drainages, filling in site, septic tanks, & clearance of site etc. |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |

**NOTE :**

1. Default in compliance with this programme in the chart in any of its section shall entail operation of liquidated clause No.19 under "Condition of Contract" in whole or part of the sole discretion of the Chief Engineer.
2. With reference to Clause No.4 under "General instruction to Contract" unless the Contractor submits his version of time and programme Chart within 15 days of communication of acceptance of tender, this chart shall be deemed to be as agreed and submitted by him.
3. In consultation with Superintending/Executive Engineer, this time and progress chart can be amended to bring in conformity and extension of time granted by competent Authority during this currency of the contract.
4. Ancillary work should be started that all such work shall be completed before the date of completion mentioned in the Appendix to the condition of contract.

**CHIEF ENGINEER**



**SCHEDULE OF QUANTITIES****SUB: TENDER FOR BUILDERS WORK, WATER SUPPLY, SANITARY INSTALLATION, ELECTRICAL INSTALLATION, LIFTS AND ANCILLARY WORKS FOR PROPOSED CONSTRUCTION OF 28 NOS. OFFICERS QUARTER AND 1 NO. OF VIP GUEST HOUSE AT SURYA NAGAR, BHUBANESWAR.**

1. Rates for each item of works are against the quantity only. Conditions of extra items will be applicable based on total quantity.
2. Rates for each item of works are on the basis of the make/brand of material mentioned in this schedule. However other equivalent make/brand as included under the heading Principal/Approved make can be chosen during execution subject to prior approval and price adjustment. In case of non availability of all the brands / makes mentioned under the heading "Principal/Approved make" Chief Engineer shall allow material of other make/ brand for use subject to price variation. For price variation purpose comparison shall be made with the brand/ make mentioned in the Schedule. However, after price adjustment if the derived rate becomes more than the rate quoted by the contractor, the contractor shall be paid quoted rate.

## **PART - A (CIVIL WORK)**

| Item No                                                | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Quantity | Rate (Rs) | Unit | Amount (Rs)         |
|--------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-----------|------|---------------------|
| <b>1</b>                                               | <b>EARTHWORK</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |          |           |      |                     |
| 1.01                                                   | Earth work in excavation by mechanical means ( Hydraulic excavator)/ manual means up to a depth of 1.50 m, below the existing ground level, over areas for foundations of columns, walls, retaining walls, rafts, beams, steps etc. in all types of soil and rock including shoring, strutting, dewatering if required, return filling in sides of foundations, trenches and plinth (under floor) in layers not exceeding 150mm thick, with approved excavated earth, well watered and rammed etc. Approved excavated earth to be spread in low lying areas at work site and disposing off the surplus/rejected excavated materials to the Contractor's own dump outside the work site as directed. | 1725.00  | 202.00    | Cum  | 348450.00           |
| 1.02                                                   | --DITTO-- as item no. 1.01 above but depth beyond 1.50m but not exceeding 3.00m below the existing ground level.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 795.00   | 240.00    | Cum  | 190800.00           |
| 1.03                                                   | Filling in layers not exceeding 150mm thick under floor with approved sand brought by the contractor from his own source outside the work site including watering, ramming, dressing and compacting to the required level as directed.                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 652.00   | 373.00    | Cum  | 243196.00           |
| 1.04                                                   | Filling the plot with approved earth brought by the contractor from his own source outside the work site filling in layers not exceeding 300 mm thick including watering, ramming, dressing and consolidating by means of roller to the required level as directed.                                                                                                                                                                                                                                                                                                                                                                                                                                 | 300.00   | 804.00    | Cum  | 241200.00           |
| <b>CARRY OVER TO GENRRAL SUMMARY VIDE PAGE NO. 225</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |          |           |      | <b>10,23,646.00</b> |

| Item No                                              | Description                                                                                                                                                                                                                                                                                                                                                                                                | Quantity | Rate (Rs) | Unit | Amount (Rs)       |
|------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-----------|------|-------------------|
| <b>2</b>                                             | <b>CONCRETE WORK: (The quoted rate of items under this trade to include to work at any floor and at any height.)</b>                                                                                                                                                                                                                                                                                       |          |           |      |                   |
|                                                      | <b><u>FORM WORK</u></b>                                                                                                                                                                                                                                                                                                                                                                                    |          |           |      |                   |
| 2.01                                                 | Formwork/ centering and shuttering for concrete members other than those having self finished exposed concrete surface needing no plaster including strutting, propping etc., <b>in foundations, footings, pedestals, bases of columns, plinth beam, Lift wall etc.</b> including removal of formwork- (i.e. all work upto plinth level). <b>(only steel plate, ply and steel props are to be allowed)</b> | 913.00   | 205.00    | Sqm. | 187165.00         |
| 2.02                                                 | Formwork/ centering and shuttering for concrete members other than those having self finished exposed concrete surface needing no plaster including strutting, propping etc. in all floors at all levels and lift for <b>suspended floors, roofs, landings, balconies and access platform etc</b> including removal of all formwork <b>(only steel plate, ply and steel props are to be allowed)</b>       | 3980.00  | 365.00    | Sqm. | 1452700.00        |
| 2.03                                                 | Formwork/ centering and shuttering for concrete members other than those having self finished exposed concrete surface needing no plaster including strutting, propping etc. in all floors at all levels and lift in <b>lintels, beams, girder, and cantilevers</b> including removal of all formwork <b>(only steel plate, ply and steel props are to be allowed)</b>                                     | 4839.00  | 317.00    | sq.m | 1533963.00        |
| 2.04                                                 | Formwork/ centering and shuttering for concrete members other than those having self finished exposed concrete surface needing no plaster including strutting, propping etc. in all floors at all levels and lift in <b>Columns, Pillars, Piers, Abutments, Post and strut etc.</b> including removal of all formwork <b>(only steel plate, ply and steel props are to be allowed)</b>                     | 2817.00  | 421.00    | sq.m | 1185957.00        |
| <b>CARRY OVER TO TRADE SUMMARY VIDE PAGE NO. 159</b> |                                                                                                                                                                                                                                                                                                                                                                                                            |          |           |      | <b>4359785.00</b> |

| Item No                                              | Description                                                                                                                                                                                                                                                                                                                                                                                                       | Quantity | Rate (Rs) | Unit | Amount (Rs)       |
|------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-----------|------|-------------------|
| 2.05                                                 | Formwork/ centering and shuttering for concrete members other than those having self finished exposed concrete surface needing no plaster including strutting, propping etc., in at all levels and lift in <b>Stairs( excluding landing) except spiral-staircase</b> including removal of all formwork <b>(only steel plate, ply and steel props are to be allowed).</b>                                          | 360.00   | 446.00    | Cum  | 160560.00         |
| 2.06                                                 | Formwork/ centering and shuttering for concrete members other than those having self finished exposed concrete surface needing no plaster including strutting, propping etc., at all levels and lift in <b>weather sheds, Chajja, corbels etc. including edges</b> (edges shall not be measured separately) including removal of all formwork. <b>(only steel plate, ply and steel props are to be allowed).</b>  | 343.00   | 558.00    | sq.m | 191394.00         |
| 2.07                                                 | Formwork/ centering and shuttering for concrete members other than those having self finished exposed concrete surface needing no plaster including strutting, propping etc., at all levels and lift for <b>walls (any thickness) including attached pilasters, buttresses, plinth and string course etc.</b> including removal of all formwork. <b>(only steel plate, ply and steel props are to be allowed)</b> | 786.00   | 344.00    | sq.m | 270384.00         |
| 2.08                                                 | Providing and laying P.C.C 1:4:8 <b>(1cement: 4 sand: 8 coarse aggregate)</b> all work up to plinth level. ( Coarse aggregate will be 20 mm and down gauge)                                                                                                                                                                                                                                                       | 178.00   | 3895.00   | Cum  | 693310.00         |
| <b>CARRY OVER THE TRADE SUMMARY VIDE PAGE NO.159</b> |                                                                                                                                                                                                                                                                                                                                                                                                                   |          |           |      | <b>1315648.00</b> |

| Item No                                              | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Quantity | Rate (Rs) | Unit | Amount (Rs)       |
|------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-----------|------|-------------------|
| 2.09                                                 | Providing and laying P.C.C. 1:2:4 (1cement: 2 sand: 4 coarse aggregate) in retaining walls, return walls, walls (any thickness) including attached pilasters, columns, piers, abutments, pillars, posts, struts, buttresses, string or lacing course, parapets, coping, bed blocks, anchor, blocks, plain window sills, fillets, sunken floor etc. (coarse graded aggregate 20mm and down gauge) <b>Cost of shuttering will not be paid extra.</b>                                                                                                                                                                                                                        | 80.00    | 5412.00   | Cum  | 432960.00         |
| 2.10                                                 | Providing and laying P.C.C. 1:2:4 (1cement: 2sand: 4coarse aggregate) in D.P.C 50mm thick including water-proofing compound including side shuttering (coarse graded aggregate 20mm and down gauge)                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 7.00     | 415.00    | Sq.m | 2905.00           |
| 2.11                                                 | Providing and laying in position <b>M25</b> grade concrete, satisfying the requirement of IS: 456 (Latest Edition), the ratio of which shall be decided by carrying out Design Mix at a Govt. Recognised Lab/ Govt. Engineering College. The work shall be carried out by using a <b>Mini Mobile Batching Plant</b> . The minimum cement content shall not be less than as stipulated in IS: 456 (Latest Edition). The rate shall be inclusive of cost of carrying out design mix in approved Govt. Recognised Lab/Govt. Engineering College and cost of materials required to carry out design mix including all incidentals as directed - <b>all works upto plinth.</b> | 477.00   | 5749.00   | Cum  | 2742273.00        |
| <b>CARRY OVER THE TRADE SUMMARY VIDE PAGE NO.159</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |          |           |      | <b>3178138.00</b> |

| Item No                                              | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Quantity | Rate (Rs) | Unit | Amount (Rs)       |
|------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-----------|------|-------------------|
| 2.12                                                 | Providing and laying in position <b>M20</b> grade concrete, satisfying the requirement of IS: 456 (Latest Edition), the ratio of which shall be decided by carrying out Design Mix at a Govt. Recognised Lab/ Govt. Engineering College. The work shall be carried out by using a <b>Mini Mobile Batching Plant</b> . The minimum cement content shall not be less than as stipulated in IS: 456 (Latest Edition). The rate shall be inclusive of cost of carrying out design mix in approved Govt. Recognised Lab/Govt. Engineering College and cost of materials required to carry out design mix including all incidentals as directed - <b>all works above plinth level</b> . | 934.00   | 6309.00   | Cum  | 5892606.00        |
| 2.13                                                 | Providing and laying R.C.C. 1:2:4 ( <b>1 Cement: 2 Sand: 4 Coarse aggregate</b> ) machine mixed in walls (any thickness) including attached pilasters, buttresses, plinth and string course, fillets, columns, pillars, piers, abutments, chajjas, weather sheds, posts and struts etc excluding the cost of centering, shuttering, finishing and reinforcement.                                                                                                                                                                                                                                                                                                                  | 54.00    | 5811.00   | Cum  | 313794.00         |
| 2.14                                                 | Providing and laying R.C.C. 1:2:4 ( <b>1 Cement: 2 Sand: 4 Coarse aggregate</b> ) machine mixed in walls (any thickness) including attached pilasters, buttresses, plinth and string course, fillets, columns, pillars, piers, abutments, posts and struts etc up to <b>plinth level</b> excluding the cost of centering, shuttering, finishing and reinforcement.                                                                                                                                                                                                                                                                                                                | 125.00   | 5129.00   | Cum  | 641125.00         |
| <b>CARRY OVER THE TRADE SUMMARY VIDE PAGE NO.159</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |          |           |      | <b>6847525.00</b> |

| Item No                                              | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Quantity | Rate (Rs) | Unit | Amount (Rs)       |
|------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-----------|------|-------------------|
| 2.15                                                 | Providing and laying in position <b>M25</b> grade concrete, satisfying the requirement of IS: 456 (Latest Edition), the ratio of which shall be decided by carrying out Design Mix at a Govt. Recognised Lab/ Govt. Engineering College. The work shall be carried out by using a <b>Mini Mobile Batching Plant</b> . The minimum cement content shall not be less than as stipulated in IS: 456 (Latest Edition). The rate shall be inclusive of cost of carrying out design mix in approved Govt. Recognised Lab/Govt. Engineering College and cost of materials required to carry out design mix including all incidentals as directed - <b>for columns above plinth level</b> | 197.00   | 6380.00   | Cum  | 1256860.00        |
| <b>CARRY OVER THE TRADE SUMMARY VIDE PAGE NO.159</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |          |           |      | <b>1256860.00</b> |

**2.00 TRADE SUMMARY OF CONCRETE WORK:**

|                                         |                     |
|-----------------------------------------|---------------------|
| C/O TO TRADE SUMMARY VIDE PAGE NO. 155  | :Rs. 43,59,785.00   |
| C/O TO TRADE SUMMARY VIDE PAGE NO. 156  | :Rs. 13,15,648.00   |
| C/O TO TRADE SUMMARY VIDE PAGE NO. 157  | :Rs. 31,78,138.00   |
| C/O TO TRADE SUMMARY VIDE PAGE NO. 158  | :Rs. 68,47,525.00   |
| C/O TO TRADE SUMMARY VIDE PAGE NO. 159  | :Rs. 12,56,860.00   |
| =====                                   |                     |
| C/O TO GENERAL SUMMARY VIDE PAGE NO.225 | :Rs. 1,69,57,956.00 |

| Item No                                               | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Quantity | Rate (Rs) | Unit | Amount (Rs)         |
|-------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-----------|------|---------------------|
| <b>3</b>                                              | <b>BRICK WORK: (The quoted rate of items under this trade to include to work at any floor and at any height.)</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |          |           |      |                     |
| 3.01                                                  | Brick work with Fly ash (non modular) bricks with minimum crushing strength 75kg/sq.cm with standard dimension in foundation and plinth in one or more brick thick in Cement-Sand mortar 1:5.                                                                                                                                                                                                                                                                                                                                                                                                       | 176.00   | 4428.00   | Cum  | 779328.00           |
| 3.02                                                  | Brick work with Fly ash (non modular) bricks with minimum crushing strength 75kg/sq.cm with standard dimension in all works above plinth level in one or more brick thick in Cement-Sand mortar 1:6.                                                                                                                                                                                                                                                                                                                                                                                                | 966.00   | 5022.00   | Cum  | 4851252.00          |
| 3.03                                                  | Brick work with Fly ash (non modular) bricks with minimum crushing strength 75kg/sq.cm with standard dimension in superstructure in Cement-Sand mortar 1:4 in half brick thick walls in partition etc. The half brick thick wall shall have 75 mm thick 1:2:4 RCC band with 2 nos. 8mm dia. Tor reinforcement. This RCC band shall be provided in half brick wall in every 1 m interval of height. <b>(Only reinforcement shall be measured and paid separately in the relevant items.)</b> When the Half brick wall does not touch the soffit of beams/slab, it also have R.C.C. band at the top). | 2855.00  | 649.00    | Sqm  | 1852895.00          |
| 3.04                                                  | Brick-on-edge soling with fly ash brick (non modular) bricks of minimum crushing strength 75kg/sq.cm with standard dimension including 25mm. thick layer of sand below and filling in joints properly with sand including watering and consolidating etc. complete.                                                                                                                                                                                                                                                                                                                                 | 2718.00  | 525.00    | Sqm  | 1426950.00          |
| <b>CARRY OVER TO GENERAL SUMMARY VIDE PAGE NO.225</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |          |           |      | <b>89,10,425.00</b> |



| Item No                                               | Description                                                                                                                                                                                                                                                                                                                                                                                                                                 | Quantity | Rate (Rs) | Unit    | Amount (Rs)           |
|-------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-----------|---------|-----------------------|
| <b>4</b>                                              | <b>STEEL AND IRON WORK: (The quoted rate of items under this trade to include to work at any floor and at any height.)</b>                                                                                                                                                                                                                                                                                                                  |          |           |         |                       |
| 4.01                                                  | Ribbed (Tor Steel)/TMT bar reinforcement in R.C.C works including bending, binding and straightening of bars and placing in position. (Steel supplied by contractor refer Clause No. 5 of General Preambles).                                                                                                                                                                                                                               | 231.00   | 64147.00  | M.T.    | 14817957.00           |
| 4.02                                                  | Providing and fixing M.S. security grills of required pattern and design for windows, ventilators, balconies, railing, Gates, made with M.S. angles, flats, Square, round bars etc. and to be fitted to the concrete/Brick work with necessary holdfasts, welding, grouting with P.C.C., 1:2:4 etc. including two coats of synthetic enamel paint over a coat of primer all as per drawing and the instruction of the Engineering-in-charge | 188.00   | 13369.00  | Quintal | 2513372.00            |
| 4.03                                                  | P&F Collapsible steel shutters with vertical channels 20 mm X 10 mm. X 2 mm.@100c/c and braced with flat iron diagonals 20 mm. X 5 mm. size, including top and bottom rails of M.S. tee 40 mm.X 40 mm X 6 mm. with 40 mm. dia. steel pulleys complete with bolts, nuts, locking arrangements, stoppers, handles, rollers, washers, etc. including two coats of synthetic enamel paint over a coat of primer complete as directed.           | 20.00    | 6572.00   | Sqm     | 131440.00             |
| 4.04                                                  | Providing and fixing M.S circular MS fan box of 16 SWG with MS rod 10mm dia. in R.C.C. slabs/beams etc. for fixing ceiling Fans, including painting all as per drawings                                                                                                                                                                                                                                                                     | 160.00   | 153.00    | Each    | 24480.00              |
| <b>CARRY OVER TO GENERAL SUMMARY VIDE PAGE NO.225</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                             |          |           |         | <b>1,74,87,249.00</b> |

| Item No                                             | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Quantity | Rate (Rs) | Unit | Amount (Rs)         |
|-----------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-----------|------|---------------------|
| <b>5</b>                                            | <b>WOOD WORK AND JOINERY: (The quoted rate of items under this trade to include to work at any floor and at any height.)</b>                                                                                                                                                                                                                                                                                                                                                                                                                    |          |           |      |                     |
| 5.01                                                | Supplying and fixing seasoned Sal wood doors & Windows frames, transoms and mullions of sizes such as 150 mm x 60 mm., 95 mm x 60 mm. etc. and cut to shape, rebated including M.S. hold fasts, anti-termite treatment and two coats of synthetic enamel paint over a coat of primer painting over all exposed surfaces and surface contact with masonry or concrete should have painting with two coats of coal-tar as per drawings and as directed at site.                                                                                   | 15.00    | 90008.00  | Cum  | 1350120.00          |
| 5.02                                                | Providing and fixing factory <b>made 30 mm thick ISI marked IS: 2202</b> (Part-I, Latest Edition) non-decorative type <b>FLUSH DOOR SHUTTERS, core of block board</b> of approved make with 4 nos. of heavy weight stainless steel butt hinges including screws (100x60x2.5mm) satisfying IS:12817 (Latest Edition) including lipping of teak wood of size 30x12 mm all-round the edge and two coats of synthetic enamel paint over a coat of wood primer etc. complete (All internal doors except toilets).                                    | 262.00   | 2047.00   | Sq.m | 536314.00           |
| 5.03                                                | Providing and fixing <b>factory made 38 mm thick ISI marked IS: 2202</b> (Part-I, Latest Edition) <b>decorative type FLUSH DOOR SHUTTERS</b> , core of block board construction with <b>4 mm thick teak veneer on both faces</b> of shutters of approved make with 4 nos. of heavy weight stainless steel butt hinges including screws (100x60x2.5mm) satisfying IS: 12817 (Latest Edition) including lipping of teak wood of size 38x12 mm all-round the edge and surfaces of shutter with melamine polish etc. complete (All Entrance doors). | 69.00    | 3457.00   | Sqm  | 238533.00           |
| <b>CARRY OVER TO TRADE SUMMARY VIDE PAGE NO.166</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |          |           |      | <b>21,24,967.00</b> |

