

**TENDER DOCUMENT FOR ELECTRICAL WORK  
FOR**

**STATE BANK OF INDIA**

**TALEGAON BRANCH, PUNE**

**TECHNICAL BID**

STATE BANK OF INDIA  
PREMISES SECTION,  
ZONAL OFFICE, ZONE-II,  
SHARADA CHAMBER, 386/2,  
SHANKARSHET ROAD,  
PUNE-411037

## **TENDER NOTICE**

1	Name of the work and place	Proposed Electrical work at TALEGAON BRANCH , PUNE(SHIFTING TO NEW PREMISES.)
2	Name of the Architect with contact details	NA
3	Estimated cost	Rs 5,00,000/-
4	Date of issue of tenders through Bank's web site	From: 10.02.2017 To: 23.02.2017
5	Tender book cost	NA
6	EMD details	Rs 5,000/-
7	Retention	8% (eight percent) from interim bills and maximum 5% (five percent) of the final value of the contract.
8	Defect Liability Period	12 months from the date of virtual completion
9	Liquidated Damages	0.5% (half percent) per week of delay or part there of the contract value subject to ceiling of 5% of the accepted contract sum.
10	Down load of tender documents	From: 10.02.2017 To: 23.02.2017
11	Eligibility for submission of tender	All Electrical contractors who are empanelled in SBI, Mumbai circle as per their eligibility may down load the tender documents.
12	Date and time of tender opening	23.02.2017 @ 03.00pm in the chambers of Chief Manager (GB) ,State Bank of India , Zonal Office, Sharada Chambers, 3 <sup>rd</sup> floor,Shankarshet Road,Pune.
13	Period of Honoring Certificate	15 days from the date of receipt of certificate.
14	Date of commencement	7 days from the date of acceptance of letter is issued to the contractor/or the day on which the contractor is instructed to take possession of the site which ever is Earlier.
15	Date of completion	4 weeks from the date of issue of work order.
16	Period of final Measurement	One month from the date of virtual completion.
17	Minimum value of work for interim certificate	3.0 lakhs (this value shall be the difference or work done of two consecutive bills)
18	Refund of total security deposit	The retention amount will be refunded to the Contractor fourteen days after the end of the defect liability period.
19	Contact details for clarification	Chief Manager (Electrical)-9923206097

## NOTICE INVITING TENDER

Sealed tenders on item rate basis are hereby invited to execute the Electrical Works for our TALEGAON BRANCH , PUNE, (SHIFTING TO Shop No 15,16,41,42,113A 134A &135A ,Shantai City Center, Station Road, Talegaon Municipal Corporation Office, Talegaon Dabhde , Tal:Maval Dist Pune-411506).Tender documents duly filled and signed including the drawings, if any, issued along with tender into two separate sealed envelopes, one containing 'Technical Bid with EMD' and the other with 'Price Bid' and to be addressed to The Chief Manager (GB), State Bank of India, Zonal Office, 7TH FLOOR, Sharda Chambers, Shankarshet Road, Pune and it should be deposited in the tender box kept during office hours not later than 15.00 Hrs on 23.02.2017

The late tenders shall be rejected including postal / courier delays.

The tenders shall be opened on the same day at 1500 Hrs at the above address in the presence of bidders who wish to attend for the same.

The tenderer shall deposit the Earnest Money Deposit of Rs 5,000/-(Rupees FIVE thousand only) by Demand draft drawn in favour of State Bank of India, pune of any Nationalized Bank, payable at Pune.

The Earnest Money Deposit will not bear any interest.

The Earnest Money Deposit will be forfeited in the event of any evasion, refusal or delay on the part of the tenderer to sign and execute the Contract on acceptance of his tender. The Earnest Money Deposit will be refunded to the tenderers whose tenders are not accepted.

This is a Two Part bid.

Part 1 (Technical Bid) – shall consists of Notice inviting tender, EMD, Instructions for tenderer, Form of tender, Articles of Agreement, General conditions of Contract, Special conditions of Contract, Proforma for various applications, General specification, Technical specification (electrical Part I), Technical specification (electrical Part II) and an un priced Bill of quantities. **Tenders without EMD will be rejected**

Part 2 (Price Bid) – Shall consist of **Bill of quantities only.**

Procedure for Submitting the Tenders:

- (a) (Envelope No.1, Technical Bid): Envelope No.1, (technical bid) shall contain covering letter accepting conditions of Contract, Deviations, if any, duly signed tender technical papers, duly signed tender drawings along with Earnest Money Deposit. Each page and correction duly signed by tenderer including tender form duly filled in, with complete details and description including all invited data are to be supplied by tenderer as specified in the information and instructions to tenderer.

The Envelope shall be super scribed as “Envelope No.1 – Technical Bid” with the Subject as “Electrical Work for the proposed branch office of State Bank of India, TALEGAON BRANCH , PUNE ” and indicating the “Due date of Submission”.