| Item No                                             | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Quantity | Rate (Rs) | Unit | Amount (Rs)       |
|-----------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-----------|------|-------------------|
| 5.04                                                | <b>Providing and fixing teak wood paneled door shutters 35 mm thick with 12 mm thick teak wood plank, for Toilet</b> door shutters made of styles ( three nos.) and top and lock rail 100 mm width and bottom rails 200 mm width with 4 nos. of heavy weight stainless steel butt hinges (100x60x2.5mm) satisfying IS: 12817 (Latest Edition) and screws two coats of synthetic enamel paint over a coat of wood primer etc. complete.                                                                      | 111.00   | 4896.00   | Sqm  | 543456.00         |
| 5.05                                                | Providing and fixing <b>19 mm thick, 150 mm wide pelmet of 19mm commercial interior grade ply wood conforming to IS : 303 BWR</b> interior grade, nickel plated M.S. pipe 20mm dia ( heavy type) curtain road with nickel plated brackets, including fixing with hollock wood cleats of size 100mmx40mmx40mm on both side of pelmet and rawl plugs 75 mm long etc. two coats of synthetic enamel paint over a coat of wood primer etc. complete.                                                            | 600.00   | 491.00    | RM   | 294600.00         |
| 5.06                                                | <b>35 mm thick teak wood shutter with fly mosquito-proof net using stainless steel grade 304 wire gauge with wire dia 0.5mm and average width of aperture 1.4mm in both direction</b> for doors, windows etc shutters made of styles and top rail 95 mm width, lock and bottom rails 197 mm width, with 4 nos. of heavy weight stainless steel butt hinges (100x60x2.5mm) satisfying IS: 12817 (Latest Edition), screws and two coats of synthetic enamel paint over a coat of wooden primer etc. complete. | 141.00   | 4869.00   | Sqm  | 686529.00         |
| 5.07                                                | Providing and fixing <b>Teak wood moulded beading/Architrave 50 mm X12 mm</b> fixed all round the frames of doors which are flush with plaster to walls including screws and synthetic enamel paint over a coat of wood primer as directed.                                                                                                                                                                                                                                                                 | 1228.00  | 161.00    | R.M  | 197708.00         |
| <b>CARRY OVER TO TRADE SUMMARY VIDE PAGE NO.166</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |          |           |      | <b>1722293.00</b> |

| Item No                                             | Description                                                                                                                                                                     | Quantity | Rate (Rs) | Unit | Amount (Rs)      |
|-----------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-----------|------|------------------|
| 5.08                                                | Providing and fixing hardware fixtures and fittings for doors & Windows.                                                                                                        |          |           |      |                  |
|                                                     | Note: The rate is include for overhead, transport and profits for purchasing hardware fixtures and fittings items and fixing them in position with screws, nails etc. complete. |          |           |      |                  |
| a)                                                  | 300 mm long 10 mm dia aluminium anodized tower bolt.                                                                                                                            | 32.00    | 263.00    | Each | 8416.00          |
| b)                                                  | 250 mm long 10 mm dia aluminium anodized tower bolt.                                                                                                                            | 167.00   | 244.00    | Each | 40748.00         |
| c)                                                  | 150 mm long 10 mm dia aluminium anodized tower bolt.                                                                                                                            | 167.00   | 201.00    | Each | 33567.00         |
| d)                                                  | 100 mm long 10 mm dia aluminium anodized tower bolt.                                                                                                                            | 250.00   | 176.00    | Each | 44000.00         |
| e)                                                  | 75 mm long 10 mm dia aluminium anodized tower bolt.                                                                                                                             | 250.00   | 151.00    | Each | 37750.00         |
| f)                                                  | 250 mm long 16 mm dia aluminium anodized All drop.                                                                                                                              | 135.00   | 347.00    | Each | 46845.00         |
| g)                                                  | 150 mm long 10 mm dia aluminium anodized bow handle with base plate.                                                                                                            | 480.00   | 200.00    | Each | 96000.00         |
| h)                                                  | 125 mm long 8 mm dia aluminium anodized bow handle with base plate.                                                                                                             | 64.00    | 169.00    | Each | 10816.00         |
| i)                                                  | 100 mm long 8 mm dia aluminium anodized bow handle with base plate.                                                                                                             | 150.00   | 138.00    | Each | 20700.00         |
| j)                                                  | 75 mm long 8 mm dia aluminium anodized bow handle with base plate.                                                                                                              | 150.00   | 107.00    | Each | 16050.00         |
| k)                                                  | Godrej 6 lever night latch.                                                                                                                                                     | 32.00    | 1340.00   | Each | 42880.00         |
| l)                                                  | 25 mm dia C.P peep hole in main entrance door shutter.                                                                                                                          | 32.00    | 50.00     | Each | 1600.00          |
| m)                                                  | C.P Safety chain (Brass)                                                                                                                                                        | 32.00    | 119.00    | Each | 3808.00          |
| n)                                                  | Aluminium Anodized double barrel door stopper.                                                                                                                                  | 245.00   | 98.00     | Each | 24010.00         |
| o)                                                  | 50 mm dia rubber buffer                                                                                                                                                         | 170.00   | 44.00     | Each | 7480.00          |
| p)                                                  | 100 mm Stainless steel butt hinges (Heavy Duty).                                                                                                                                | 500.00   | 45.00     | Each | 22500.00         |
| q)                                                  | 75 mm Stainless steel butt hinges (Heavy Duty).                                                                                                                                 | 500.00   | 30.00     | Each | 15000.00         |
| r)                                                  | 50 mm Stainless steel butt hinges (Heavy Duty).                                                                                                                                 | 500.00   | 25.00     | Each | 12500.00         |
| <b>CARRY OVER TO TRADE SUMMARY VIDE PAGE NO.166</b> |                                                                                                                                                                                 |          |           |      | <b>484670.00</b> |

| Item No                                             | Description                                                                                                                                                                                                                                                                                                                                                 | Quantity | Rate (Rs) | Unit | Amount (Rs)       |
|-----------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-----------|------|-------------------|
| s)                                                  | Godrej make multipurpose lock.                                                                                                                                                                                                                                                                                                                              | 150.00   | 302.00    | Each | 45300.00          |
| t)                                                  | Stainless steel powder coated 450 mm long drawer sliding channel.                                                                                                                                                                                                                                                                                           | 120.00   | 350.00    | Each | 42000.00          |
| u)                                                  | Godrej make cupboard lock.                                                                                                                                                                                                                                                                                                                                  | 120.00   | 375.00    | Each | 45000.00          |
| v)                                                  | 75 mm long 8 mm dia Brass baby latch.                                                                                                                                                                                                                                                                                                                       | 60.00    | 137.00    | Each | 8220.00           |
| w)                                                  | Hydraulic door closer of Garness/ Everite or approved make.                                                                                                                                                                                                                                                                                                 | 7.00     | 1500.00   | Each | 10500.00          |
| x)                                                  | Brass Magnetic Catcher                                                                                                                                                                                                                                                                                                                                      | 300.00   | 68.00     | Each | 20400.00          |
| 5.09                                                | Providing and fixing <b>12 mm thick commercial interior grade ply wood conforming to IS : 303 BWR interior grade</b> for making cupboard, show case, crockery cabinet, kitchen shelf , rack, over-head kitchen cabinet etc the cost is including nails, screws adhesive etc <b>(cost of hard ware fittings and painting shall be paid for separately )</b>  | 300.00   | 1359.00   | Sqm  | 407700.00         |
| 5.10                                                | Providing and fixing <b>teak wood hand rail</b> of size 40x125mm/ 50x150mm or any other size finished with spirit polishing fixed with screws with MS balusters etc complete.                                                                                                                                                                               | 1.60     | 199433.00 | Cum  | 319092.80         |
| 5.11                                                | Providing and fixing <b>19 mm thick both side commercial veneer conforming IS : 1659 block board</b> for making cupboard, show case, crockery cabinet, kitchen shelf , rack, over-head kitchen cabinet etc <b>( cost of hard ware fittings and painting shall be paid for separately )</b>                                                                  | 1250.00  | 2327.00   | Sqm  | 2908750.00        |
| 5.12                                                | Providing and fixing <b>06 mm thick commercial interior grade ply wood conforming to IS : 303 BWR interior grade</b> for making cupboard, show case, crockery cabinet, kitchen shelf , rack, over-head kitchen cabinet etc the cost is including nails, screws adhesive etc <b>( cost of hard ware fittings and painting shall be paid for separately )</b> | 325.00   | 1152.00   | Sqm  | 374400.00         |
| <b>CARRY OVER TO TRADE SUMMARY VIDE PAGE NO.166</b> |                                                                                                                                                                                                                                                                                                                                                             |          |           |      | <b>4181362.80</b> |

| Item No                                             | Description                                                                                                                                                                                                                                                                                     | Quantity | Rate (Rs) | Unit | Amount (Rs)      |
|-----------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-----------|------|------------------|
| 5.13                                                | Providing and fixing 1 mm thick decorative high pressure laminated sheet of plain/wood grain in gloss/matt/suede finish with high density protective surface layer and reverse side and adhesive bonding quality conforming to IS: 2046 Type S, including cost of adhesive of approved quality. | 800.00   | 648.00    | Sqm  | 518400.00        |
| 5.14                                                | Providing and fixing 8mm thick plain float glass to be fixed for making show case, crockery cabinet, kitchen shelf, rack, over-head kitchen cabinet etc ( cost of hard ware fittings shall be paid for separately )                                                                             | 10.00    | 987.00    | Sqm  | 9870.00          |
| 5.15                                                | Providing and fixing 6mm thick plain float glass to be fixed for making show case, crockery cabinet, kitchen shelf, rack, over-head kitchen cabinet etc ( cost of hard ware fittings shall be paid for separately )                                                                             | 10.00    | 780.00    | Sqm  | 7800.00          |
| 5.16                                                | Providing and fixing teak wood beading of any size finished with spirit polishing fixed with screws/nails, including cost of adhesive of approved quality etc complete.                                                                                                                         | 0.20     | 199433.00 | Cum  | 39886.00         |
| <b>CARRY OVER TO TRADE SUMMARY VIDE PAGE NO.166</b> |                                                                                                                                                                                                                                                                                                 |          |           |      | <b>575956.60</b> |

#### 5.0 TRADE SUMMARY OF WOOD WORK & JOINERY:

|                                        |                   |
|----------------------------------------|-------------------|
| C/O TO TRADE SUMMARY VIDE PAGE NO. 162 | :Rs. 21,24,967.00 |
| C/O TO TRADE SUMMARY VIDE PAGE NO. 163 | :Rs. 17,22,293.00 |
| C/O TO TRADE SUMMARY VIDE PAGE NO. 164 | :Rs. 4,84,670.00  |
| C/O TO TRADE SUMMARY VIDE PAGE NO. 165 | :Rs. 41,81,362.80 |
| C/O TO TRADE SUMMARY VIDE PAGE NO. 166 | :Rs. 5,75,956.60  |

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|                                         |                   |
|-----------------------------------------|-------------------|
| C/O TO GENERAL SUMMARY VIDE PAGE NO.225 | :Rs. 90,89,249.40 |
|-----------------------------------------|-------------------|

| Item No                                             | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Quantity | Rate (Rs) | Unit | Amount (Rs)       |
|-----------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-----------|------|-------------------|
| <b>6</b>                                            | <b>FLOORING AND FINISHING:</b> (The quoted rate of items under this trade to include to work at any floor and at any height. For Tender Item Nos. 6.01,6.02,6.03, 6.04, 6.05,6.06,6.07,6.08 & 6.09 under this trade, basic rates of materials are mentioned. However, direct price variation will not be payable. But these items shall attract adjustment of materials and adjustment of labours as per clause no.11.6, 11.7, 11.8 & 11.9 of Part-II of tender. The cost of purchased materials F.O.R at site shall not be less than basic price mentioned against respective items.)                                    |          |           |      |                   |
| 6.01                                                | Providing and laying pre-polished white marble minimum <b>16 mm thick sizes 1200mm x 900mm slab or part thereof in entrance/ corridor/ Guest House/ Officers' Quarters flooring</b> as per design and pattern over bed mortar 20 mm thick 1:4 (Cement: sand) and floated <b>with grey cement slurry @ 4.40 kg/sqm</b> including machine cut machine polishing with hair fine joints with moulded exposed edges(for entrance), filling joints with white cement including rubbing and polishing complete etc. as per drawing and direction of the Engineering in charge. <b>(Basic rate of Marble is Rs.90 per Sq.ft.)</b> | 1210.00  | 1902.00   | Sqm  | 2301420.00        |
| 6.02                                                | Providing and laying pre-polished minimum <b>16 mm thick</b> white marble in Skirting of entrance/ Guest House/ corridor/ Officers' Quarters over 12mm thick of Bed cement mortar 1:3 (1 Cement : 3 Coarse sand) and jointed with cement slurry @ 3.3 kg/sqm including pointing in white cement mixed with white pigment of matching shade of the Marble including rubbing and polishing etc. complete. Height of skirting shall be 125mm made out of marble. <b>(Basic rate of Marble is Rs.90 per Sq.ft.)</b>                                                                                                           | 170.00   | 1180.00   | sq.m | 200600.00         |
| 6.03                                                | Supplying and fixing machine cut machine finished white marble minimum 16mm thick in <b>skirting, risers and dado</b> up to 2 m high, over 12 mm thick bed of cement mortar backing 1:3 ( 1 cement : 3 course sand ) and jointed with grey cement slurry @ 3.3 kg/sqm, including pointing in white cement mixed with pigment of matching shade complete. <b>(Basic rate of Marble is Rs.90 per Sq.ft.)</b>                                                                                                                                                                                                                | 625.00   | 1648.00   | Sq.m | 1030000.00        |
| <b>CARRY OVER TO TRADE SUMMARY VIDE PAGE NO.172</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |          |           |      | <b>3532020.00</b> |



| Item No                                             | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Quantity | Rate (Rs) | Unit | Amount (Rs)       |
|-----------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-----------|------|-------------------|
| 6.04                                                | Supplying and laying machine cut machine finished having size full length of tread <b>green</b> marble, minimum 16mm thick in <b>TREAD</b> , over 20 mm thick bed of cement mortar backing <b>1:4 ( 1 cement : 4 course sand ) and floated with grey cement slurry @ 4.40 kg/sqm</b> , including half nosing marble edge and pointing in white cement mixed with pigment of matching shade complete. <b>(Basic rate of Marble @ Rs.90 per Sq.ft.)</b>                                                                                                    | 167.00   | 2068.00   | sq.m | 345356.00         |
| 6.05                                                | Supplying and laying machine cut machine finished marble (green, minimum 16mm thick) in FLOORING/LANDING/ WINDOW SILL ETC, over 20 mm thick bed of cement mortar backing 1:4 ( 1 cement : 4 course sand ) and floated with grey cement slurry @ 4.40 kg/sqm, including pointing in white cement mixed with pigment of matching shade complete. Exposed edge of the marble shall be half rounded. <b>(Basic rate of Marble @ Rs.90 per Sq.ft.)</b>                                                                                                        | 798.00   | 1549.00   | sq.m | 1236102.00        |
| 6.06                                                | Proving and laying rectified glazed Ceramic floor tiles in flooring of size 395x395mm / or bigger size (thickness to be specified by the manufacturer) of 1st quality conforming to IS: 15622 of approved make, in all colour and shades except White, Ivory, Grey, Fume Red Brown, on 20 mm thick cement mortar 1: 4 ( 1 cement : 4 course sand ) and floated with grey cement slurry @ 4.40 kg/sqm, including pointing in white cement mixed with pigment of matching shade etc. complete. <b>(Basic rate of Rectified Tiles @ Rs.45/- per Sq.ft.)</b> | 1018.00  | 963.00    | sq.m | 980334.00         |
| <b>CARRY OVER TO TRADE SUMMARY VIDE PAGE NO.172</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |          |           |      | <b>2561792.00</b> |



| Item No                                             | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Quantity | Rate (Rs) | Unit | Amount (Rs)       |
|-----------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-----------|------|-------------------|
| 6.07                                                | Proving and fixing rectified glazed Ceramic tiles in skirting of size 395x395mm / or any other size ( thickness to be specified by the manufacturer) of 1st quality conforming to IS : 15622 of approved make, in all colour and shades except White, Ivory, Grey, Fume Red Brown, over 12 mm thick bed of cement mortar 1: 3 ( 1 cement : 3 course sand ) and jointed with jointed with grey cement slurry @ 3.30 kg/sqm, including pointing in white cement mixed with pigment of matching shade etc. complete. <b>(Basic rate of Rectified Tiles is Rs.45/- per Sq.ft.)</b>                                                 | 159.00   | 979.00    | sq.m | 155661.00         |
| 6.08                                                | Proving and laying Ceramic glazed floor tiles in flooring of size 300x300mm / or any other size (thickness to be specified by the manufacturer) of 1 <sup>st</sup> quality conforming to IS : 15622 of approved make, in all colour and shades except White, Ivory, Grey, Fume Red Brown, on 20 mm thick cement mortar 1: 4 ( 1 cement : 4 course sand ) and floated with grey cement slurry @ 4.40 kg/sqm, including pointing in white cement mixed with pigment of matching shade etc. complete. <b>(Basic rate of Ceramic Glazed Tiles is Rs.45/- per Sq.ft.)</b>                                                           | 244.00   | 832.00    | sq.m | 203008.00         |
| 6.09                                                | Proving and fixing 1st quality Ceramic glazed wall tiles 200mmX300mm conforming to IS: 15622 (thickness to be specified by the manufacturer) of approved make, in all colour and shades except burgundy, bottle green, black, <b>in skirting, and dados, over kitchen platform, in wall above wash basin, in wall below kitchen sink etc over 12 mm thick cement mortar 1: 3 ( 1 cement : 3 course sand )</b> and jointed with grey cement slurry @ 3.30 kg/sqm, including pointing in white cement mixed with pigment of matching shade etc. complete. <b>(Basic rate of Ceramic Glazed Wall Tiles is Rs.35/- per Sq.ft.)</b> | 1548.00  | 888.00    | sq.m | 1374624.00        |
| <b>CARRY OVER TO TRADE SUMMARY VIDE PAGE NO.172</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |          |           |      | <b>1733293.00</b> |

| Item No                                             | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Quantity | Rate (Rs) | Unit | Amount (Rs)       |
|-----------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-----------|------|-------------------|
| 6.10                                                | Supplying and fixing 18 mm thick, mirror polished, premoulded and prepolished, machine cut GRANITE for kitchen platform, of required size, approved shade, colour and texture laid over 20 mm thick in Cement Mortar 1:4 (1 cement: 4 coarse sand), floated with grey cement slurry @ 4.40 kg/sqm, joints treated with white cement with matching pigment, moulding and polishing to edge to give high gloss finish etc. complete at all levels. (area of each slab over 0.50sqm) complete.         | 135.00   | 4125.00   | sq.m | 556875.00         |
| 6.11                                                | 52 mm thick cement concrete flooring in stilt with concrete hardener topping, under layer 40 mm thick cement concrete 1:2:4 (1 cement: 2 coarse sand: 4 graded stone aggregate 20 mm nominal size) and top layer 12mm thick cement hardener consisting of mix 1:2 (1 cement hardener mix: 2 graded stone aggregate 6 mm nominal size) by volume, hardening compound mixed @ 2 litre per 50 kg of cement or as per manufacturer's specifications. This includes cost of cement slurry etc. complete. | 1107.00  | 313.00    | sq.m | 346491.00         |
| 6.12                                                | Providing and laying cement concrete plinth protection, under the cement concrete flooring in stilt etc. 1:2:4 (1cement: 2 sand: 4 coarse aggregate) including finishing with 20mm nominal size stone aggregate.                                                                                                                                                                                                                                                                                    | 107.00   | 5175.00   | Cum  | 553725.00         |
| 6.13                                                | Internal Cement Plaster in cement-sand mortar 1:4, minimum 12mm. thick smooth finish to brick/ Cement concrete work (excluding R.C.C. slab/beam Soffits) & all complete.                                                                                                                                                                                                                                                                                                                            | 10827.00 | 132.00    | sq.m | 1429164.00        |
| 6.14                                                | Internal Cement Plaster in cement-sand mortar not less than 6mm thick smooth finish to soffits of R.C.C. slabs/beam & waist slab of Staircase in cement mortar 1:4 mix including chipping & all complete.                                                                                                                                                                                                                                                                                           | 4640.00  | 108.00    | sq.m | 501120.00         |
| <b>CARRY OVER TO TRADE SUMMARY VIDE PAGE NO.172</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |          |           |      | <b>3387375.00</b> |

| Item No                                             | Description                                                                                                                                                                                                                                           | Quantity | Rate (Rs) | Unit | Amount (Rs)       |
|-----------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-----------|------|-------------------|
| 6.15                                                | External Cement plaster 1:4, minimum 12mm thick, over concrete surface including water- proofing compound (@ 1kg per 50 kg of cement) & all complete.                                                                                                 | 1575.00  | 148.00    | sq.m | 233100.00         |
| 6.16                                                | External Cement plaster 1:4, minimum 15mm thick, over brick/concrete surface including water- proofing compound (@ 1kg per 50 kg of cement) & all complete.                                                                                           | 5900.00  | 172.00    | sq.m | 1014800.00        |
| 6.17                                                | Distempering with washable 1st quality acrylic distemper paint of approved quality & shade in two or more coats over a coat primer to internal wall complete as per manufacturer's specification.                                                     | 14840.00 | 87.00     | sq.m | 1291080.00        |
| 6.18                                                | Wall/ceiling painting with acrylic emulsion paint of approved quality & shade in two or more coats over a coat primer to internal wall complete as per manufacturer's specification (SDM Flat & VIP Guest House).                                     | 650.00   | 99.00     | sq.m | 64350.00          |
| 6.19                                                | Applying exterior wall with Acrylic Smooth exterior paint (Anti-fungal) of required shade, two or more coats including priming coat of exterior cement primer. Consumption of paints as per manufacturer's specification for newly plastered surface. | 8900.00  | 115.00    | sq.m | 1023500.00        |
| 6.20                                                | Providing and applying Ready Mix Wall putty (white cement based) approved make having minimum 1.5 mm. thick to walls, beams, slabs etc. including preparation of base.                                                                                | 15466.00 | 146.00    | sq.m | 2258036.00        |
| 6.21                                                | Providing and fixing G.I. Chicken wire mesh of 22 gauge to the position with necessary nails.                                                                                                                                                         | 650.00   | 20.00     | sq.m | 13000.00          |
| 6.22                                                | 12mm thick cement plaster of mix 1:4 finished with a coat of neat cement with water proofing compound ( @ 1kg per 50 kg of cement), over brick/concrete surface including water- proofing compound & all complete.(for water tank & septic tank)      | 914.00   | 184.00    | sq.m | 168176.00         |
| <b>CARRY OVER TO TRADE SUMMARY VIDE PAGE NO.172</b> |                                                                                                                                                                                                                                                       |          |           |      | <b>6066042.00</b> |

| Item No                                             | Description                                                                                                                                                                                                                    | Quantity | Rate (Rs) | Unit | Amount (Rs)      |
|-----------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-----------|------|------------------|
| 6.23                                                | Painting with synthetic enamel paint over wooden surface of approved brand, quality & shade in two or more coats over a coat primer to internal work complete as per manufacturer's specification for newly plastered surface. | 1500.00  | 104.00    | sq.m | 156000.00        |
| 6.24                                                | Cement plaster skirting upto 30cm height, 18 mm thick with cement mortar of mix 1:3 finished with a coat of neat cement & all complete.                                                                                        | 33.00    | 257.00    | sq.m | 8481.00          |
| <b>CARRY OVER TO TRADE SUMMARY VIDE PAGE NO.172</b> |                                                                                                                                                                                                                                |          |           |      | <b>164481.00</b> |