- (b) Envelope No.2 (Price Bid) – Envelope No. 2 shall contain only prices duly filled in the Bill of quantities of tender document. The tenderer must signed each page and correction, if any, of price schedule.

The Envelope shall be super scribed as “Envelope No.2 – Price Bid” with the Subject as “Electrical Work for the proposed branch office of State Bank of India, TALEGAON BRANCH , PUNE , and indicating the “Due date of Submission”.

The Work is to be completed within Four weeks from the date of issue of the Letter of Intent / Work Order.

The tenders shall be valid for a period not less than 90 days after the date of opening of the Price Bid.

All the rates quoted in the tender shall be inclusive of all taxes, levies, duties, transportation charges, wastage, Octroi etc; and shall remain firm till the completion of Work. No escalation of prices will be payable for what-so-ever reasons.

BANK reserves the right to accept either in part or as whole any or reject any or all the tenders without assigning any reasons thereof.

This tender Notice shall form part of the Contract.

Yours faithfully,

Chief Manager(GB)

## SECTION II

### INSTRUCTION FOR TENDERER

2.0 The details of work to be carried out and its scope are given in the specifications and Bill of Quantities in these documents, which also indicate a brief description of the project where work is to be executed. The tenderers are advised to study the same carefully before tendering and they shall be deemed to have fully acquainted themselves with the same.

2.1 The tenderers in their own interest, are advised to inspect and examine the site and its surroundings and satisfy themselves before submitting their tenders in respect of the site conditions including but not restricting to the following which may influence or affect the work or cost thereof under the contract.

- a. Site conditions including access to the site, existing and required roads and other means of transport/communication for use by him in connection with the work.
- b. Requirement and availability of land and other facilities for his enabling works, stores and workshops etc.
- c. Ground conditions including those bearing upon transportation, disposal, handling and storage of material required for the work or obtained there from.
- d. Source and extend of availability of suitable materials including water etc. and labour (skilled and unskilled), required for work and Laws & Regulations governing their use and employment.
- e. Geological, meteorological, topographical and other general figures of the site and its surroundings as are pertaining to and needed for the performance of the work.
- f. The limit and extent of surface and sub surface water to be encountered during the performance of the work, the requirement of drainage and pumping.
- g. The type of equipment and facilities needed preliminary for and in the performance of the work, and for successful completion of work.
- h. All other information pertaining to and needed for the work including information as to the risks, contingencies and other circumstances which may influence or affect the work or the cost thereof under this contract.

2.2 The Tenderers should note the information, if any, regards to the site and local conditions, as contained in these tender documents has been given merely to assist the Tendereres and is not warranted to be complete.

2.3 The Tenderers should note and bear in mind that the BANK shall bear no responsibility for the lack of acquaintance of the site and other conditions or any information relating thereto, on their part. The consequences of the lack of any knowledge, as aforesaid, on the part of the tenderers shall be at their risk and cost and no charges or claims whatsoever consequent upon the lack of any information, knowledge or understanding shall be entertained or payable by the Bank.

2.4 Immediately on receipt of the Tender Documents from the Bank, but at least three days prior to the date fixed for opening of envelope no.1 of tender, the Tenderer may submit

in writing any tender enquiry on matters where clarifications or additional information is desired.

If considered appropriate, the Bank reserves the right to issue addendum(s) / amendment(s) to any condition/ specifications/schedules of all tenderers before the date of submission. Tenders submitted by the tender shall be deemed to cover the effect of such addendum(s)/ amendment(s) issued and such addendum(s)/ amendment(s) duly signed by the Tenderers shall be submitted along with the tenders.

2.5 The Tender should be submitted in the prescribed form and the same should be signed as laid down here under:

- a. If the Tender is submitted by an individual, it shall be signed by the Proprietor with his full name and full name of his firm with its current business address.
- b. If the Tender is submitted by proprietary firm, it shall be signed by the proprietor with his full name and full name of his firm with its current business address.
- c. If the Tender is submitted by a firm in partnership, it shall be signed for and on behalf of the firm by all the partners of the firm about their full names and current business address, or by a partner holding the power of attorney by the firm for signing the tender, in which case, a certified copy of the partnership deed and current business address of all the partners of the firm shall also accompany the tender.
- d. All witnesses and sureties (if any) shall be person of status and their full names, occupations and address shall be stated below their signature. All signatures affixed on each page in the tender will be dated.

2.7 The Earnest Money deposit without any interest will be returned to the unsuccessful tenderes only after Validity period / award of work.

2.8 The Tenderers should quote for all the items of work as given in Bill of Quantities. The rates shall be written both in words and in figures. Tenderer shall also show cost of each item in total of each sub head and the grand total of the whole contract. Corrections, if any shall be made by crossing out initialing dating and rewriting.

2.9 The acceptance of a tender will rest with the Bank, which does not bind itself to accept the lowest tender, and reserves to itself the authority to reject any or all of the tenders received without the assignments of any reasons. All tenders in which any of the prescribed conditions are not fulfilled or are incomplete, in any respect are liable to be rejected.