#### **6. TRADE SUMMARY OF FLOORING & FINISHING WORK:**

|                                         |                     |
|-----------------------------------------|---------------------|
| C/O TO TRADE SUMMARY VIDE PAGE NO. 167  | :Rs. 35,32,020.00   |
| C/O TO TRADE SUMMARY VIDE PAGE NO. 168  | :Rs. 25,61,792.00   |
| C/O TO TRADE SUMMARY VIDE PAGE NO. 169  | :Rs. 17,33,293.00   |
| C/O TO TRADE SUMMARY VIDE PAGE NO. 170  | :Rs. 33,87,375.00   |
| C/O TO TRADE SUMMARY VIDE PAGE NO. 171  | :Rs. 60,66,042.00   |
| C/O TO TRADE SUMMARY VIDE PAGE NO. 172  | :Rs. 1,64,481.00    |
| =====                                   |                     |
| C/O TO GENERAL SUMMARY VIDE PAGE NO.225 | :Rs. 1,74,45,003.00 |

| Item No                                             | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Quantity | Rate (Rs) | Unit | Amount (Rs)      |
|-----------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-----------|------|------------------|
| <b>7</b>                                            | <b>WATER PROOFING: (The quoted rate of items under this trade to include to work at any floor and at any height.)</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                       |          |           |      |                  |
| 7.01                                                | Providing and laying integral cement based water proofing treatment including preparation of surface as required for treatment of roofs, balconies, terraces etc. consisting of following operations through approved agency under guarantee of 10 Years .                                                                                                                                                                                                                                                                                                                  | 1070.00  | 635.00    | sq.m | 679450.00        |
| a)                                                  | Applying and grouting a slurry coat of neat cement using 2.75 kg/Sqm of cement admixed with proprietary water proofing compound conforming to IS: 2645 over the RCC slab including adjoining walls upto 300mm height including cleaning the surface before treatment.                                                                                                                                                                                                                                                                                                       |          |           |      |                  |
| b)                                                  | Laying brick bats with mortar using broken/brick bats 25mm to 115mm size with 50% of cement mortar of mix 1 : 5 (1 cement 5 coarse sand) admixed with water proofing compound conforming to IS : 2645 over 20mm thick layer of cement mortar of mix 1 : 5 (1 cement : 5 coarse sand) admixed with water proofing compound conforming to IS : 2645 to required slope and treating similarly the adjoining walls upto 300mm height including rounding of the junctions of walls and slabs with minimum radius of 450mm and tucking the treatment in the vertical surface etc. |          |           |      |                  |
| c)                                                  | After two days of proper curing applying a second coat of cement slurry using 2.75 Kg/m <sup>2</sup> of cement admixed with water proofing compound conforming to IS: 2645.                                                                                                                                                                                                                                                                                                                                                                                                 |          |           |      |                  |
| d)                                                  | Finishing the surface with 20mm thick joint less cement mortar of mix 1 : 4 (1 cement 4 coarse sand) admixed with water proofing compound conforming to IS : 2645 including laying glass fiber cloth of approved quality in top layer of plaster and finally finishing the surface with trowel with neat cement slurry and making pattern of 300 x 300mm square 3mm deep.                                                                                                                                                                                                   |          |           |      |                  |
| <b>CARRY OVER TO TRADE SUMMARY VIDE PAGE NO.175</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |          |           |      | <b>679450.00</b> |

| Item No                                             | Description                                                                                                                                                                                                                                                                                                                                                                                                                                            | Quantity | Rate (Rs) | Unit | Amount (Rs)      |
|-----------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-----------|------|------------------|
| e)                                                  | The whole terrace so finished shall be flooded with water for a minimum period of two weeks for curing and for final test. All above operations to be done in order and through one of the approved agencies under guarantee of 10 years. With average thickness as 120mm. (Flat area covered between inside of the parapet wall [unfinished] shall be measured i.e., watta shall not be measured).                                                    |          |           |      |                  |
| 7.02                                                | Providing and laying water proofing treatment to vertical and horizontal surfaces of depressed portion of W.C. , kitchen and the like consisting of:                                                                                                                                                                                                                                                                                                   | 460.00   | 243.00    | Sqm. | 111780.00        |
| a)                                                  | I course of applying cement slurry @ 4.4 kg/m <sup>2</sup> mixed with water proofing compound conforming to IS : 2645 in recommended proportions including rounding off junction of vertical and horizontal surface.                                                                                                                                                                                                                                   |          |           |      |                  |
| b)                                                  | II course of 20mm cement plaster 1 : 3 (1 cement 3 coarse sand) mixed with water proofing compound in recommended proportion including rounding off junction of vertical and horizontal surface.                                                                                                                                                                                                                                                       |          |           |      |                  |
| c)                                                  | III course of applying blown or residual bitumen applied hot at @ 1.7 kg/m <sup>2</sup> of area.                                                                                                                                                                                                                                                                                                                                                       |          |           |      |                  |
| d)                                                  | IV course of 400 micron thick PVC sheet. (overlaps at joint of PVC sheet should be 100 mm wide and pasted to each other with bitumen @ 1.7 kg/m <sup>2</sup> of area.                                                                                                                                                                                                                                                                                  |          |           |      |                  |
| 7.03                                                | Cement based water proofing treatment conforming to latest IS code to sunk floors of toilets including filling in deep sunk floors with water proof brick bat coba, with cement mortar of mix 1:4 (1 cement 4 coarse sand) admixed with proprietary water proofing compound conforming to IS: 2645 all as per specifications of and through one of the approved agencies under a guarantee of 10 years. The rate shall be including pressure grouting. | 25.00    | 5134.00   | Cum. | 128350.00        |
| <b>CARRY OVER TO TRADE SUMMARY VIDE PAGE NO.175</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                        |          |           |      | <b>240130.00</b> |

### **7. TRADE SUMMARY OF WATER PROOFING WORK:**

|                                         |                  |
|-----------------------------------------|------------------|
| C/O TO TRADE SUMMARY VIDE PAGE NO. 173  | :Rs. 6,79,450.00 |
| C/O TO TRADE SUMMARY VIDE PAGE NO. 174  | :Rs. 2,40,130.00 |
| =====                                   |                  |
| C/O TO GENERAL SUMMARY VIDE PAGE NO.225 | :Rs. 9,19,580.00 |

| Item No                                             | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Quantity | Rate (Rs) | Unit | Amount (Rs)       |
|-----------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-----------|------|-------------------|
| <b>8.00</b>                                         | <b>ALUMINIUM AND GLAZING WORK: (The quoted rate of items under this trade to include to work at any floor and at any height.)</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |          |           |      |                   |
| 8.01                                                | Providing and fixing <b>fully glazing colour anodized of minimum 15 microns, two track/three track</b> aluminium WINDOWS (sliding) & ventilators (top hung) or outer frame vertical mullions, fixing the glazing and mosquito proof net with glazing clips of required size with EPDM gaskates. Shutter of the window shall be fixed to the frame with locking arrangement. The frames are to be fixed to the brick work / concrete with necessary rawl plugs, fasteners and fisher screws etc. all as per shop drawing. <b>No and size of screws shall be decided as per the size of opening and maximum wind speed as defined in relevant IS Codes.</b> Glazing and mosquito proof net will be measured and paid separately. | 6400.00  | 451.00    | Kg.  | 2886400.00        |
| 8.02                                                | Providing in aluminium window, ventilator shutter etc. <b>5mm</b> thick tinted float glass to be fixed as per specification mentioned in item no. 8.01 above etc. complete as per architectural drawings and the direction of Engineering-in-charge.                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 480.00   | 899.00    | Sqm. | 431520.00         |
| 8.03                                                | Providing in aluminium window, ventilator shutter etc. fly mosquito-proof net using stainless steel grade 304 wire gauge with wire dia 0.5mm and average width of aperture 1.4mm in both direction to be fixed as per specification mentioned in item no. 8.01 above etc. complete as per architectural drawings and the direction of Engineering-in-charge                                                                                                                                                                                                                                                                                                                                                                    | 310.00   | 696.00    | Sqm. | 215760.00         |
| <b>CARRY OVER TO TRADE SUMMARY VIDE PAGE NO.177</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |          |           |      | <b>3533680.00</b> |



| Item No                                             | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Quantity | Rate (Rs) | Unit | Amount (Rs)      |
|-----------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-----------|------|------------------|
| 8.04                                                | Providing and fixing aluminium sections of different sizes with extruded built up appropriate section of approved make conforming to relevant IS Code. The frames are to be fixed to the brick work / concrete with necessary rawl plugs, fasteners and fisher screws etc. all as per shop drawing for structural glazing and fixing ACP panel. The aluminium sections shall have plain anodized coating of 15 micron. <b>No and size of screws shall be decided as per the size of opening and maximum wind speed as defined in relevant IS Codes.</b> | 190.00   | 395.00    | Kg.  | 75050.00         |
| 8.05                                                | Providing and fixing 4 mm thick Aluminium Composite Panel consisting of Thermoplastic compound core of polythene sandwich between two skins of 0.50 mm thick aluminium foil of approved brand. The rate is inclusive of Silicon, adhesive, pressure clits, tapes etc complete (cost of aluminium section for framing will be paid as per tender item no. 8.04).                                                                                                                                                                                         | 150.00   | 2668.00   | Sqm. | 400200.00        |
| 8.06                                                | Supplying & fixing 5 mm thick coloured reflective glass of approved make fixed to frame with necessary fixtures for aluminium structural glazing. (Cost of aluminium section for framing will be paid as per tender item no. 8.04).                                                                                                                                                                                                                                                                                                                     | 100.00   | 1202.00   | Sqm. | 120200.00        |
| <b>CARRY OVER TO TRADE SUMMARY VIDE PAGE NO.177</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |          |           |      | <b>595450.00</b> |

**8. TRADE SUMMARY OF ALUMINIUM WORK:**

|                                         |                   |
|-----------------------------------------|-------------------|
| C/O TO TRADE SUMMARY VIDE PAGE NO. 176  | :Rs. 35,33,680.00 |
| C/O TO TRADE SUMMARY VIDE PAGE NO. 177  | :Rs. 5,95,450.00  |
| =====                                   | =====             |
| C/O TO GENERAL SUMMARY VIDE PAGE NO.225 | :Rs. 41,29,130.00 |

| Item No                                             | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Quantity | Rate (Rs) | Unit | Amount (Rs)      |
|-----------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-----------|------|------------------|
| 9                                                   | <b>SANITARY INSTALLATION, WATER SUPPLY AND DRAINAGE: (The quoted rate of items under this trade to include to work at any floor and at any height. All the C.P. fittings shall be of Jaquar make.)</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |          |           |      |                  |
| 9.01                                                | Proving & fixing G.I. water supply pipes "MEDIUM" quality ( "B" class) 15 mm dia concealed to walls including all specials, fittings, Hessian wrapping, bitumen painting , refilling, chasing in walls and floors and making good of the plaster surface, etc. complete.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 426.00   | 326.00    | R. M | 138876.00        |
| 9.02                                                | Proving & fixing G.I. water supply pipes "MEDIUM" quality ( "B" class) 20 mm dia concealed to walls including all specials, fittings, Hessian wrapping, bitumen painting , refilling, chasing in walls and floors and making good , of the plaster surface, etc. complete.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 150.00   | 345.00    | R. M | 51750.00         |
| 9.03                                                | Supplying & fixing ISI Marked 1st Grade of white vitreous Pedestal type W.C. pan (European pattern) having integrated P trap of 400 mm height(approx) fixed to floor with C.P. brass screws and washers and making necessary connection with branch soil and vent pipe complete with white PVC seat cover, Low level plastic flushing cistern (valve less symphonic type) 10 ltrs. Capacity of approved quality and manufacturer confirming to IS: 7231-1984 including all internal fittings, Concealed brackets 15mm dia. brass valve with polythene float, 32mm dia. PVC flush bend, 15mm dia Polythene pipe inlet, mosquito proof PVC brass coupling, brass union, jam, nuts, handle. 110mm dia PVC waste pipe measured and paid separately in the relevant items. | 32.00    | 4454.00   | No   | 142528.00        |
| <b>CARRY OVER TO TRADE SUMMARY VIDE PAGE NO.187</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |          |           |      | <b>333154.00</b> |

| Item No                                             | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Quantity | Rate (Rs) | Unit | Amount (Rs)      |
|-----------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-----------|------|------------------|
| 9.04                                                | Supplying & fixing ISI Marked 1st Grade white vitreous Orissa pattern W.C. pan with integrated foot rests, size 580mm.X440 mm. fixed flush with floor including PVC " P" TRAP , Low level plastic flushing cistern (valve less symphonic type) 10 ltrs. Capacity of approved quality and manufacturer confirming to IS: 7231-1984 including all internal fittings, Concealed brackets 15mm dia. brass valve with polythene float, 32mm dia. PVC flush bend with extra PVC pipe for IWC with fittings, 15mm dia Polythene pipe inlet, mosquito proof PVC brass coupling, brass union, jam, nuts, handle making necessary 110mm dia PVC waste pipe connections up to vertical stack pipe, complete. 110mm dia PVC waste pipe measured and paid separately in the relevant items. | 32.00    | 4371.00   | Nos. | 139872.00        |
| 9.05                                                | Supplying & fixing white vitreous ISI marked China wash basin size 550 x 400mm with 15 mm dia. C.P. brass long neck pillar cock with aerator , 32mm C.P. brass waste coupling, 15mm dia. polythene pipe inlet, , unions, joints, etc. supported on painted C.I. bracket etc. complete.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 62.00    | 2941.00   | Nos. | 182342.00        |
| 9.06                                                | Providing and fixing Chrome Plated 20 mm dia brass 600mm long towel rail.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 62.00    | 1468.00   | Nos. | 91016.00         |
| 9.07                                                | Providing and fixing 15mm dia. C.P. brass long body Bib cock with Wall Flange.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 128.00   | 1306.00   | Nos. | 167168.00        |
| 9.08                                                | Providing & fixing 110mm dia. out-let PVC Nahani/ Floor trap with C.P. stainless steel grating including bedding in cement mortar 1:5, add brick-work band, cement plaster 1:3 around the trap for seat and raising level making good the surface etc. complete.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 150.00   | 274.00    | Nos. | 41100.00         |
| 9.09                                                | Providing & fixing 110mm dia out-let PVC "P" / multipurpose trap bedding in cement mortar 1:5, add brick-work band, cement plaster 1:3 around the trap for seat and raising level making good the surface etc. complete.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 32.00    | 313.00    | Nos. | 10016.00         |
| <b>CARRY OVER TO TRADE SUMMARY VIDE PAGE NO.187</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |          |           |      | <b>631514.00</b> |

| Item No                                             | Description                                                                                                                                                                                                                                                                                                                                   | Quantity | Rate (Rs) | Unit | Amount (Rs)       |
|-----------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-----------|------|-------------------|
| 9.10                                                | Providing and fixing 15mm dia. C.P. brass Angular male/ female / long thread stop cock.                                                                                                                                                                                                                                                       | 215.00   | 876.00    | Nos. | 188340.00         |
| 9.11                                                | Providing and fixing 15mm dia. C.P. brass concealed stop cock, extra heavy body with adjustable Wall Flange.                                                                                                                                                                                                                                  | 60.00    | 1304.00   | Each | 78240.00          |
| 9.12                                                | Providing & fixing 600x450mm , 6mm thick mirror approved make & quality with 6mm thick ply backing with teak wood beading 50 mm x 25 mm of fixed to walls with wooden plug, C.P. brass screws etc. complete.                                                                                                                                  | 66.00    | 728.00    | Each | 48048.00          |
| 9.13                                                | Providing and fixing 15mm dia C.P. brass Swan Neck Bib Cock.                                                                                                                                                                                                                                                                                  | 32.00    | 1817.00   | Nos  | 58144.00          |
| 9.14                                                | Providing & fixing G.I.(A Class) Connecting pipe for waste and joining to traps etc -32mm dia including all specials.                                                                                                                                                                                                                         | 160.00   | 334.00    | RM   | 53440.00          |
| 9.15                                                | 15mm dia C.P. brass extension piece with flange 50mm long.                                                                                                                                                                                                                                                                                    | 150.00   | 72.00     | Each | 10800.00          |
| 9.16                                                | 15mm dia C.P. brass extension piece with flange 100mm long.                                                                                                                                                                                                                                                                                   | 100.00   | 96.00     | Each | 9600.00           |
| 9.17                                                | Supplying and fixing CP (Chrome plated) brass Soap Dish.                                                                                                                                                                                                                                                                                      | 66.00    | 999.00    | Each | 65934.00          |
| 9.18                                                | Providing & fixing CP brass glass self 600 mm long.                                                                                                                                                                                                                                                                                           | 66.00    | 1434.00   | Each | 94644.00          |
| 9.19                                                | Providing and fixing C.P. brass wall mixture (3 in 1 ) with Telephonic shower.                                                                                                                                                                                                                                                                | 34.00    | 4371.00   | Each | 148614.00         |
| 9.20                                                | Providing and fixing C.P. brass 190mm long shower Arm.                                                                                                                                                                                                                                                                                        | 64.00    | 553.00    | Each | 35392.00          |
| 9.21                                                | Providing & fixing stainless steel sink of "NEELKANTH/NIRALI" of similar approved make with drain board approx. overall size 1040mmx510mmx225mm with 32mm dia C.P. brass waste coupling,32mm dia P.V.C. waste pipe up to floor level                                                                                                          | 31.00    | 7060.00   | Each | 218860.00         |
| 9.22                                                | Providing & fixing internal unplasticised Rigid PVC Soil pipes (working pressure 6kg/ cm <sup>2</sup> ) 110 mm dia , conforming to IS : 4985, including jointing with seal ring conforming to IS : 5382, PVC clamps, wooden clits including all rubber gasket, lubricants/solvent cement etc. as directed by the Engineer-in-charge complete. | 358.00   | 248.00    | RM   | 88784.00          |
| <b>CARRY OVER TO TRADE SUMMARY VIDE PAGE NO.187</b> |                                                                                                                                                                                                                                                                                                                                               |          |           |      | <b>1098840.00</b> |

| Item No                                             | Description                                                                                                                                                                                                                                                                                                         | Quantity | Rate (Rs) | Unit | Amount (Rs)      |
|-----------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-----------|------|------------------|
| 9.23                                                | Providing and fixing C.P. brass overhead shower rose.                                                                                                                                                                                                                                                               | 64.00    | 843.00    | Each | 53952.00         |
| 9.24                                                | Providing and fixing C.P. brass Towel Ring.                                                                                                                                                                                                                                                                         | 32.00    | 1082.00   | Each | 34624.00         |
| 9.25                                                | Supplying & fixing coloured vitrious ISI marked China Under Counter Oval Shaped wash basin size 550 x 400mm with 15 mm dia. C.P. brass long neck pillar cock with aerator , 32mm C.P. brass waste coupling, 15mm dia. polythene pipe inlet, , unions, joints, etc. supported on painted C.I. bracket etc. complete. | 4.00     | 3771.00   | Each | 15084.00         |
| 9.26                                                | Supplying and fixing G.I. water supply pipes "MEDIUM" quality ( "B" class) fixed to walls including all specials making hole in walls and floors and making it good where directed , painting exposed length and fixing with M.S. clamps and wooden brackets to wall etc. complete.                                 |          |           |      |                  |
|                                                     | a.) 50mm dia.                                                                                                                                                                                                                                                                                                       | 300.00   | 611.00    | R.M. | 183300.00        |
|                                                     | b.) 40mm dia.                                                                                                                                                                                                                                                                                                       | 408.00   | 492.00    | R.M. | 200736.00        |
|                                                     | c.) 32mm dia.                                                                                                                                                                                                                                                                                                       | 80.00    | 417.00    | R.M. | 33360.00         |
|                                                     | d.) 25mm dia.                                                                                                                                                                                                                                                                                                       | 75.00    | 385.00    | R.M. | 28875.00         |
|                                                     | e.) 20mm dia.                                                                                                                                                                                                                                                                                                       | 100.00   | 275.00    | R.M. | 27500.00         |
|                                                     | f.) 15mm dia.                                                                                                                                                                                                                                                                                                       | 150.00   | 254.00    | R.M. | 38100.00         |
| 9.27                                                | Providing and fixing Gun metal gate valve full way opening (conforming to IS: 776- class I) with M.S. wheel completer with necessary unions and joints.                                                                                                                                                             |          |           |      |                  |
|                                                     | a) 50 mm dia.                                                                                                                                                                                                                                                                                                       | 12.00    | 3932.00   | Each | 47184.00         |
|                                                     | b) 40 mm dia.                                                                                                                                                                                                                                                                                                       | 24.00    | 2710.00   | Each | 65040.00         |
|                                                     | c) 32 mm dia.                                                                                                                                                                                                                                                                                                       | 8.00     | 1994.00   | Each | 15952.00         |
|                                                     | d) 25 mm dia.                                                                                                                                                                                                                                                                                                       | 2.00     | 1363.00   | Each | 2726.00          |
|                                                     | c) 20 mm dia.                                                                                                                                                                                                                                                                                                       | 65.00    | 1119.00   | Each | 72735.00         |
|                                                     | c) 15 mm dia.                                                                                                                                                                                                                                                                                                       | 32.00    | 570.00    | Each | 18240.00         |
| <b>CARRY OVER TO TRADE SUMMARY VIDE PAGE NO.187</b> |                                                                                                                                                                                                                                                                                                                     |          |           |      | <b>837408.00</b> |

| Item No                                             | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Quantity | Rate (Rs) | Unit | Amount (Rs)      |
|-----------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-----------|------|------------------|
| 9.28                                                | Construction of brick masonry chambers, made with 250 mm thick wall for set of valves/water meter with common burnt clay F.P.S ( non - modular) brick of class designation 7.5 in cement mortar 1:4 ( 1 cement : 4 coarse sand) having inside dimension 455 x 610mm and 450mm deep , inside plastering 12mm thick with C.M. 1:3( 1 cement : 3 coarse sand) finished smooth with a coat of neat cement on walls and bed concrete etc. with C.I. cover and frame weighing not less than 23Kgs. with painting set on R.C.C. top slab ,1:2:4 slab 100 mm. thick, foundation concrete 1:5:10 ( 1 cement : 5 coarse sand: 10 graded stone aggregate 40 mm nominal size ) , 150mm thick , excavating, refilling, watering, disposing off surplus earth/ Materials out side LIC plot as directed etc. complete as per standard design.. | 4.00     | 4829.00   | Each | 19316.00         |
| 9.29                                                | Mosquito-proof Brass coupling of 15mm.dia for venting G.I. down take pipes of overhead Tanks, complete.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 10.00    | 50.00     | Each | 500.00           |
| 9.30                                                | Providing & fixing on wall face unplasticised Rigid PVC rain water pipes ( working pressure 4kg/ cm <sup>2</sup> ) 110 mm dia , conforming to IS : 4985 Type A, including jointing with seal ring conforming to IS : 5382, PVC clamps, wooden clits including all rubber gasket, lubricants/solvent cement etc. as directed by the Engineer-in-charge complete.                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 276.00   | 346.00    | RM   | 95496.00         |
| 9.31                                                | Gun metal check valves (Non-return valve) horizontal or vertical type with all accessories complete. 50 mm dia.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 3.00     | 3084.00   | Each | 9252.00          |
| 9.32                                                | Providing and fixing Chromium Plated grating of 110 mm dia.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 27.00    | 85.00     | Each | 2295.00          |
| 9.33                                                | Providing and fixing Chromium Plated grating of 150 mm dia.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 6.00     | 123.00    | Each | 738.00           |
| <b>CARRY OVER TO TRADE SUMMARY VIDE PAGE NO.187</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |          |           |      | <b>127597.00</b> |

| Item No                                             | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Quantity | Rate (Rs) | Unit | Amount (Rs)      |
|-----------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-----------|------|------------------|
| 9.34                                                | Providing and fixing square-mouth S.W. Gully Trap size 150x150mm "P" type with common burnt clay ( non-modular) bricks of class designation 7.5 in cement mortar 1:4 ( 1 cement: 4 coarse sand) , complete with C.I. grating brick masonry chamber with water tight C.I. cover with frame of 300x300mm size ( inside) the weight of cover to be not less than 4.50kg and frame to be not less than 2.70 kg as per standard design on 100mm thick P.C.C. 1:5:10 bedding.                               | 9.00     | 2058.00   | Each | 18522.00         |
| 9.35                                                | Providing, laying and jointing 100 mm dia glazed stoneware pipes with stiff mixture of cement mortar in proportion 1:1 ( 1 cement: 1 fine sand) including testing of joints, , P.C.C. 1:5:10 ( 1 cement : 5 coarse sand: 10 graded stone aggregate 40 mm nominal size ) 150 mm all-round S.W. pipes including bed concrete , including excavation upto 1.5mtrs. depth, refilling, ramming, watering disposing off surplus materials within LIC plot etc complete as per standard design.              | 100.00   | 1012.00   | RM   | 101200.00        |
| 9.36                                                | Providing, laying and jointing 150 mm dia glazed stoneware pipes with stiff mixture of cement mortar in proportion 1:1 ( 1 cement: 1 fine sand) including testing of joints, , P.C.C. 1:5:10 ( 1 cement : 5 coarse sand: 10 graded stone aggregate 40 mm nominal size ) 150 mm all-round S.W. pipes including bed concrete 482 mm width , including excavation upto 1.5mtrs. depth, refilling, ramming, watering disposing off surplus materials within LIC plot etc complete as per standard design. | 150.00   | 1292.00   | RM   | 193800.00        |
| <b>CARRY OVER TO TRADE SUMMARY VIDE PAGE NO.187</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |          |           |      | <b>313522.00</b> |



| Item No                                             | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Quantity | Rate (Rs) | Unit | Amount (Rs)      |
|-----------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-----------|------|------------------|
| 9.37                                                | Providing, laying and jointing 200 mm dia glazed stoneware pipes with stiff mixture of cement mortar in proportion 1:1 ( 1 cement: 1 fine sand) including testing of joints, P.C.C. 1:5:10 ( 1 cement : 5 coarse sand: 10 graded stone aggregate 40 mm nominal size ) 150 mm all-round S.W. pipes including bed concrete 534 mm width , including excavation upto 1.5mtrs. depth, refilling, ramming, watering disposing off surplus materials within LIC plot etc complete as per standard design.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 50.00    | 1718.00   | RM   | 85900.00         |
| 9.38                                                | Construction of brick masonry manhole chambers, in cement mortar 1:4 ( 1 cement : 4 coarse sand) with RCC top slab with mix 1:2:4 ( 1 cement : 2 coarse sand: 4 graded stone aggregate 20 mm nominal size ) , foundation concrete 1:4:8 ( 1 cement : 4 coarse sand: 5 graded stone aggregate 40 mm nominal size ), inside plastering 12mm thick with C.M. 1:3( 1 cement : 3 coarse sand) finished smooth with floating coat of neat cement and making channel in cement concrete 1:2:4 ( 1 cement : 2 coarse sand: 4 graded stone aggregate 20 mm nominal size ) finished smooth with floating coat of neat cement having <b>inside dimension 900 x 800mm and 45cm deep including C.I. cover and frame weighing to be not less than 38Kgs( weight of cover 23kg and weight of frame 15kg)</b> . with painting set on R.C.C. top slab ,1:2:4 slab 150 mm. thick, with 250 mm thick wall with common burnt clay F.P.S ( non - modular) brick of class designation 7.5 , excavating, refilling, watering, disposing off surplus earth/ Materials out side LIC plot as directed etc. complete as per standard design. | 22.00    | 10569.00  | Each | 232518.00        |
| <b>CARRY OVER TO TRADE SUMMARY VIDE PAGE NO.187</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |          |           |      | <b>318418.00</b> |



| Item No                                             | Description                                                                                                                                                                                                                                                                                                                                      | Quantity | Rate (Rs) | Unit | Amount (Rs)      |
|-----------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-----------|------|------------------|
| 9.39                                                | Rate for each 10 cm extra depth of Inspection chamber on above Item.                                                                                                                                                                                                                                                                             | 12.00    | 302.00    | Each | 3624.00          |
| 9.40                                                | Providing & fixing C.I medium duty (circular) manhole cover 450 mm dia and frame fixed with R.C.C slab weighing minimum 38 Kgs. For septic tank.                                                                                                                                                                                                 | 13.00    | 1501.00   | Each | 19513.00         |
| 9.41                                                | Providing & fixing on wall face unplasticised Rigid PVC Soil pipes (working pressure 6kg/ cm <sup>2</sup> ) 110 mm dia, conforming to IS : 4985, including jointing with seal ring conforming to IS : 5382, PVC clamps, wooden clits including all rubber gasket, lubricants/solvent cement etc. as directed by the Engineer-in-charge complete. | 672.00   | 468.00    | RM   | 314496.00        |
| 9.42                                                | Providing & fixing on wall face unplasticised Rigid PVC Soil pipes (working pressure 6kg/ cm <sup>2</sup> ) 160 mm dia, conforming to IS : 4985, including jointing with seal ring conforming to IS : 5382, PVC clamps, wooden clits including all rubber gasket, lubricants/solvent cement etc. as directed by the Engineer-in-charge complete. | 150.00   | 919.00    | RM   | 137850.00        |
| 9.43                                                | Providing & fixing on wall face unplasticised - PVC moulded fittings/accessories for 110 mm dia unplasticised Rigid PVC Soil pipes conforming to IS : 4985, including jointing with seal ring conforming to IS : 5382. etc. as directed by the Engineer-in-charge complete.                                                                      |          |           |      |                  |
| a)                                                  | Single Tee/ Y with door - 110x110x110mm                                                                                                                                                                                                                                                                                                          | 30.00    | 338.00    | Each | 10140.00         |
| b)                                                  | Single Tee/Y without door - 110x110x110mm                                                                                                                                                                                                                                                                                                        | 30.00    | 287.00    | Each | 8610.00          |
| c)                                                  | Double Tee/Y without door - 110x110x110x110mm                                                                                                                                                                                                                                                                                                    | 30.00    | 488.00    | Each | 14640.00         |
| d)                                                  | Double Tee/Y with door - 110x110x110x110mm                                                                                                                                                                                                                                                                                                       | 30.00    | 607.00    | Each | 18210.00         |
| e)                                                  | Plain bend 110x110mm                                                                                                                                                                                                                                                                                                                             | 30.00    | 206.00    | Each | 6180.00          |
| <b>CARRY OVER TO TRADE SUMMARY VIDE PAGE NO.187</b> |                                                                                                                                                                                                                                                                                                                                                  |          |           |      | <b>533263.00</b> |

| Item No                                             | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Quantity | Rate (Rs) | Unit | Amount (Rs)      |
|-----------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-----------|------|------------------|
| f)                                                  | Door bend 110x110mm                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 30.00    | 249.00    | Each | 7470.00          |
| g)                                                  | 110 mm dia PVC cowl                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 44.00    | 142.00    | Each | 6248.00          |
| h)                                                  | 110 mm dia PVC shoe.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 10.00    | 313.00    | Each | 3130.00          |
| 9.44                                                | Providing & fixing on wall face unplasticised - PVC moulded fittings/accessories for 160 mm dia unplasticised Rigid PVC Soil pipes conforming to IS : 4985, including jointing with seal ring conforming to IS : 5382. etc. as directed by the Engineer-in-charge complete.                                                                                                                                                                                                                                                                                                                                               |          |           |      |                  |
| a)                                                  | Single Tee/ Y with door - 160x160x160mm                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 12.00    | 746.00    | Each | 8952.00          |
| b)                                                  | Single Tee/Y without door - 160x160x160mm                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 12.00    | 728.00    | Each | 8736.00          |
| c)                                                  | Double Tee/Y without door - 160x160x160x160mm                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 12.00    | 801.00    | Each | 9612.00          |
| d)                                                  | Double Tee/Y with door - 160x160x160x160mm                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 12.00    | 831.00    | Each | 9972.00          |
| e)                                                  | Plain bend 160x160mm                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 12.00    | 490.00    | Each | 5880.00          |
| f)                                                  | Door bend 160x160mm                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 12.00    | 545.00    | Each | 6540.00          |
| g)                                                  | 160 mm dia PVC cowl                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 5.00     | 191.00    | Each | 955.00           |
| 9.45                                                | Construction of brick masonry manhole chambers, in cement mortar 1:4 ( 1 cement : 4 coarse sand) with RCC top slab with mix 1:2:4 ( 1 cement : 2 coarse sand: 4 graded stone aggregate 20 mm nominal size ) , foundation concrete 1:4:8 ( 1 cement : 4 coarse sand: 5 graded stone aggregate 40 mm nominal size ), inside plastering 12mm thick with C.M. 1:3( 1 cement : 3 coarse sand) finished smooth with floating coat of neat cement and making channel in cement concrete 1:2:4 ( 1 cement : 2 coarse sand: 4 graded stone aggregate 20 mm nominal size ) finished smooth with floating coat of neat cement having | 5.00     | 13845.00  | Each | 69225.00         |
| <b>CARRY OVER TO TRADE SUMMARY VIDE PAGE NO.187</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |          |           |      | <b>136720.00</b> |

| Item No                                             | Description                                                                                                                                                                                                                                                                                                                                                                                                                     | Quantity | Rate (Rs) | Unit | Amount (Rs) |
|-----------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-----------|------|-------------|
|                                                     | inside dimension 1200 x 900mm and 90cm deep including C.I. cover and frame weighing to be not less than 58Kgs with painting set on R.C.C. top slab ,1:2:4 slab 150 mm. thick, with 250 mm thick wall with common burnt clay F.P.S ( non - modular) brick of class designation 7.5 , excavating, refilling, watering, disposing off surplus earth/ Materials out side LIC plot as directed etc. complete as per standard design. |          |           |      |             |
| <b>CARRY OVER TO TRADE SUMMARY VIDE PAGE NO.187</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                 |          |           |      | <b>0.00</b> |

**9.00. TRADE SUMMARY OF WATER SUPPLY & SANITARY INSTALLATION WORK:**

|                                         |                   |
|-----------------------------------------|-------------------|
| C/O TO TRADE SUMMARY VIDE PAGE NO. 178  | :Rs. 3,33,154.00  |
| C/O TO TRADE SUMMARY VIDE PAGE NO. 179  | :Rs. 6,31,514.00  |
| C/O TO TRADE SUMMARY VIDE PAGE NO. 180  | :Rs. 10,98,840.00 |
| C/O TO TRADE SUMMARY VIDE PAGE NO. 181  | :Rs. 8,37,408.00  |
| C/O TO TRADE SUMMARY VIDE PAGE NO. 182  | :Rs. 1,27,597.00  |
| C/O TO TRADE SUMMARY VIDE PAGE NO. 183  | :Rs. 3,13,522.00  |
| C/O TO TRADE SUMMARY VIDE PAGE NO. 184  | :Rs. 3,18,418.00  |
| C/O TO TRADE SUMMARY VIDE PAGE NO. 185  | :Rs. 5,33,263.00  |
| C/O TO TRADE SUMMARY VIDE PAGE NO. 186  | :Rs. 1,36,720.00  |
| C/O TO TRADE SUMMARY VIDE PAGE NO. 187  | :Rs. 0.00         |
| =====                                   |                   |
| C/O TO GENERAL SUMMARY VIDE PAGE NO.225 | :Rs. 43,30,436.00 |

| Item No                                               | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Quantity | Rate (Rs) | Unit | Amount (Rs)        |
|-------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-----------|------|--------------------|
| <b>10.00</b>                                          | <b>ANTI-TERMITE TREATMENT WORK:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |          |           |      |                    |
| 10.01                                                 | Injecting Chemical emulsion chloropyrifos as per manufacturer's specification or preconstruction anti termite treatment and creating a chemical barrier as per IS-6313 PART II, 1981 (or latest) in wall trenches, foundations, top surfaces of plinth filling, junction of walls and floors along the external perimeter of the building, surroundings of pipes etc., complete. The work shall be executed through approved agency/agencies and with guarantee of 10 years. The rates shall be as per plinth area including as directed below. (Plinth area of the Building at ground shall be measured for payment.) | 1080.00  | 154.00    | Sq.M | 166320.00          |
| <b>CARRY OVER TO GENERAL SUMMARY VIDE PAGE NO.225</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |          |           |      | <b>1,66,320.00</b> |

| Item No                                               | Description                                                                                                                                                                                                                                                                                                                                     | Quantity | Rate (Rs) | Unit | Amount (Rs)         |
|-------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-----------|------|---------------------|
| <b>11</b>                                             | <b>PAVEMENT AND ROADS:</b>                                                                                                                                                                                                                                                                                                                      |          |           |      |                     |
| 11.01                                                 | Providing and laying P.C.C. 1:2:4 (1cement: 2 sand: 4 coarse aggregate) in pavement, laid to required slope and camber in panels as required including consolidating finishing and tamping. (coarse graded aggregate 20mm and down gauge) Cost of shuttering will not be paid extra.                                                            | 166.00   | 5354.00   | Cum  | 888764.00           |
| 11.02                                                 | Providing and laying minimum 75MM thick factory made cement concrete interlocking paver block of M-30 GRADE made by block making machine with strong vibratory compaction, of approved size, design and shape, laid in required colour and pattern , filling the joint with fine sand etc. all complete as per direction of Engineer-in-charge. | 1652.00  | 725.00    | Sq.M | 1197700.00          |
| <b>CARRY OVER TO GENERAL SUMMARY VIDE PAGE NO.225</b> |                                                                                                                                                                                                                                                                                                                                                 |          |           |      | <b>20,86,464.00</b> |

| Item No                                               | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Quantity | Rate (Rs)  | Unit | Amount (Rs)       |
|-------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|------------|------|-------------------|
| <b>12</b>                                             | <b>SEWERAGE TREATMENT PLANT:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |          |            |      |                   |
| 12.01                                                 | Supply, Installation, Testing and Commissioning of package Sewage treatment plant having capacity of <b>25KLD</b> of approved make including carrying out all Civil, Mechanical and Electrical work with supply of all equipments to make the sewage treatment plant operational so that outlet parameters shall satisfy the Central Pollution Control Board norms for treated water fit to be re-used or discharged to storm water drain. The entire sewage treatment plants along with all its Civil, Mechanical & Electrical equipments (excluding electrical panel board) are to be placed completely underground and the sewage treatment plant shall operate in Aerobic process. The contractor is required to obtain NOCs from various authorities (if necessary) for completion certificate point of view viz. Bhubaneswar Municipal Corporation, Bhubaneswar Development Authority, State Pollution Control Board, Orissa and Ministry of Environment and Forest, Government of India. The package sewerage treatment plant shall be Eco-friendly, Rust proof, Leak proof, Durable, Light weight, Easy to install and requiring sludge handling once in 12-18 months. The excavated portion after installation of STP shall be re-filled with stone aggregates of 20mm and down graded mixed with stone chips of 6mm and down graded sizes. | 1.00     | 4000000.00 | L.S  | 4000000.00        |
| <b>CARRY OVER TO GENERAL SUMMARY VIDE PAGE NO.225</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |          |            |      | <b>4000000.00</b> |

### **SCHEDULE OF QUANTITIES FOR ELECTRICAL WORKS (PART-B)**

| <b>Item No</b>                                      | <b>Description</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <b>Quantity</b> | <b>Rate (Rs)</b> | <b>Unit</b> | <b>Amount (Rs)</b> |
|-----------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|------------------|-------------|--------------------|
| <b>13.</b>                                          | <b>Concealed Conduit work</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                 |                  |             |                    |
| 13.01                                               | Supplying & laying 32 mm heavy duty Rigid PVC conduit of 2.0 mm thickness with ISI mark & as per tender specification (in slab) with all PVC accessories with a provision of 65 mm deep M.S junction Box of size 100/150/75 mm at an interval of 15 meters in straight length and at every change in the direction , taking care to securely fix the conduit to the reinforced steel rods and blocking the end opening of the conduit to avoid entry of water or concrete or any other materials inside the conduit , complete with laying of 18 SWG GI wire inside the conduit to enable to draw the wires at a later date. ( Note : clearance of conduit is to be ensured) (32 mm dia heavy duty rigid PVC conduit in slab) | 1600.00         | 88.00            | RM          | 140800.00          |
| 13.02                                               | Supplying & laying 25 mm heavy duty Rigid PVC conduit of 2.0 mm thickness with ISI mark & as per tender specification (in slab) with all PVC accessories with a provision of 65 mm deep M.S junction Box of size 100/150/75 mm at an interval of 15 meters in straight length and at every change in the direction , taking care to securely fix the conduit to the reinforced steel rods and blocking the end opening of the conduit to avoid entry of water or concrete or any other materials inside the conduit, complete with laying of 18 SWG GI wire inside the conduit to enable to draw the wires at a later date. ( Note : clearance of conduit is to be ensured) (25 mm dia heavy duty rigid PVC conduit in slab)  | 2300.00         | 68.00            | RM          | 156400.00          |
| <b>CARRY OVER TO TRADE SUMMARY VIDE PAGE NO.197</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                 |                  |             | <b>297200.00</b>   |

| Item No                                             | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Quantity | Rate (Rs) | Unit | Amount (Rs)      |
|-----------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-----------|------|------------------|
| 13.03                                               | Supplying & laying 20 mm size heavy duty Rigid PVC conduit of 2.0 mm thickness with ISI mark & as per tender specification (in slab) with all PVC accessories with a provision of 65 mm deep M.S junction box of size 100/150/75 mm at an interval of 15 meters in straight length and at every change in the direction, taking care to securely fix the conduit to the reinforced steel rods and blocking the end opening of the conduit to avoid entry of water or concrete or any other materials inside the conduit, complete with laying of 18 SWG GI wire inside the conduit to enable to draw the wires at a later date. ( Note : clearance of conduit is to be ensured) (20 mm dia heavy duty rigid PVC conduit in slab) | 3000.00  | 58.00     | RM   | 174000.00        |
| 13.04                                               | Supplying & Fixing of 1 way 32 mm x 65 mm deep PVC circular box suitable for entry of 32/25/20 mm dia PVC conduit to be pre-laid during casting on floor/roof slab for all electrical outlaid point. Circular box shall be mounted flush with ceiling/ walls. <b>(1 way 32 mm x 65 mm)</b>                                                                                                                                                                                                                                                                                                                                                                                                                                       | 60.00    | 58.00     | Each | 3480.00          |
| 13.05                                               | Supplying & Fixing of 2 way 32 mm x 65 mm deep PVC circular box suitable for entry of 32/25/20 mm dia PVC conduit to be pre-laid during casting on floor/roof slab for all electrical outlaid point. Circular box shall be mounted flush with ceiling/ walls. <b>(2 way 32 mm x 65 mm)</b>                                                                                                                                                                                                                                                                                                                                                                                                                                       | 40.00    | 63.00     | Each | 2520.00          |
| 13.06                                               | Supplying & Fixing of 3 way 32 mm x 65 mm deep PVC circular box suitable for entry of 32/25/20 mm dia PVC conduit to be pre-laid during casting on floor/roof slab for all electrical outlaid point. Circular box shall be mounted flush with ceiling/ walls. <b>(3 way 32 mm x 65 mm)</b>                                                                                                                                                                                                                                                                                                                                                                                                                                       | 20.00    | 68.00     | Each | 1360.00          |
| 13.07                                               | Supplying & Fixing of 1 way 25 mm x 65 mm deep PVC circular box suitable for entry of 32/25/20 mm dia PVC conduit to be pre-laid during casting on floor/roof slab for all electrical outlaid point. Circular box shall be mounted flush with ceiling/ walls. <b>(1 way 25 mm x 65 mm)</b>                                                                                                                                                                                                                                                                                                                                                                                                                                       | 150.00   | 55.00     | Each | 8250.00          |
| <b>CARRY OVER TO TRADE SUMMARY VIDE PAGE NO.197</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |          |           |      | <b>189610.00</b> |



| Item No                                             | Description                                                                                                                                                                                                                                                                               | Quantity | Rate (Rs) | Unit | Amount (Rs)     |
|-----------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-----------|------|-----------------|
| 13.08                                               | Supplying & Fixing of following 65 mm deep PVC circular box suitable for entry of 32/25/20 mm dia PVC conduit to be pre-laid during casting on floor/roof slab for all electrical outlaid point. Circular box shall be mounted flush with ceiling/ walls.<br><b>(2 way 25 mm x 65 mm)</b> | 65.00    | 57.00     | Each | 3705.00         |
| 13.09                                               | Supplying & Fixing of following 65 mm deep PVC circular box suitable for entry of 32/25/20 mm dia PVC conduit to be pre-laid during casting on floor/roof slab for all electrical outlaid point. Circular box shall be mounted flush with ceiling/ walls.<br><b>(3 way 25 mm x 65 mm)</b> | 250.00   | 60.00     | Each | 15000.00        |
| 13.10                                               | Supplying & Fixing of following 65 mm deep PVC circular box suitable for entry of 32/25/20 mm dia PVC conduit to be pre-laid during casting on floor/roof slab for all electrical outlaid point. Circular box shall be mounted flush with ceiling/ walls.<br><b>(4 way 25 mm x 65 mm)</b> | 40.00    | 62.00     | Each | 2480.00         |
| 13.11                                               | Supplying & Fixing of following 65 mm deep PVC circular box suitable for entry of 32/25/20 mm dia PVC conduit to be pre-laid during casting on floor/roof slab for all electrical outlaid point. Circular box shall be mounted flush with ceiling/ walls.<br><b>(1 way 20 mm x 65 mm)</b> | 150.00   | 51.00     | Each | 7650.00         |
| 13.12                                               | Supplying & Fixing of following 65 mm deep PVC circular box suitable for entry of 32/25/20 mm dia PVC conduit o be pre-laid during casting on floor/roof slab for all electrical outlaid point. Circular box shall be mounted flush with ceiling/ walls.<br><b>(2 way 20 mm x 65 mm)</b>  | 70.00    | 54.00     | Each | 3780.00         |
| 13.13                                               | Supplying & Fixing of following 65 mm deep PVC circular box suitable for entry of 32/25/20 mm dia PVC conduit to be pre-laid during casting on floor/roof slab for all electrical outlaid point. Circular box shall be mounted flush with ceiling/ walls.<br><b>(3 way 20 mm x 65 mm)</b> | 80.00    | 56.00     | Each | 4480.00         |
| <b>CARRY OVER TO TRADE SUMMARY VIDE PAGE NO.197</b> |                                                                                                                                                                                                                                                                                           |          |           |      | <b>37095.00</b> |

| Item No                                             | Description                                                                                                                                                                                                                                                                                                                                                                                                 | Quantity | Rate (Rs) | Unit | Amount (Rs)      |
|-----------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-----------|------|------------------|
| 13.14                                               | Supplying & Fixing of following 65 mm deep PVC circular box suitable for entry of 32/25/20 mm dia PVC conduit to be pre-laid during casting on floor/roof slab for all electrical outlaid point. Circular box shall be mounted flush with ceiling/ walls. <b>(4 way 20 mm x 65 mm)</b>                                                                                                                      | 250.00   | 59.00     | Each | 14750.00         |
| 13.15                                               | Supplying & laying 32 mm dia heavy duty Rigid PVC conduit of 2.0 mm thickness with ISI mark & as per tender specification (on wall / column) including wall chasing and making good the damages caused with all PVC accessories Note: clearance of conduit is to be ensured and is to be flush with wall so that the wall can be plastered at alter date.) (32 mm dia heavy duty rigid PVC conduit on wall) | 100.00   | 127.00    | RM   | 12700.00         |
| 13.16                                               | Supplying & laying 25 mm dia heavy duty Rigid PVC conduit of 2.0 mm thickness with ISI mark & as per tender specification (on wall / column) including wall chasing and making good the damages caused with all PVC accessories Note: clearance of conduit is to be ensured and is to be flush with wall so that the wall can be plastered at alter date.) (25 mm dia heavy duty rigid PVC conduit on wall) | 1500.00  | 104.00    | RM   | 156000.00        |
| 13.17                                               | Supplying & laying 20 mm dia heavy duty Rigid PVC conduit of 2.0 mm thickness ISI mark & as per tender specification (on wall / column) including wall chasing and making good the damages caused with all PVC accessories. (Note: clearance of conduit is to be ensured and is to be flush with wall so that the wall can be plastered at alter date.) (20 mm dia heavy duty rigid PVC conduit on wall)    | 1500.00  | 90.00     | RM   | 135000.00        |
| 13.18                                               | Supplying & Fixing of 1 way 25 mm x 35 mm deep PVC circular box suitable for entry of 32/25/20 mm dia PVC conduit to be laid on wall after cutting the wall for all electrical outlaid point. Circular box shall be mounted flush with walls as required at site. (1 way 25 mm x 35 mm)                                                                                                                     | 60.00    | 67.00     | Each | 4020.00          |
| <b>CARRY OVER TO TRADE SUMMARY VIDE PAGE NO.197</b> |                                                                                                                                                                                                                                                                                                                                                                                                             |          |           |      | <b>322470.00</b> |

| Item No                                             | Description                                                                                                                                                                                                                                                                             | Quantity | Rate (Rs) | Unit | Amount (Rs)      |
|-----------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-----------|------|------------------|
| 13.19                                               | Supplying & Fixing of 2 way 25 mm x 35 mm deep PVC circular box suitable for entry of 32/25/20 mm dia PVC conduit to be laid on wall after cutting the wall for all electrical outlaid point. Circular box shall be mounted flush with walls as required at site. (2 way 25 mm x 35 mm) | 130.00   | 69.00     | Each | 8970.00          |
| 13.20                                               | Supplying & Fixing of 3 way 25 mm x 35 mm deep PVC circular box suitable for entry of 32/25/20 mm dia PVC conduit to be laid on wall after cutting the wall for all electrical outlaid point. Circular box shall be mounted flush with walls as required at site. (3 way 25 mm x 35 mm) | 300.00   | 70.00     | Each | 21000.00         |
| 13.21                                               | Supplying & Fixing of 4 way 25 mm x 35 mm deep PVC circular box suitable for entry of 32/25/20 mm dia PVC conduit to be laid on wall after cutting the wall for all electrical outlaid point. Circular box shall be mounted flush with walls as required at site. (4 way 25 mm x 35 mm) | 300.00   | 72.00     | Each | 21600.00         |
| 13.22                                               | Supplying & Fixing of 1 way 20 mm x 35 mm deep PVC circular box suitable for entry of 32/25/20 mm dia PVC conduit to be laid on wall after cutting the wall for all electrical outlaid point. Circular box shall be mounted flush with walls as required at site. (1 way 20 mm x 35 mm) | 400.00   | 65.00     | Each | 26000.00         |
| 13.23                                               | Supplying & Fixing of 2 way 20 mm x 35 mm deep PVC circular box suitable for entry of 32/25/20 mm dia PVC conduit to be laid on wall after cutting the wall for all electrical outlaid point. Circular box shall be mounted flush with walls as required at site. (2 way 20 mm x 35 mm) | 200.00   | 67.00     | Each | 13400.00         |
| 13.24                                               | Supplying & Fixing of 3 way 20 mm x 35 mm deep PVC circular box suitable for entry of 32/25/20 mm dia PVC conduit to be laid on wall after cutting the wall for all electrical outlaid point. Circular box shall be mounted flush with walls as required at site. (3 way 20 mm x 35 mm) | 500.00   | 69.00     | Each | 34500.00         |
| 13.25                                               | Supplying & Fixing of 4 way 20 mm x 35 mm deep PVC circular box suitable for entry of 32/25/20 mm dia PVC conduit to be laid on wall after cutting the wall for all electrical outlaid point. Circular box shall be mounted flush with walls as required at site. (4 way 20 mm x 35 mm) | 300.00   | 70.00     | Each | 21000.00         |
| <b>CARRY OVER TO TRADE SUMMARY VIDE PAGE NO.197</b> |                                                                                                                                                                                                                                                                                         |          |           |      | <b>146470.00</b> |

| Item No                                             | Description                                                                                                                                                                                                                                                                                                                                                                                                       | Quantity | Rate (Rs) | Unit | Amount (Rs)      |
|-----------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-----------|------|------------------|
| 13.26                                               | Supplying & fixing of following size GI rust proof box (18 SWG), including tressa glossy type face plate and inner cover suitable for holding modular switch and sockets in concealed manner including wall cutting , plastering etc & making good the damages caused to the original finish. (Boxes are to be installed at a height from FFL as per approval / instruction.) 78 x 78 x45 mm (1/2 mod)            | 364.00   | 167.00    | Each | 60788.00         |
| 13.27                                               | Supplying & fixing of following size GI rust proof box (18 SWG), including tressa glossy type face plate and inner cover suitable for holding modular switch and sockets in concealed manner including wall cutting, plastering etc & making good the damages caused to the original finish. (Boxes are to be installed at a height from FFL as per approval / instruction.) 100 x 78 x45 mm (3 mod)              | 307.00   | 213.00    | Each | 65391.00         |
| 13.28                                               | Supplying & fixing of following size GI rust proof box (18 SWG), including tressa glossy type face plate and inner cover suitable for holding modular switch and sockets in concealed manner including wall cutting, plastering etc & making good the damages caused to the original finish. (Boxes are to be installed at a height from FFL as per approval / instruction.) 140 x 78 x 50 mm (4 mod)             | 73.00    | 239.00    | Each | 17447.00         |
| 13.29                                               | Supplying & fixing of following size GI rust proof box (18 SWG), including tressa glossy type face plate and inner cover suitable for holding modular switch and sockets in concealed manner including wall cutting ,plastering etc & making good the damages caused to the original finish. (Boxes are to be installed at a height from FFL as per approval / instruction.) 205 x 78 x 50 mm (6 mod)             | 48.00    | 304.00    | Each | 14592.00         |
| 13.30                                               | Supplying & fixing of following size GI rust proof box (18 SWG), including tressa glossy type face plate and inner cover suitable for holding modular switch and sockets in concealed manner including wall cutting, plastering etc & making good the damages caused to the original finish. (Boxes are to be installed at a height from FFL as per approval / instruction.) 230 x 78 x 60 mm (8 mod. Horizontal) | 137.00   | 374.00    | Each | 51238.00         |
| <b>CARRY OVER TO TRADE SUMMARY VIDE PAGE NO.197</b> |                                                                                                                                                                                                                                                                                                                                                                                                                   |          |           |      | <b>209456.00</b> |

| Item No                                             | Description                                                                                                                                                                                                                                                                                                                                                                                             | Quantity | Rate (Rs) | Unit | Amount (Rs)     |
|-----------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-----------|------|-----------------|
| 13.31                                               | Supplying & fixing of following size GI rust proof box (18 SWG), including tressa glossy type face plate and inner cover suitable for holding modular switch and sockets in concealed manner including wall cutting, plastering etc & making good the damages caused to the original finish. (Boxes are to be installed at a height from FFL as per approval / instruction.) 205 x 135 x 60 mm (12 mod) | 47.00    | 445.00    | Each | 20915.00        |
| 13.32                                               | Supplying & fixing of following size GI rust proof box (18 SWG), including tressa glossy type face plate and inner cover suitable for holding modular switch and sockets in concealed manner including wall cutting, plastering etc & making good the damages caused to the original finish. (Boxes are to be installed at a height from FFL as per approval / instruction.) 230 x 135 x 60 mm (16 mod) | 20.00    | 484.00    | Each | 9680.00         |
| 13.33                                               | Supplying & fixing of following size GI rust proof box (18 SWG), including tressa glossy type face plate and inner cover suitable for holding modular switch and sockets in concealed manner including wall cutting, plastering etc & making good the damages caused to the original finish. (Boxes are to be installed at a height from FFL as per approval / instruction.) 215 x 205 x 60 mm (18 mod) | 20.00    | 512.00    | Each | 10240.00        |
| <b>CARRY OVER TO TRADE SUMMARY VIDE PAGE NO.197</b> |                                                                                                                                                                                                                                                                                                                                                                                                         |          |           |      | <b>40835.00</b> |

### 13. TRADE SUMMARY OF CONCELED CONDUIT WORK:

C/O TO TRADE SUMMARY VIDE PAGE NO. 191 :Rs. 2,97,200.00  
 C/O TO TRADE SUMMARY VIDE PAGE NO. 192 :Rs.1,89,610.00  
 C/O TO TRADE SUMMARY VIDE PAGE NO. 193 :Rs. 37,095.00  
 C/O TO TRADE SUMMARY VIDE PAGE NO. 194 :Rs.3,22,470.00  
 C/O TO TRADE SUMMARY VIDE PAGE NO. 195 :Rs.1,46,470.00  
 C/O TO TRADE SUMMARY VIDE PAGE NO. 196 :Rs.2,09,456.00  
 C/O TO TRADE SUMMARY VIDE PAGE NO. 197 :Rs. 40,835.00

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C/O TO GENERAL SUMMARY VIDE PAGE NO.225 :Rs.12,43,136.00

| Item No                                             | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Quantity | Rate (Rs) | Unit | Amount (Rs)      |
|-----------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-----------|------|------------------|
| <b>14.</b>                                          | <b>Internal Electrical Work and Light Fittings Work</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |          |           |      |                  |
| 14.01                                               | Providing fluorescent light point wiring with necessary circuit wiring with 3x2.5 sqmm multistrand PVC insulated Cu. conductor wire and point wiring with 2x1.5 & 1x1.5(as continuous earth) sqmm multistrand PVC insulated Cu. conductor wire in the existing concealed conduit already laid in the slab/wall or PVC casing capping/ surface conduit with complete range of modular accessories such as 3 plate ceiling rose,10 Amp. modular snap switch of Anchor Roma or equivalent make as specified in the tender. (But excluding the cost of MS/PVC boxes, Face plate & inner cover).Multi strand PVC insulated FR copper wires shall be used.                                                                | 180.00   | 476.00    | Each | 85680.00         |
| 14.02                                               | Providing Group fluorescent/ cfl light point(Six points) as the case may be wiring with necessary circuit wiring with 3x2.5 sqmm multistrand PVC insulated Cu. conductor wire and point wiring with 2x1.5 & 1x1.5(as continuous earth) sqmm multistrand PVC insulated Cu. conductor wire in the existing concealed conduit already laid in the slab/wall or PVC casing capping/ surface conduit with complete range of modular accessories such as 3 plate ceiling rose,10 Amp. modular snap switch of Anchor Roma or equivalent make as specified in the tender. (But excluding the cost of MS/PVC boxes, Face plate & inner cover). Multystrand PVC insulated FR copper wires shall be used. (for corridor light) | 10.00    | 2227.00   | Each | 22270.00         |
| 14.03                                               | Providing CF light point (without CFL lamp) wiring with necessary circuit wiring with 2x2.5 & 1x2.5 sqmm multistrand PVC insulated Cu. conductor wire and point wiring with 2x1.5 & 1x1.5 (as continuous earth) sqmm multistrand PVC insulated Cu. conductor wire in the existing concealed conduit already laid in the slab/wall or PVC casing capping/ surface conduit with complete range of modular accessories such as 3 plate ceiling rose,10 Amp. modular snap switch of Anchor Roma or equivalent make as specified in the tender. (But excluding the cost of MS/PVC boxes, Face plate & inner Multy strand PVC insulated FR copper wires shall be used.                                                    | 320.00   | 476.00    | Each | 152320.00        |
| <b>CARRY OVER TO TRADE SUMMARY VIDE PAGE NO.208</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |          |           |      | <b>260270.00</b> |

| Item No                                             | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Quantity | Rate (Rs) | Unit | Amount (Rs)      |
|-----------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-----------|------|------------------|
| 14.04                                               | Providing Exhaust fan point wiring with necessary circuit wiring with 3x2.5 sqmm multistrand PVC insulated Cu. conductor wire and point wiring with 2x1.5 & 1x1.5 (as continuous earth) sqmm multistrand PVC insulated Cu. conductor wire in the existing concealed conduit already laid in the slab/wall or PVC casing capping/ surface conduit with complete range of modular accessories such as 3 plate ceiling rose, 10 Amp. modular snap switch of Anchor Roma or equivalent make as specified in the tender. (But excluding the cost of MS/PVC boxes, Face plate & inner cover). Multy strand PVC insulated FR copper wires shall be used. | 36.00    | 476.00    | Each | 17136.00         |
| 14.05                                               | Providing plug point on switch board including supplying & fixing of 10 Amp, 5 pin modular socket and 10 Amp modular switch of Anchor Roma or its equivalent approved make as per tender specifications including all connections.                                                                                                                                                                                                                                                                                                                                                                                                                | 164.00   | 249.00    | Each | 40836.00         |
| 14.06                                               | Providing wiring with 2x2.5+1 X 1.5 sqmm multistrand PVC insulated FR, Cu. Conductor wires in the existing concealed conduits already laid. (For plug point away from switch board)                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 1826.00  | 59.00     | RM   | 107734.00        |
| 14.07                                               | Supply and fixing of 1 no. 10 Amp. Modular switch & 1 no. 10 Amp. multi pin socket including all connections with earthing (but excluding the cost of MS box, face plate and inner cover) (For plug point away from board and for Grinders)                                                                                                                                                                                                                                                                                                                                                                                                       | 253.00   | 245.00    | Each | 61985.00         |
| 14.08                                               | Providing call bell point wiring with necessary circuit wiring with 2x2.5 & 1x1.5 sqmm multistrand PVC insulated Cu. conductor wire and point wiring with 2x1.5 & 1x1.5 (as continuous earth) sqmm multistrand PVC insulated Cu. conductor wire in the existing concealed conduit already laid in the slab/wall or PVC casing capping / surface conduit with complete range of modular accessories such as box type bell push and call bell (Ding Dong type) of Anchor Roma or equivalent make as specified in the tender. (But excluding the cost of MS/PVC boxes, Face plate & inner cover).                                                    | 31.00    | 567.00    | Each | 17577.00         |
| <b>CARRY OVER TO TRADE SUMMARY VIDE PAGE NO.208</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |          |           |      | <b>245268.00</b> |



| Item No                                             | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Quantity | Rate (Rs) | Unit | Amount (Rs)      |
|-----------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-----------|------|------------------|
| 14.09                                               | Providing 2 way staircase fluorescent light point wiring with necessary circuit wiring with 3x2.5 sqmm multistrand PVC insulated Cu. conductor wire and point wiring with 2x1.5 & 1x1.5(as continuous earth) sqmm multistrand PVC insulated Cu. conductor wire in the existing concealed conduit already laid in the slab/wall or PVC casing capping/ surface conduit with complete range of modular accessories such as 3 plate ceiling rose, 2 way10 Amp. modular snap switch of Anchor Roma or equivalent make as specified in the tender. (But excluding the cost of MS/PVC boxes, Face plate & inner cover). | 15.00    | 558.00    | Each | 8370.00          |
| 14.10                                               | Providing & fixing 18 watt CFL lamp retrofit type in the existing holder provided.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 350.00   | 135.00    | Each | 47250.00         |
| 14.11                                               | Providing wiring with 2x4.0 & 1x2.5 sqmm multistrand PVC insulated Cu. conductor FR wires in concealed conduits already laid. (For Geyser and AC plug point)                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 1500.00  | 121.00    | RM   | 181500.00        |
| 14.12                                               | Providing 20 Amp modular starter and20 Amp multipin socket with all modular accessories including all connections. (For Geyser & AC point)                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 80.00    | 697.00    | Each | 55760.00         |
| 14.13                                               | Providing and drawing submain wiring with 2 x6.0 and 1x4.0 sqmm PVC insulated multistrand FR Cu. conductor wires in the existing prelaid conduits in slab or on wall including all connections complete in all respect.                                                                                                                                                                                                                                                                                                                                                                                           | 600.00   | 175.00    | RM   | 105000.00        |
| 14.14                                               | Providing and drawing submain wiring with 4x6.0 and 2x4.0 sqmm PVC insulated multistrand FR Cu. conductor wires in the existing prelaid conduits in slab or on wall including all connections complete in all respect                                                                                                                                                                                                                                                                                                                                                                                             | 120.00   | 350.00    | RM   | 42000.00         |
| 14.15                                               | Providing and drawing submain wiring with 4x10.0 and 2x6.0 sqmm PVC insulated multistrand FR Cu. conductor wires in the exhistig prelaid conduits in slab or on wall including all connections complete in all respect                                                                                                                                                                                                                                                                                                                                                                                            | 50.00    | 587.00    | RM   | 29350.00         |
| 14.16                                               | Supply & fixing of PVC casing capping of size 20mmx12mm(nominal)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 50.00    | 27.00     | RM   | 1350.00          |
| <b>CARRY OVER TO TRADE SUMMARY VIDE PAGE NO.208</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |          |           |      | <b>470580.00</b> |



| Item No                                             | Description                                                                                                                                                                                                                                                                                                                                         | Quantity | Rate (Rs) | Unit | Amount (Rs)      |
|-----------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-----------|------|------------------|
| 14.17                                               | Supply & fixing of PVC casing capping of size 25mmx12mm(nominal)                                                                                                                                                                                                                                                                                    | 50.00    | 29.00     | RM   | 1450.00          |
| 14.18                                               | Supply & fixing of PVC casing capping of size 32mmx12mm(nominal)                                                                                                                                                                                                                                                                                    | 50.00    | 36.00     | RM   | 1800.00          |
| 14.19                                               | Supply & fixing of PVC casing capping of size 25mmx16mm(nominal)                                                                                                                                                                                                                                                                                    | 20.00    | 44.00     | RM   | 880.00           |
| 14.20                                               | Supply & fixing of heavy duty PVC conduit of size 20mm dia. on the surface of the wall including all accessories.                                                                                                                                                                                                                                   | 50.00    | 58.00     | RM   | 2900.00          |
| 14.21                                               | Supply & fixing of heavy duty PVC conduit of size 25mm dia. on the surface of the wall including all accessories.                                                                                                                                                                                                                                   | 50.00    | 68.00     | RM   | 3400.00          |
| 14.22                                               | Supply & fixing of heavy duty PVC conduit of size 32mm dia. on the surface of the wall including all accessories.                                                                                                                                                                                                                                   | 50.00    | 88.00     | RM   | 4400.00          |
| 14.23                                               | Supply & fixing of 300x250x50mm Deep size, 16 SWG MS junction box in concealed manner or on surface with 3 mm thick phenolic laminated sheet.                                                                                                                                                                                                       | 60.00    | 290.00    | Each | 17400.00         |
| 14.24                                               | Supply & fixing of 250x200x50mm Deep size, 16 SWG MS junction box in concealed manner or on surface with 3 mm thick phenolic laminated sheet.                                                                                                                                                                                                       | 80.00    | 216.00    | Each | 17280.00         |
| 14.25                                               | Supply & fixing of 180x100x50mm Deep size, 16 SWG MS junction box in concealed manner or on surface with 3 mm thick phenolic laminated sheet.                                                                                                                                                                                                       | 100.00   | 116.00    | Each | 11600.00         |
| 14.26                                               | Supply & fixing of 150x150x50mm Deep size, 16 SWG MS junction box in concealed manner or on surface with 3 mm thick phenolic laminated sheet.                                                                                                                                                                                                       | 100.00   | 135.00    | Each | 13500.00         |
| 14.27                                               | Supply & fixing of 100x100x50mm Deep size, 16 SWG MS junction box in concealed manner or on surface with 3 mm thick phenolic laminated sheet.                                                                                                                                                                                                       | 250.00   | 88.00     | Each | 22000.00         |
| 14.28                                               | Supply, erection, testing and commissioning of 1200mm (48") sweep brown color ceiling fan with condenser, double ball bearing, 300 mm down rod, canopies, sackles etc but without speed regulator, suitable for operation with 230/240 volt, 50 Hz AC supply of approved make including all connections complete in all respect. (BEE-5 star rated) | 133.00   | 1644.00   | Each | 218652.00        |
| <b>CARRY OVER TO TRADE SUMMARY VIDE PAGE NO.208</b> |                                                                                                                                                                                                                                                                                                                                                     |          |           |      | <b>315262.00</b> |

| Item No                                             | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Quantity | Rate (Rs) | Unit    | Amount (Rs)      |
|-----------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-----------|---------|------------------|
| 14.29                                               | Supply and installation of modular type ceiling fan speed regulator of Anchor Roma cat. no.21496 EME or its equivalent make as specified in tender including all connections complete in all respect.                                                                                                                                                                                                                                                                              | 133.00   | 433.00    | Each    | 57589.00         |
| 14.30                                               | Supply, erection, testing & commissioning of 4 ft 36 Watt box type fluorescent light fitting of Philips or equivalent make, suitable for operation with 230 volt AC supply, complete all accessories such as low loss copper ballast, starter, power factor correction capacitor, lock in type rotary holder with 1 no 36 watt tube of same make, to be installed on round block including making all connections with 3x1.5 sqmm PVC insulated cu. wires complete in all respect. | 180.00   | 757.00    | Each    | 136260.00        |
| 14.31                                               | Supply & erection of circular ceiling fitting with 150 mm dia glass/ opal/acrylic dome, brass holder including making necessary connections and earthing on the ceiling or as directed. (Fittings are to be got approved before fixing)                                                                                                                                                                                                                                            | 10.00    | 621.00    | Each    | 6210.00          |
| 14.32                                               | Supply and installation of Bulk Head light fitting as per tender specifications, with prismatic heat resitant glass bowl, cast aluminium body, brass holder,9/11 watt CFL including all connections.The fitting shall be installed on suitable size TW wooden board.                                                                                                                                                                                                               | 20.00    | 673.00    | Each    | 13460.00         |
| 14.33                                               | Supply & installation of fancy wall bracket fittings with frosted/flowered glass/ opal acrylic shade, brass holder, to be installed on wall including all connections. (Fittings are to be got approved before fixing)                                                                                                                                                                                                                                                             | 10.00    | 621.00    | Each    | 6210.00          |
| 14.34                                               | Supply & installation of decorative basin light fittings of philips(FMS200/11 or Bajaj (BJC111) make including 1 no 9/11 watt CFL bulb with all necessary connections.                                                                                                                                                                                                                                                                                                             | 10.00    | 515.00    | Each    | 5150.00          |
| 14.35                                               | Supply & installation of 225 mm (9") sweep exhaust fan suitable for single phase 230 volt AC, 50Hz, supply complete with mounting frame , aluminium louver, to be erected on ventilator/wall opening as directed including making all necessary connections and earthing.                                                                                                                                                                                                          | 30.00    | 17123.00  | Each    | 51690.00         |
| 14.36                                               | Supply & fixing of suitable size white bakelite sheet ( Hylum)                                                                                                                                                                                                                                                                                                                                                                                                                     | 25000.00 | 1.00      | Sq.Inch | 25000.00         |
| <b>CARRY OVER TO TRADE SUMMARY VIDE PAGE NO.208</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |          |           |         | <b>301569.00</b> |

| Item No                                             | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Quantity | Rate (Rs) | Unit | Amount (Rs)     |
|-----------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-----------|------|-----------------|
| 14.37                                               | Supply & installation of earth electrode made up of 40 mm dia, B class GI pipe of 3.0 mtr long as per IS-3043-1987, code of practice & its latest version with brick masonry chamber, RCC slab cover of 50 mm thick with lifting arrangement, including providing of charcoal & salt in alternate layer, GI funnel for watering, clamping arrangement with bolts & nuts at the top of the GI pipe electrode for connecting the earth wire as per the sketch enclosed (The earth electrode shall have 12 mm dia holes drilled with a spacing of 15 cm & 7.5 cm up to 2.5 mtr of the length of the GI pipe from the bottom) (For building power-2, Pump Room-1, Lighting Arrester-4) | 7.00     | 3380.00   | Each | 23660.00        |
| 14.38                                               | Supply & laying of two runs of 8 SWG GI earth wire, 50 cm below the ground level or on the surface of the wall or laying inside the protection pipe for connections between the earth electrode and electrical main panel board/ submain board/ meter board/ earth busbar and making connections at both ends.                                                                                                                                                                                                                                                                                                                                                                     | 200.00   | 20.00     | RM   | 4000.00         |
| 14.39                                               | Supply & fixing of Cu. earth busbar of size 250x25x3 mm on porcelain insulator                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 5.00     | 237.00    | Each | 1185.00         |
| 14.40                                               | Supply & installation of 8 way TPN, MCB, DB with double door with acrylic cover, IP 42 protection complete with tinned cu. busbar, neutral busbar, earth bar, din bar, & inter connections in concealed manner at the location as directed including all incoming & out going connections and consisting of the followings:-<br>Main Incomer : 63 Amps, 4P, MCB -1 nos.<br>Out goings : 20 Amps, DP, MCB -6 nos. (for Ext. lights),<br>32 Amps, DP, MCB : 6 nos.<br>(3 for stilt fl., 1 for care taker room, 2 for st.case & corridore)                                                                                                                                            | 1.00     | 15258.00  | Each | 15258.00        |
| 14.41                                               | Supply & installation of 4 way TPN, MCB, DB with double door with acrylic cover, IP 42 protection complete with tinned cu. busbar, neutral busbar, earth bar, din bar, & inter connections in concealed manner at the location as directed including all incoming & out going connections and consisting of the followings :-<br>Main Incomer : 40 Amps TPN MCB -1 nos.<br>Out goings : 32 Amps, TPN, MCB - 2 nos.<br>20 Amps, DP, MCB - 2 nos ( for lifts)                                                                                                                                                                                                                        | 2.00     | 9799.00   | Each | 19598.00        |
| <b>CARRY OVER TO TRADE SUMMARY VIDE PAGE NO.208</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |          |           |      | <b>63701.00</b> |

| Item No                                             | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Quantity | Rate (Rs) | Unit | Amount (Rs)      |
|-----------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-----------|------|------------------|
| 14.42                                               | Supply & installation of 12 way SPN, MCB, DB with double door with acrylic cover, IP 42 protection complete with tinned cu. busbar, neutral busbar, earth bar, din bar & inter connections in concealed manner at the location as directed including all incoming & out going connections and consisting of the followings:-<br>Main Incomer : 32 Amps, DP, MCB -1 nos.<br>Out goings : 10 Amps, SP, MCB - 10 nos.<br>(3for stilt.fl,2 for st.case & corridore)                                                                                  | 5.00     | 5226.00   | Each | 26130.00         |
| 14.43                                               | Supply & installation of 16 way SPN, MCB, DB with double door with acrylic cover, IP 42 protection complete with tinned cu. busbar, neutral busbar, earth bar, din bar, & inter connections in concealed manner at the location as directed including all incoming & out going connections and consisting of the followings:-<br>Main Incomer : 40 Amps, DP, RCCB, 30mA - 1 nos. 40 Amps, DP MCB- 1 nos.<br>Out goings : 20 Amps, SP, MCB - 6 nos.<br>10 Amps, SP, MCB - 6 nos.<br>(for 3 BHK & 2 BHK flats )                                    | 27.00    | 10497.00  | Each | 283419.00        |
| 14.44                                               | Supply & installation of 6 way TPN, MCB, DB with double door with acrylic cover, IP 42 protection complete with tinned cu. busbar, neutral busbar, earth bar, din bar & inter connections in concealed manner at the location as directed including all incoming & out going connections and consisting of the followings:-<br>Main Incomer : 40 Amps, FP, RCCB, 30 mA - 1 nos. 40 Amp, FP, MCB - 1 Nos.<br>Out goings : 20 Amps, SP, MCB-5 nos.<br>32 Amps, DP, MCB- 4 nos.<br>10 Amps ,SP, MCB- 5 nos.<br>(2 for SDM flat & 2 for Guest House) | 4.00     | 17086.00  | Each | 68344.00         |
| 14.45                                               | Supply & installation of 4 way TPN, MCB, DB with double door with acrylic cover, IP 42 protection complete with tinned cu. busbar, neutral busbar, earth bar, din bar & inter connections in concealed manner at the location as directed including all incoming & out going connections and consisting of the followings:-<br>Main Incomer : 63 Amps, FP, MCB -1 nos.<br>Out goings : 32 Amps, DP, MCB - 6 nos.<br>(for AC in Guest House)                                                                                                      | 1.00     | 9132.00   | Each | 9132.00          |
| <b>CARRY OVER TO TRADE SUMMARY VIDE PAGE NO.208</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |          |           |      | <b>387025.00</b> |

| Item No                                             | Description                                                                                                                                                                                                                                             | Quantity | Rate (Rs) | Unit | Amount (Rs)     |
|-----------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-----------|------|-----------------|
| 14.46                                               | Supply & laying of co-axial, Cu. conductor RG-6 cable with PVC sheath suitable for cable TV connection through the existing conduit already laid in slab/ wall.                                                                                         | 500.00   | 38.00     | RM   | 19000.00        |
| 14.47                                               | Supply & fixing of modular type jack for TV ,single line including face plate & inner cover of Anchor Roma or its equivalent make as per tender specification.                                                                                          | 98.00    | 120.00    | Each | 11760.00        |
| 14.48                                               | Supply, installation, testing & commissioning of lightning conductor finial, made up of 25 mm diameter, 300 mm long, copper tube having single prong at top with 85 mm diameter 3 mm thick copper base plate including holes etc, complete as required. | 9.00     | 701.00    | Each | 6309.00         |
| 14.49 (a)                                           | Supply, installation, testing & commissioning of GI tape 20 mm x 3 mm thick on parapet or surface of wall for lightning conductor complete as required (for horizontal run)                                                                             | 200.00   | 58.00     | RM   | 11600.00        |
| 14.49 (b)                                           | Supply, installation, testing & commissioning of GI tape 20 mm x 3 mm thick on parapet or surface of wall for lightning conductor complete as required (for vertical run)                                                                               | 200.00   | 82.00     | RM   | 16400.00        |
| 14.50                                               | Supply & laying of 2 pair 0.50mm PVC insulated Cu. conductor telephone wire through the existing conduit already laid including connections.                                                                                                            | 500.00   | 18.00     | RM   | 9000.00         |
| 14.51                                               | Supply & installation of modular type telephone jack RJ11 single line with shutter of Anchor Roma make or its equivalent as per tender specification including face plate & inner cover & connections.                                                  | 99.00    | 120.00    | Each | 11880.00        |
| 14.52                                               | Supply & fixing of 10 pair KRONE box in suitable size sheet steel enclosure                                                                                                                                                                             | 10.00    | 203.00    | Each | 2030.00         |
| <b>CARRY OVER TO TRADE SUMMARY VIDE PAGE NO.208</b> |                                                                                                                                                                                                                                                         |          |           |      | <b>87979.00</b> |

| Item No                                             | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Quantity | Rate (Rs) | Unit | Amount (Rs)      |
|-----------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-----------|------|------------------|
| 14.53                                               | Supply & laying of following size XLPE insulated, PVC Inner sheathed, Armoured, Aluminium conductor power cable of 650/1100 volt grade, laid directly in underground trench/on the surface of the wall/column/existing RCC Hume pipe/in cable trench as the case may be or as per the direction of the engineer in charge including termination of the cable with suitable size cable end gland & sockets along with 2 runs of continuous GI earth wire - (4.0 core 16 sqmm + 2 runs of 12 SWG GI wire) For Lifts.                                                                                                           | 60.00    | 263.00    | RM   | 15780.00         |
| 14.54                                               | Supply & laying of following size XLPE insulated, PVC Inner sheathed, Armoured, Aluminium conductor power cable of 650/1100 volt grade, laid directly in underground trench/on the surface of the wall/column/existing RCC Hume pipe/in cable trench as the case may be or as per the direction of the engineer in charge including termination of the cable with suitable size cable end gland & sockets along with 2 runs of continuous GI earth wire - (4.0 core 6 sqmm + 2 runs of 12 SWG GI wire)                                                                                                                       | 20.00    | 176.00    | RM   | 3520.00          |
| 14.55                                               | Supply & laying of 25 mm dia B class medium GI pipe complete with bends, Tees, coupling, flanges, union, long screw, nipple etc. as required for the protection of the underground cable including thread cutting, painting etc.                                                                                                                                                                                                                                                                                                                                                                                             | 50.00    | 277.00    | RM   | 13850.00         |
| 14.56                                               | Supply & laying of 50 mm dia B class medium GI pipe complete with bends, Tees, coupling, flanges, union, long screw, nipple etc. as required for the protection of the underground cable including thread cutting, painting etc.                                                                                                                                                                                                                                                                                                                                                                                             | 50.00    | 447.00    | RM   | 22350.00         |
| 14.57                                               | Excavation of cable trench in all kinds of soil including rock of all variety up to a depth of 600 mm & 300 mm wide, filling the bottom trench with 3 mm layer of fine sand & then laying the cable & covering with 1st. class KB brick on both sides of the cable continuously & filling the voids with sand, then laying the top layer of brick placed side by side in continuous series as protective cover. (Total no. of bricks being 16 nos. per meter run) & filling the trench with a layer of sand and the balance trench with excavated earth & consolidation. (Note: Rates should be excluding the cost of cable) | 500.00   | 163.00    | RM   | 81500.00         |
| <b>CARRY OVER TO TRADE SUMMARY VIDE PAGE NO.208</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |          |           |      | <b>137000.00</b> |

| Item No                                             | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Quantity | Rate (Rs) | Unit | Amount (Rs)     |
|-----------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-----------|------|-----------------|
| 14.58                                               | Providing Masonry Inspection Chamber (450 x 450) mm & depth from (0.6 –1.0) mtr. with brick & cement mortar 1:6 and plaster with 1:5, PCC bed of 100 mm thick (1:3:6) for service connection cable wherever required as per the site requirement with RCC pre cast slab 75mm thick, 8mm dia steel rods at 200 mm CC with handle as directed. Rate to include for excavation.                                                                                                                                                                                    | 5.00     | 2500.00   | Each | 12500.00        |
| 14.59                                               | Providing Masonry Inspection Chamber (750 x 750) mm & depth from (0.6 –1.0) mtr. with brick & cement mortar 1:6 and plaster with 1:5, PCC bed of 100 mm thick (1:3:6) for service connection cable wherever required as per the site requirement with RCC pre cast slab 75mm thick, 8mm dia steel rods at 200 mm CC with handle as directed. Rate to include for excavation.                                                                                                                                                                                    | 5.00     | 4000.00   | Each | 20000.00        |
| 14.60                                               | Supply and fixing of Cable route markers with concrete base of size 8" / 4", / 3" to be erected on ground above the underground cable trench at a distance of 10 mtrs. between each marker as directed at site.                                                                                                                                                                                                                                                                                                                                                 | 50.00    | 52.00     | Each | 2600.00         |
| 14.61                                               | Supplying & laying of following size RCC hume pipe as per direction.<br>( 100 mm dia)                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 50.00    | 290.00    | RM   | 14500.00        |
| 14.62                                               | Supply & fixing of modular type blanking plate as directed at site.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 50.00    | 28.00     | Each | 1400.00         |
| 14.63                                               | SITC of Post top lantern fittings of Crompton make Cat. No. CFPT 18 or equivalent approved make along with 1 nos. 18 Watt CFL along with it's all accessories like choke, condenser etc. including supply & fixing MS grills of suitable size with locking arrangement for safety & protection of fittings, with providing & grouting 50mm. dia B class GI pipe of suitable length in the Gate pillar, PVC cable loop box of SYNTEX or equivalent approved make make with 16Amp SP MCB, neutral link connector etc. including necessary connections & earthing. | 4.00     | 6169.00   | Each | 24676.00        |
| <b>CARRY OVER TO TRADE SUMMARY VIDE PAGE NO.208</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |          |           |      | <b>75676.00</b> |



| Item No                                             | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Quantity | Rate (Rs) | Unit | Amount (Rs)     |
|-----------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-----------|------|-----------------|
| 14.64                                               | Providing Ceiling fan point (without mod. fan regulator) wiring with necessary circuit wiring with 2x2.5 & 1x1.5 sqmm multistrand PVC insulated Cu. conductor wire and point wiring with 2x1.5 & 1x1.5(as continuous earth) sqmm multistrand PVC insulated Cu. conductor wire in the existing concealed conduit already laid in the slab/wall or PVC casing capping/ surface conduit with complete range of modular accessories such as 3 plate ceiling rose,10 Amp. modular snap switch of Anchor Roma or equivalent make as specified in the tender. (But excluding the cost of MS/PVC boxes, Face plate & inner cover. Multystand PVC insulated FR copper wires shall be used | 133.00   | 476.00    | Each | 63308.00        |
| <b>CARRY OVER TO TRADE SUMMARY VIDE PAGE NO.208</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |          |           |      | <b>63308.00</b> |

**14. TRADE SUMMARY INTERNAL ELECTRICAL AND LIGHT FITTINGS WORK :**

|                                         |                  |
|-----------------------------------------|------------------|
| C/O TO TRADE SUMMARY VIDE PAGE NO. 198  | :Rs.2,60,270.00  |
| C/O TO TRADE SUMMARY VIDE PAGE NO. 199  | :Rs.2,45,268.00  |
| C/O TO TRADE SUMMARY VIDE PAGE NO. 200  | :Rs.4,70,580.00  |
| C/O TO TRADE SUMMARY VIDE PAGE NO. 201  | :Rs.3,15,262.00  |
| C/O TO TRADE SUMMARY VIDE PAGE NO. 202  | :Rs.3,01,569.00  |
| C/O TO TRADE SUMMARY VIDE PAGE NO. 203  | :Rs. 63,701.00   |
| C/O TO TRADE SUMMARY VIDE PAGE NO. 204  | :Rs.3,87,025.00  |
| C/O TO TRADE SUMMARY VIDE PAGE NO. 205  | :Rs. 87,979.00   |
| C/O TO TRADE SUMMARY VIDE PAGE NO. 206  | :Rs.1,37,000.00  |
| C/O TO TRADE SUMMARY VIDE PAGE NO. 207  | :Rs. 75,676.00   |
| C/O TO TRADE SUMMARY VIDE PAGE NO. 208  | :Rs. 63,308.00   |
| =====                                   |                  |
| C/O TO GENERAL SUMMARY VIDE PAGE NO.225 | :Rs.24,07,638.00 |



| Item No                                             | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Quantity | Rate (Rs) | Unit | Amount (Rs)     |
|-----------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-----------|------|-----------------|
| <b>15.</b>                                          | <b>PUMP SET &amp; CABLING WORK</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                        |          |           |      |                 |
| 15.01                                               | Supply & installation of 4 way TPN, MCB, DB with double door acrylic cover, IP 42 protection complete with tinned cu. busbar, neutral busbar, earth bar, din bar,& inter connections in concealed manner at the location as directed including all incoming & out going connections and consisting of the followings:-<br>Main Incomer : 40 Amps, FP, MCB -1 Nos.<br>Out goings : 32 Amps, TP, MCB - 1 Nos.<br>32 Amps, SP, MCB - 1 Nos.<br>32 Amps, TPN, MCB - 2 Nos.<br>(for Pump room) | 1.00     | 8734.00   | Each | 8734.00         |
| 15.02                                               | Supply & laying of 80 mm dia B class medium GI pipe complete with bends, Tees, coupling, flanges, union, long screw, nipple etc. as required for suction and delivery lines of the pump sets including thread cutting, painting etc.                                                                                                                                                                                                                                                      | 10.00    | 658.00    | RM   | 6580.00         |
| 15.03                                               | Supply & laying of 65 mm dia B class medium GI pipe complete with bends, Tees, coupling, flanges, union, long screw, nipple etc. as required for suction and delivery lines of the pump sets including thread cutting, painting etc.                                                                                                                                                                                                                                                      | 10.00    | 586.00    | RM   | 5860.00         |
| 15.04                                               | Supply & laying of 15 mm dia B class medium GI pipe complete with bends, Tees, coupling, flanges, union, long Screw, nipple etc. as required for suction and delivery lines of the pump sets including thread cutting, painting etc.                                                                                                                                                                                                                                                      | 40.00    | 164.00    | RM   | 6560.00         |
| 15.05                                               | Supply & laying of HDPE pipe (single run without joint) of size 40mm dia(ID), 50mm dia (OD), 10Kg/cm2 in to the borewell along with the submersible pump up to the required depth (as directed) excluding the length of the pump set including all accessories such as steel nipple, sockets, 2 runs of 6mm steel rope with pvc sleeve for extra support for the pump set.                                                                                                                | 70.00    | 80.00     | RM   | 5600.00         |
| <b>CARRY OVER TO TRADE SUMMARY VIDE PAGE NO.211</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |          |           |      | <b>33334.00</b> |

| Item No                                             | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Quantity | Rate (Rs) | Unit | Amount (Rs)     |
|-----------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-----------|------|-----------------|
| 15.06                                               | Supply, Lowering, testing and commissioning of submersible type pump set capable of delivering 8500 LPH against a total head of approximately 57.0 mtrs, Suitable for operation on 415 volt, 3 phase, 50 Hz, AC power supply at required RPM, capacity 3.0 HP. The pump set shall lowered in to the borewell at a depth of 57.0 mtrs (approx), making electrical connections as required along with the HDPE pipe & steel rope.<br>Make:- KSB.<br>Type:- CORA-7C/15 + UMA 100, 3 Phase, 3.0 HP, 2.5 KW.                                                                                          | 1.00     | 28800.00  | Each | 28800.00        |
| 15.07                                               | Supply, installation, testing and commissioning of open well type submersible monoblock pumpset of delivering 13 LPS against a total head of approximately 40.0 mtrs, suitable for operation on 415 volt, 3 phase, 50 Hz, AC power supply at required RPM, capacity 5.0 HP. The pump set shall be installed in the sump by providing suitable M.S. clamps, brackets, bolts & nuts, making necessary alignment, leveling etc including connecting the pumpset to the delivery lines, making electrical connections as required. Catalogue ref. Crompton LHOPM52TAE or equivalent of approved make | 2.00     | 20000.00  | Each | 40000.00        |
| 15.08                                               | Supply, installation, testing and commissioning of control panel suitable for operating submersible type pump set capable of delivering 8500 LPH against a total head of approximately 57.0 mtrs, suitable for operation on 415 volt, 3 phase, 50 Hz, AC power supply at required RPM, capacity 3.0 HP. making electrical connections as required complete in all respect. Make:- L&T/ Kirloskar/Crompton.                                                                                                                                                                                       | 1.00     | 5000.00   | Each | 5000.00         |
| 15.09                                               | Supply, installation, testing and commissioning of control panel with single phasing preventer and dry run protection for 5 HP Submersible pumpset suitable for operation on 3 PHASE 415 Volt AC power supply. The Panel shall be installed in the pump room and interconnections from Pump Room Panel to Control panel shall be done by using 4 core 4 sq.mm. copper conductor PVC insulated flexible cable to be drawn in M.S. flexible pipe.                                                                                                                                                  | 2.00     | 5000.00   | Each | 10000.00        |
| <b>CARRY OVER TO TRADE SUMMARY VIDE PAGE NO.211</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |          |           |      | <b>83800.00</b> |

| Item No                                             | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Quantity | Rate (Rs) | Unit | Amount (Rs)     |
|-----------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-----------|------|-----------------|
| 15.10                                               | Supply & laying of following size XLPE insulated, PVC Inner sheathed, Armoured, Aluminium conductor power cable of 650/1100 volt grade, laid directly in underground trench/on the surface of the all/column/existing RCC Hume pipe/in cable trench as the case may be or as per the direction of the engineer in charge including termination of the cable with suitable size cable end gland & sockets along with 2 runs of continuous GI earth wire - (4.0 core 16 sqmm + 2 runs of 12 SWG GI wire) For Pump | 10.00    | 263.00    | RM   | 2630.00         |
| 15.11                                               | Supply & fixing of 80 mm dia, GM, N/R valve/Check valve valve with accessories of Leader make suitable for the pump sets.                                                                                                                                                                                                                                                                                                                                                                                       | 2.00     | 6250.00   | Each | 12500.00        |
| 15.12                                               | Supply & fixing of 65 mm dia, GM, N/R valve/Check valve with accessories of Leader make suitable for the pump sets.                                                                                                                                                                                                                                                                                                                                                                                             | 2.00     | 5100.00   | Each | 10200.00        |
| 15.13                                               | Supply & fixing of 80 mm dia, GM, Gate valve with accessories of Leader make suitable for the pump sets.                                                                                                                                                                                                                                                                                                                                                                                                        | 2.00     | 10100.00  | Each | 20200.00        |
| 15.14                                               | Supply & fixing of 65 mm dia, GM, Gate valve with accessories of Leader make suitable for the pump sets.                                                                                                                                                                                                                                                                                                                                                                                                        | 3.00     | 6500.00   | Each | 19500.00        |
| 15.15                                               | Supply & fixing of 6" dia, MS cover for the Bore Well.                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 1.00     | 300.00    | Each | 300.00          |
| 15.16                                               | Supply & fixing of 6 mm MS clamp for 6 " dia, MS cover for the Bore Well                                                                                                                                                                                                                                                                                                                                                                                                                                        | 1.00     | 300.00    | Each | 300.00          |
| 15.17                                               | Supply & laying of 2.5 sqmm 3 core submersible cable, to be laid along with the submersible pump being lowered in to the bore well. The cable is to be fastened to the HDPE pipe with the help of nylon / steel wire                                                                                                                                                                                                                                                                                            | 150.00   | 112.00    | RM   | 16800.00        |
| <b>CARRY OVER TO TRADE SUMMARY VIDE PAGE NO.211</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |          |           |      | <b>82430.00</b> |

**15. TRADE SUMMARY PUMP SET & CABLING WORK:**

C/O TO TRADE SUMMARY VIDE PAGE NO. 209 :Rs.33,334.00  
 C/O TO TRADE SUMMARY VIDE PAGE NO. 210 :Rs.83,800.00  
 C/O TO TRADE SUMMARY VIDE PAGE NO. 211 :Rs.82,430.00  
 =====  
 C/O TO GENERAL SUMMARY VIDE PAGE NO.225 :Rs.1,99,564.00

| Item No                                             | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Quantity | Rate (Rs) | Unit | Amount (Rs)      |
|-----------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-----------|------|------------------|
| <b>16.</b>                                          | <b>External Lighting Work</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |          |           |      |                  |
| 16.01                                               | Supply & laying of following size XLPE insulated, PVC Inner sheathed, Armoured, Aluminium conductor power cable of 650/1100 volt grade, laid directly in underground trench/on the surface of the all/column/existing RCC Hume pipe/in cable trench as the case may be or as per the direction of the engineer in charge including termination of the cable with suitable size cable end gland & sockets along with 2 runs of continuous GI earth wire - (2 core 6 sqmm + 2 runs of 14 SWG GI wire)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 450.00   | 133.00    | RM   | 59850.00         |
| 16.02                                               | Supply & fixing of suitable size brass compression gland for the 2 core 6 sqmm Al. Arm. Cable                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 100.00   | 53.00     | Each | 5300.00          |
| 16.03                                               | Supply & erection of 3.5 meters long 50mm dia. B class GI pipe of approved make with M.S. base plate size 300mm x 300mm x 6 mm duly welded at the bottom of the pipe. The post shall be erected vertically and buried minimum 1.0 mtr. deep below the ground level and providing necessary cement concrete foundation of 1:2:4 ratios up to ground level and brick masonry pedestal up to a height of 600 mm. square type above FGL including provision of 2 nos. PVC pipes of 32mm dia. 2.5 mtr. long for entry & exit of incoming & outgoing armoured cables of size 2 x 6 sqmm in & out of pedestal in concealed manner and of suitable size weather proof (SINTEX or equivalent approved make box) with 16Amp SP MCB, neutral link connector etc. including necessary earth bolt and earthing connection. The pedestal shall be painted with 2 coats of cement paint of approved color, the post & accessories are to be painted with 2 coats of approved make aluminium paint over 1 coat red oxide primer. Sintex or equivalent approved make box is to be installed at a height of minimum 2.0 mtr. above the FGL.<br>NOTE : The rate for the above item shall be inclusive of the following works:<br>i) Providing of required length of 3 C x 1.5 sq.mm. PVC insulated Cu. Conductor cable for connecting the post top lantern light fittings from the loop box. (Drawing to be got approved before installation). The pole top cap should be duly welded. | 10.00    | 4744.00   | Each | 47440.00         |
| <b>CARRY OVER TO TRADE SUMMARY VIDE PAGE NO.214</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |          |           |      | <b>112590.00</b> |

| Item No                                             | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Quantity | Rate (Rs) | Unit | Amount (Rs)      |
|-----------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-----------|------|------------------|
| 16.04                                               | Supply & erection of 4.5 meters long 50mm dia. B class GI pipe ('TATA' medium) with M.S. base plate size 300mm x 300mm x 6 mm duly welded at the bottom of the pipe. The post shall be erected vertically and buried minimum 1.0 mtr. deep below the ground level and providing necessary cement concrete foundation of 1:2:4 ratios up to ground level and brick masonry pedestal up to a height of 600 mm. square type above FGL including provision of 2 nos. PVC pipes of 32mm dia. 2.5 mtr. long for entry & exit of incoming & outgoing armoured cables of size 2 x 6 sqmm in & out of pedestal in concealed manner and of suitable size weather proof (SINTEX or equivalent approved make box) with 16Amp SP MCB, neutral link connector etc. including necessary earth bolt and earthing connection. The pedestal shall be painted with 2 coats of cement paint of approved color, the post & accessories are to be painted with 2 coats of approved make aluminium paint over 1 coat red oxide primer. Sintex or equivalent approved make box is to be installed at a height of minimum 2.0 mtr. above the FGL.<br>NOTE : The rate for the above item shall be inclusive of the following works:<br>i) Providing of required length of 3 C x 1.5 sq.mm. PVC insulated Cu. Conductor cable for connecting the street light fittings from the loop box. (Drawing to be got approved before installation).<br>ii) Providing bracket to be made out of 40 mm dia. G.I. pipe of 1.2 mtrs. Long and clamed to the pole (Double clamp-2 Nos.) at an angle of at least 120 degree or as directed. The pole top cap duly welded. | 37.00    | 5799.00   | Each | 214563.00        |
| 16.05                                               | SITC of Street light luminaries of Crompton make, Cat. No. SCE 13218 or its equivalent approved make with 2 No. 18 watt CF lamps along with its all accessories like choke, condenser etc. and including all connections.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 45.00    | 1521.00   | Each | 68445.00         |
| 16.06                                               | SITC of post top lanterns of Crompton make, Cat. No. CFPT 18 or its equivalent approved make with 1 nos.18 watt CF lamps along with it's all accessories like choke, condenser etc. and including all connections. (Post top lanterns are to be installed on 3.5 mtrs long posts)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 10.00    | 4299.00   | Each | 42990.00         |
| <b>CARRY OVER TO TRADE SUMMARY VIDE PAGE NO.214</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |          |           |      | <b>325998.00</b> |

**16. TRADE SUMMARY EXTERNAL LIGHTING WORK:**

|                                         |                 |
|-----------------------------------------|-----------------|
| C/O TO TRADE SUMMARY VIDE PAGE NO. 212  | :Rs.1,12,590.00 |
| C/O TO TRADE SUMMARY VIDE PAGE NO. 213  | :Rs.3,25,998.00 |
| =====                                   |                 |
| C/O TO GENERAL SUMMARY VIDE PAGE NO.225 | :Rs.4,38,588.00 |

| Item No                                             | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Quantity | Rate (Rs) | Unit | Amount (Rs)     |
|-----------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-----------|------|-----------------|
| <b>17.</b>                                          | <b>Service Connection Cables Work</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |          |           |      |                 |
| 17.01                                               | SITC of cubical type main panel board consisting of the following, compartmentalized, fabricated out of 16 SWG MS sheet & suitable frame work. The panel shall be floor/wall mounted on suitable frame work and properly grouted. The panel shall be degreased, anti rust treated with two coats of red oxide primer & finished with two coats of spray enamel painted of approved color with a provision of ventilation slots and cable entry. Busbars shall be tinned Cu. flats of following size: -4(50mmx6mmx1500mm)- One set, & Two sets of 4(25 mmx 3mmx150mm), & comprising of the followings:-<br>Incomer : 250 Amps, FP, 36 kA, MCCB (L&T make)-1 nos.<br>Outgoing : 63 Amp, FP, MCB - 2 nos. ( for SDM .Res. & VIP G.H),<br>40 Amps, DP, MCB - 27 nos. (For flats) including suitable capacity of Volt Meter & Ammeter and internal wiring. | 1.00     | 66418.00  | Each | 66418.00        |
| 17.02                                               | SITC of cubical type panel board consisting of the following MCCB/MCB isolators, compartmentalized, fabricated out of 16 SWG MS sheet & suitable frame work. The panel shall be floor/ wall mounted on suitable frame work and properly grouted. The panel shall be degreased, anti rust treated with two coats of red oxide primer & finished with two coats of spray enamel painted of approved color with a provision of ventilation slots and cable entry. Busbars shall be tinned Cu. flats of following size: - 4(50mmx6mmx750mm)- 1 set, & comprising of the followings:-<br>80 Amps, FP, 36 KA, MCCB (L&T make) -1 nos. 40 Amp, FP, MCB -3 nos. 63 Amp, FP, MCB -1 nos. Energy Meter (L&T make), 3 Phase, 4 wire, 50-100 Amps - 1no, (For common loads) including suitable capacity of Volt Meter & Ammeter and internal wiring.              | 1.00     | 28534.00  | Each | 28534.00        |
| <b>CARRY OVER TO TRADE SUMMARY VIDE PAGE NO.217</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |          |           |      | <b>94952.00</b> |

| Item No                                             | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Quantity | Rate (Rs) | Unit | Amount (Rs)      |
|-----------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-----------|------|------------------|
| 17.03                                               | Supply, installation,& commissioning of energy meters, electronics type, 3 phase, 4 wire, 10-60 Amps capacity, duly tested by the states laboratory, along with suitable size MS enclosure, made out of 16 SWG sheet with hinged door, glass panel for taking KWH reading, locking facility & painted with enamel paint after a coat of red oxide primer, including all connections from the Busbars in the main panel as incoming & from the outgoing connections of the meters to the MCBs in the panel as incoming for the flats (L&T make).<br>(For SDMs residence & VIP guest house) | 2.00     | 5399.00   | Each | 10798.00         |
| 17.04                                               | Supply & laying of following size XLPE insulated, PVC Inner sheathed, Armoured, Aluminium conductor power cable of 650/1100 volt grade, laid directly in underground trench/on the surface of the wall/column/existing RCC hume pipe/in cable trench as the case may be or as per the direction of the engineer in charge including termination of the cable with suitable size cable end gland & sockets along with 2 runs of continuous GI earth wire (3.5 core 120 sqmm + 2 runs of 8 SWG GI wire)                                                                                     | 140.00   | 820.00    | RM   | 114800.00        |
| 17.05                                               | Supply & laying of following size XLPE insulated, PVC Inner sheathed, Armoured, Aluminium conductor power cable of 650/1100 volt grade, laid directly in underground trench/on the surface of the wall/column/existing RCC hume pipe/in cable trench as the case may be or as per the direction of the engineer in charge including termination of the cable with suitable size cable end gland & sockets along with 2 runs of continuous GI earth wire (3.5 core 70 sqmm + 2 runs of 8 SWG GI wire)                                                                                      | 100.00   | 574.00    | RM   | 57400.00         |
| <b>CARRY OVER TO TRADE SUMMARY VIDE PAGE NO.217</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |          |           |      | <b>182998.00</b> |



| Item No                                             | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Quantity | Rate (Rs) | Unit | Amount (Rs)      |
|-----------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-----------|------|------------------|
| 17.06                                               | Supply & laying of following size XLPE insulated, PVC Inner sheathed, Armoured, Aluminium conductor power cable of 650/1100 volt grade ,laid directly in underground trench/on the surface of the all/column/existing RCC hume pipe/in cable trench as the case may be or as per the direction of the engineer in charge including termination of the cable with suitable size cable end gland & sockets along with 2 runs of continuous GI earth wire (3.5 core 50 sqmm + 2 runs of 8 SWG GI wire)                                                                | 150.00   | 447.00    | RM   | 67050.00         |
| 17.07                                               | Supply, installation,& commissioning of energy meters, electronics type, 1 phase, 10-60 Amps capacity, duly tested by the states laboratory, along with suitable size MS enclosure, made out of 16 SWG sheet with hinged door, glass panel for taking KWH reading, locking facility & painted with enamel paint after a coat of red oxide primer, including all connections from the Busbars in the main panel as incoming & from the outgoing connections of the meters to the MCBs in the panel as incoming for the flats (L&T make).<br>(For officers quarters) | 27.00    | 3000.00   | Each | 81000.00         |
| <b>CARRY OVER TO TRADE SUMMARY VIDE PAGE NO.217</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |          |           |      | <b>148050.00</b> |

**17.TRADE SUMMARY SERVICE CONNECTION CABLES WORK:**

C/O TO TRADE SUMMARY VIDE PAGE NO. 215 :Rs. 94,952.00  
C/O TO TRADE SUMMARY VIDE PAGE NO. 216 :Rs.1,82,998.00  
C/O TO TRADE SUMMARY VIDE PAGE NO. 217 :Rs.1,48,050.00

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C/O TO GENERAL SUMMARY VIDE PAGE NO.225 :Rs.4,26,000.00

| Item No                                             | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Quantity | Rate (Rs) | Unit | Amount (Rs)      |
|-----------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-----------|------|------------------|
| <b>18.</b>                                          | <b>FIRE FIGHTING WORK</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |          |           |      |                  |
| 18.01                                               | SITC of Electrical motor driven booster pump of mono block type capable to discharge 900 LPM giving a pressure of 2.0 kg/cm sq. The pump shall be coupled to TEFC motor of 5.0 HP (3.7 KW) and complete set shall be mounted on common base frame (KIRLOSKAR) Model: KDI -527++ Mono block Pump or its equivalent make. (Suction/Delivery pipe size- 80.0 mm /65.0 mm)                                                                                                                                                          | 1.00     | 26042.00  | Set  | 26042.00         |
| 18.02                                               | SITC of Pump Controller for Auto start/stop of above fire pump, complete in all respect including all connections.                                                                                                                                                                                                                                                                                                                                                                                                              | 1.00     | 8180.00   | Set  | 8180.00          |
| 18.03                                               | Supplying, Installation, testing and commissioning of gun metal gate Valve (Kirloskar/ Hazra / Kalpana make) complete with double flange with brass hinge pins, nuts, bolts, gaskets, 3ply rubber insertion etc as per IS 780 grade PN 1.6. [65mm dia]                                                                                                                                                                                                                                                                          | 5.00     | 5500.00   | RM   | 27500.00         |
| 18.04                                               | Supplying, laying, cutting, welding, testing and commissioning of MS pipe of Heavy grade ( as per IS 1239/3589 part 1, over ground / wall / surface including MS flanges, reducers, bends, tees, sockets, fastener, U clamps etc including all necessary fittings in all respect.(Internal / external work). and will have to be painted with 2 coats of synthetic enamel paint over one coat of red oxide primer complete as required. For wet riser / down comer pipes and other connecting pipes.                            |          |           |      |                  |
| A                                                   | 80 mm dia                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 10.00    | 820.00    | RM   | 8200.00          |
| B                                                   | 65 mm dia                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 50.00    | 733.00    | RM   | 36650.00         |
| 18.05                                               | SITC of Wet Riser First Aid Hose reel full swinging type painted with red enameled paint, wall mounted, fitted with 30 mtr. length of 20mm dia high pressure braided rubber hose pipe of DUNLOP or equivalent make with gun metal 20mm screwed inlet for connecting to hose reel, valve along with 25mm dia MS pipe from main riser up to hose reel including suitable size hose box as required as per IS specification and connecting the same with the system (IS 884-1969 or its latest version) including shut off nozzle. | 5.00     | 6348.00   | Set  | 31740.00         |
| <b>CARRY OVER TO TRADE SUMMARY VIDE PAGE NO.220</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |          |           |      | <b>138312.00</b> |

| Item No                                             | Description                                                                                                                                                                                                                                                                                       | Quantity | Rate (Rs) | Unit | Amount (Rs)     |
|-----------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-----------|------|-----------------|
| 18.06                                               | Supply and installing of ISI Marked (IS:940) Fire extinguisher, water CO2 type, 9 liters capacity with gun metal cap and nozzle and complete in all respects including initial fill and wall suspension brackets, including dash fastener nuts & bolt. Complete as required.                      | 5.00     | 3070.00   | Each | 15350.00        |
| 18.07                                               | Supply and installing ISI marked (IS:2878) Fire Extinguisher, Carbon-di-oxide type capacity 4.5 Kgs. Flat base including valve, discharge hose of not less than 10mm dia., 1M long and complete in all respects including initial fill with CO2 gas. Complete as required.                        | 5.00     | 7400.00   | Each | 37000.00        |
| 18.08                                               | Supply and installing of ISI marked (IS:2171) Portable Dry Chemical Powder Type Fire Extinguisher of 5 Kg capacity with Gun Metal cap and nozzle and complete in all respects including initial fill and wall suspension bracket, including dash fastener, nuts, bolts etc. complete as required. | 2.00     | 2540.00   | Each | 5080.00         |
| 18.09                                               | Supply, installation of fire bucket stand made out of suitable size angle iron frame work with "U" hooks for two Nos of fire buckets, duly painted with a coat of red oxide primer and two coats of enamel paint duly fixed on brick masonry pedestal as directed.                                | 3.00     | 2000.00   | Each | 6000.00         |
| 18.10                                               | Supply, installation, of 250 x 150 mm fire exist signage of photo luminescent on aluminium sheet of 1.0 mm ( $\pm$ 10%) containing lumigen-III as base chemical, covered with U/V stabilized coating.                                                                                             | 15.00    | 357.00    | Each | 5355.00         |
| 18.11                                               | Supply, erection, jointing, testing and commissioning of FIREALARM 6 Zone Control panel working on 220 Volt AC complete with S.M.F. Battery Backup with Battery charger arrangements.                                                                                                             | 1.00     | 18714.00  | Set  | 18714.00        |
| 18.12                                               | Supply, erection, jointing, testing and commissioning of ELECTRONIC Hooter cum warning lamp.                                                                                                                                                                                                      | 5.00     | 615.00    | Each | 3075.00         |
| <b>CARRY OVER TO TRADE SUMMARY VIDE PAGE NO.220</b> |                                                                                                                                                                                                                                                                                                   |          |           |      | <b>90574.00</b> |

| Item No                                             | Description                                                                                                                                                                                                                                                   | Quantity | Rate (Rs) | Unit | Amount (Rs)     |
|-----------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-----------|------|-----------------|
| 18.13                                               | Supply, erection, jointing, testing and commissioning of Manual Call point (Pill box).                                                                                                                                                                        | 5.00     | 615.00    | Each | 3075.00         |
| 18.14                                               | Supply and doing wiring with 3 core 1.5 Sq mm XLPE insulated armoured Copper cable - with necessary saddles with spacers, to be installed on surface of wall or ceiling. Rate is inclusive of chase cutting & concealing as directed at site                  | 150.00   | 138.00    | RM   | 20700.00        |
| 18.15                                               | supply & fixing of 3 phase 4 way MCB DB double door acrylic type in concealed manner with the following MCB including connections & earthing.<br>Incomer : 63 AMP, 4 pole isolator - 1 nos.<br>Outgoing : 32 Amp, DP, MCB - 4 nos.<br>32 Amp, FP, MCB - 1 nos | 1.00     | 6918.00   | Set  | 6918.00         |
| 18.16                                               | Supply & installation of 4 Pole 63A Change over Switch housed in Sheet steel factory made enclosure to be fixed on wall including making connections.<br>[Make: Havell's /HPL.]                                                                               | 1.00     | 6133.00   | Each | 6133.00         |
| <b>CARRY OVER TO TRADE SUMMARY VIDE PAGE NO.220</b> |                                                                                                                                                                                                                                                               |          |           |      | <b>36826.00</b> |

**18. TRADE SUMMARY FIRE FIGHTING WORK:**

|                                         |                 |
|-----------------------------------------|-----------------|
| C/O TO TRADE SUMMARY VIDE PAGE NO. 218  | :Rs.1,38,312.00 |
| C/O TO TRADE SUMMARY VIDE PAGE NO. 219  | :Rs. 90,574.00  |
| C/O TO TRADE SUMMARY VIDE PAGE NO. 220  | :Rs. 36,826.00  |
| =====                                   |                 |
| C/O TO GENERAL SUMMARY VIDE PAGE NO.225 | :Rs.2,65,712.00 |

| Item No                                               | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Quantity | Rate (Rs) | Unit | Amount (Rs)        |
|-------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-----------|------|--------------------|
| <b>19.</b>                                            | <b>AIR CONDITIONING WORK</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |          |           |      |                    |
| 19.01                                                 | Supply of following type of High Wall Split Air Conditioners Units having Rotary compressor and all accessories consisting of high wall mounting type indoor units with remote control and outdoor unit consisting of compressor, condenser coil, laying of refrigerant pipe up to 5 meter length, Power input cable for the machine, Inter connection cable between the outdoor and indoor units, condenser fan, suitable for operation with single phase 240 volt + 10 % or - 10% AC supply, protection unit for under voltage complete in all respect.<br>1.5 TR HIGHWALL SPLIT AC UNITS (5 star Rated)<br><b>(Make : VOLTAS / BLUESTAR / CARRIER / HITACHI)</b> | 6.00     | 34500.00  | Each | 207000.00          |
| 19.02                                                 | Supply and installation of reputed make wall mountable type, 4 KVA single phase automatic voltage stabilizer Range 130 to 270 V.<br><b>(Make : Sakti / Sharp / Sen &amp; Pandit / Power Tech / Bluestar).</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 6.00     | 4000.00   | Each | 24000.00           |
| 19.03                                                 | Supply and installation of medium gauge PVC Drain pipes of suitable size to effectively drain out the sweat water, as directed at site as per make specified. (All drain pipes are to be properly saddled on to the external wall & brought down to at least 1.0m above the plinth protection.)                                                                                                                                                                                                                                                                                                                                                                     | 30.00    | 50.00     | RM   | 1500.00            |
| <b>CARRY OVER TO GENERAL SUMMARY VIDE PAGE NO.225</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |          |           |      | <b>2,32,500.00</b> |

| Item No                                               | Description                                                                                                                                                                                                                                                                                                                                                                                    | Quantity | Rate (Rs)  | Unit | Amount (Rs)         |
|-------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|------------|------|---------------------|
| <b>20.</b>                                            | <b>LIFT WORK</b>                                                                                                                                                                                                                                                                                                                                                                               |          |            |      |                     |
| 20.01                                                 | Supply, Installation Testing & Commissioning of 06 Passenger capacities, Automatic Passenger Lift with V3F drive & as per the specification laid down in Technical Specification and Technical details of Lift of this tender.<br><b>Make :OTIS/ KONE/ SCHINDLER/ MITSUBISHI ELECTRIC/ JOHNSON/ THYSENCRUPP)</b>                                                                               | 1.00     | 1600000.00 | Set  | 1600000.00          |
| 20.02                                                 | Supply, Installation Testing & Commissioning of 15 Passenger capacities having size to accommodate stretcher in time of need, Automatic Hospital Lift with VF Regenerative (Closed Loop) drive & as per the specification laid down in Technical Specification and Technical details of Lift of this tender.<br><b>Make :OTIS/ KONE/ SCHINDLER/ MITSUBISHI ELECTRIC/ JOHNSON/ THYSENCRUPP)</b> | 1.00     | 2510284.00 | Set  | 2510284.00          |
| <b>CARRY OVER TO GENERAL SUMMARY VIDE PAGE NO.225</b> |                                                                                                                                                                                                                                                                                                                                                                                                |          |            |      | <b>41,10,284.00</b> |

| Item No                                               | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Quantity | Rate (Rs) | Unit | Amount (Rs)        |
|-------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-----------|------|--------------------|
| <b>21.</b>                                            | <b>SOLAR WATER HEATING SYSTEM</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |          |           |      |                    |
| 21.01                                                 | Supply, Installation Testing & Commissioning of Solar Water Heater systems with capacity of 1500 LPD (500LPD x 3), Flat Plate Collectors 12 Nos. (4 Nos. X 3), Non Pressurized, thermosyphon circulation having 60 deg C Temp of output water including providing 6 KW / 9 KW electric heater Back up. System shall conform to BIS standard IS 12933. The inner tank shall be of SS304 construction. Outer casing to be GI pre-coated. The system shall also comprise the following:                                                                                                                                    | 2.00     | 411870.00 | Set  | 823740.00          |
| (a)                                                   | Supply, Installation, testing & Commissioning of Sintex or equivalent tank of 1500 litre capacity for providing make up water for Solar tanks. All necessary plumbing connections to and from tank are included in the rate. Pipes shall be measured and paid for separately under relevant item in the SOQ.                                                                                                                                                                                                                                                                                                            |          |           |      |                    |
| (b)                                                   | SITC of CFC free PUF insulation 50mm thick or Rock wool Insulation 48Kg density / CuM or better as available, 50mm thick with Aluminium foil facing and then cladding with 24 SWG Aluminium sheet (for Hot water System, hot water storage tank, Interconnections & Outlets etc.). Insulation is to be provided for hot water sections such as pipe tank etc. only. Necessary tightening with chicken mesh must be done to secure the insulation to the body of the object being insulated to ensure there are no air pockets or gaps between the insulation and the body before doing the aluminum cladding.           |          |           |      |                    |
| (c)                                                   | Necessary valves, stop cock, inlet and outlet flanges for taking out connections etc. as required for the system.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |          |           |      |                    |
| (d)                                                   | Necessary mounting structure complete as required The structure should be able to withstand wind velocity as appropriate for the place of installation ( 75 - 100 Km/ Hr) and shall be of angle iron of 35mmx35mmx4mm or better; will have vertical support at top and bottom edge of the inclined plane of the collector suitably placed. The vertical support shall be firmly grouted as required /as recommended by the manufacturer and directed by Chief Engineer. Two coats of primer and two coats of weather proof/ anti corrosive paint shall be applied after proper cleaning and degreasing of the surfaces. |          |           |      |                    |
| <b>CARRY OVER TO GENERAL SUMMARY VIDE PAGE NO.225</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |          |           |      | <b>8,23,740.00</b> |

| <b>Item No</b>                                        | <b>Description</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>Quantity</b> | <b>Rate (Rs)</b> | <b>Unit</b> | <b>Amount (Rs)</b> |
|-------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|------------------|-------------|--------------------|
| <b>22.</b>                                            | <b>SOLAR STREET LIGHT WORK</b>                                                                                                                                                                                                                                                                                                                                                                                                                                       |                 |                  |             |                    |
| 22.01                                                 | Supply, Installation, Testing & Commissioning of Standalone Solar Street lights including providing necessary Solar module of 100Wp, 50mm dia GI pipe of approx length 4.5 Mtr (for mounting of solar panel, light fixture, Pole mounted box, Adaptors as necessary), LED lamp 12W with necessary drivers, Weather proof box suitable for mounting on pole and house MCB, Battery backup with 12V 40 AH tubular gel type Lead acid batteries, Charge Controller Unit | 4.00            | 34099.00         | Set         | 136396.00          |
| <b>CARRY OVER TO GENERAL SUMMARY VIDE PAGE NO.225</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                 |                  |             | <b>1,36,396.00</b> |



**SUB: TENDER FOR BUILDERS WORK, WATER SUPPLY, SANITARY INSTALLATION, ELECTRICAL INSTALLATION, LIFTS AND ANCILLARY WORKS FOR PROPOSED CONSTRUCTION OF 28 NOS. OF OFFICERS' QUARTERS AND 1 NO. OF VIP GUEST HOUSE AT SURYA NAGAR, BHUBANESWAR.**

**GENERAL SUMMARY**

| TRADE                                      | TRADE SUMMARY                                     | C/O FROM PAGE NO. | AMOUNT                |
|--------------------------------------------|---------------------------------------------------|-------------------|-----------------------|
| 1                                          | EARTH WORK AND EXCAVATION                         | 154               | 10,23,646.00          |
| 2                                          | CONCRETE & FORM WORK                              | 159               | 1,69,57,956.00        |
| 3                                          | BRICK WORK                                        | 160               | 89,10,425.00          |
| 4                                          | STEEL & IRON WORK                                 | 161               | 1,74,87,249.00        |
| 5                                          | WOOD WORK AND JOINERY                             | 166               | 90,89,249.00          |
| 6                                          | FLOORING AND FINISHING                            | 172               | 1,74,45,003.00        |
| 7                                          | WATER PROOFING                                    | 175               | 9,19,580.00           |
| 8                                          | ALUMINIUM DOORS, WINDOWS, VENTILATOR & GLAZING    | 177               | 41,29,130.00          |
| 9                                          | WATER SUPPLY AND SANITARY INSTALLATIONS           | 187               | 43,30,436.00          |
| 10                                         | ANTI-TERMITE TREATMENT                            | 188               | 1,66,320.00           |
| 11                                         | PAVEMENTS AND ROADS                               | 189               | 20,86,464.00          |
| 12                                         | SEWERAGE TREATMENT PLANT                          | 190               | 40,00,000.00          |
| 13                                         | CONCEALED CONDUIT WORK                            | 197               | 12,43,136.00          |
| 14                                         | INTERNAL ELECTRICAL WORK AND LIGHT FITTINGS WORK. | 208               | 24,07,638.00          |
| 15                                         | PUMP SET & CABLING WORK                           | 211               | 1,99,564.00           |
| 16                                         | EXTERNAL LIGHTING WORK                            | 214               | 4,38,588.00           |
| 17                                         | SERVICE CONNECTION CABLING WORK                   | 217               | 4,26,000.00           |
| 18                                         | FIRE FIGHTING WORK                                | 220               | 2,65,712.00           |
| 19                                         | AIR CONDITIONING WORK                             | 221               | 2,32,500.00           |
| 20                                         | LIFT WORK                                         | 222               | 41,10,284.00          |
| 21                                         | SOLAR WATER HEATING SYSTEM WORK                   | 223               | 8,23,740.00           |
| 22                                         | SOLAR STREET LIGHT WORK                           | 224               | 1,36,396.00           |
| <b>TOTAL ESTIMATED COST OF THE PROJECT</b> |                                                   | <b>RS.</b>        | <b>9,68,29,016.00</b> |

**SUB: TENDER FOR BUILDERS WORK, WATER SUPPLY, SANITARY INSTALLATION, ELECTRICAL INSTALLATION, LIFTS AND ANCILLARY WORKS FOR PROPOSED CONSTRUCTION OF 28 NOS. OF OFFICERS' QUARTERS AND 1 NO. OF VIP GUEST HOUSE AT SURYA NAGAR, BHUBANESWAR.**

## **SUMMARY**

**TOTAL ESTIMATED COST (CIVIL+ELECTRICAL) :Rs. 9,68,29,016.00**

**PERCENTAGE ABOVE / BELOW / AT PAR (+/-) :Rs.  
ON THE ABOVE ( ..... %)  
(Strike out whichever are not applicable)**

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**SUBMITTED TENDER AMOUNT :Rs.**

**In words:  
(Rupees.....) only.**

**CARRY OVER THIS AMOUNT (QUOTED TENDER AMOUNT ) TO LETTER TO CHIEF ENGINEER FROM CONTRACTOR ON PAGE NO. 6**

**(SIGNATURE OF CONTRACTOR)**