2.10 All item rates shall be quoted on the proper form of the tender alone.

2.11 An item rate tender containing percentage "below / above will be summarily rejected. However where a tenderer voluntary offers a rebate for payment without a stipulated period, this may be considered.

2.11 On acceptance of tender the name of the accredited representative (s) of the Contractor who would be responsible for taking instructions from the Employer / Architect shall be communicated to the Employer / Architect.

2.12 Special care shall be taken to write the rates in figures as well as in words, and the amounts in figures only, in such a way that misinterpretation is not possible. The total amount should be written both in figures and in words. In case of figures, the words 'Rs' should be written before the figure of rupees and words 'P' after the decimal figures e.g. Rs. 2.15 P and in case of words, the word Rupees should be precede and the word 'Paise' should be written at the end. Unless the rate is in whole rupees and followed by the words 'only' it should

invariably be upto two decimal places. While quoting the rates in the bill of quantities, the word 'only' should be written closely following the amount and it should not be written in the next line.

2.13 a) The Bank does not bind itself to accept the lowest tender but it may accept any tender and reserves to itself the right of accepting the whole or any part of tender and the tenderer shall be bound to perform the same at the rates quoted.

b) The Bank also reserves the right to accept the tender in full or in parts and that the tender shall have no claim for revision of rates or other conditions if the tender is accepted in parts.

2.14 The tender for work shall remain open for acceptance for a period of 90 days from the date of opening of Envelope no. 2 of the tenders. If any, tenderer withdraws his tender before the said period, then the Bank shall be at liberty to forfeit his Earnest Money Deposit.

The Earnest Money Deposit of the tenderer whose tender is accepted shall be forfeited in full in case he does not start the work by the stipulated date mentioned in the award letter.

2.15 It will be obligatory on the part of the tenderer to tender and sign the tender documents for all the component parts and that after the work is awarded, he will have to enter into an agreement for each component with the competent authority of Employer.

2.16 The "Notice Inviting Tender" and this "Instructions for Tenderers" shall form part of the Tender Documents.

**SECTION – III**  
**FORMAT OF AGREEMENT**

**(TO BE EXECUTED ON STAMP PAPER OF RS. 100/-)**

ARTICLES OF AGREEMENT MADE THE .....DAY OF .....  
2015 BETWEEN The State Bank of India Act 19.... and **having its**  
**Office** \_\_\_\_\_  
\_\_\_\_\_, here in after called “the Employer” which expression shall  
unless repugnant to the context mean & include its successors & assigns Of the one  
part & M/S \_\_\_\_\_ Whose registered office  
is situated at \_\_\_\_\_  
\_\_\_\_\_ (herein-after called “the  
Contractor”) which expression shall unless repugnant to the context mean & include  
on the other part.

**WHEREAS the Employer is desirous of carrying out “Electrical work at its**  
**premises at** \_\_\_\_\_

”  
\_\_\_\_\_

**AND WHEREAS the contractor has supplied the Bank with a fully priced  
copy of the said schedules of quantities and rates (which copy is herein after  
referred to as “the contract document” and the contract bill have been signed by  
or on behalf of the parties hereto:**

AND WHEREAS the Contractor has agreed to execute the said works subject to the provisions  
hereinafter contained and subject also to the General Instructions , GCC (Annexure IV  
hereto), special conditions (Annexure V ), safety code (Annexure IV hereto) Preamble &  
BOQ collectively referred to as “ the said conditions”. The works shown upon the said



drawings & described in the said such sum as may be ascertained to be payable to the contractor in terms of the bills of Quantities & sum is estimated to be Rs..... (Rupees.....) hereinafter referred to as the said contract amount.

NOW IT IS HEREBY AGREED AS FOLLOWS:

- a) In consideration of the said contract sum to be paid by the Employer in the manner set for in the said conditions execute and complete the work shown in the said drawings as described in the said specifications and schedule of quantities.
- b) The Employer / Bank shall pay the Contractor the said sum or such other sums as shall become payable hereunder at the times and in the manner specified in the said conditions.
- c) Tender documents containing Notice to the Contractors, Conditions of Contract, Appendix thereto, Special conditions of Contract, Specifications and Schedule of Quantities with the rates entered therein, shall be read and studied as forming part of this agreement and the parties hereto shall respectively abide by and submit themselves to conditions and stipulations and perform the agreements on their part respectively contained in said conditions.
- d) This contract is neither a Fixed Lump sum Contract nor a Piece Work Contract, but is a Contract to carry out work in respect of the entire work to be paid for according to actual measured quantities at the rates contained in the schedule of rates and probable quantities or as provided in the said conditions.
- e) The Employer / Bank on his own reserves to himself the right of altering the drawings and nature of the work of adding to or omitting any items of work or having portions of the same carried out without prejudice to this contract.
- f) (a) The contractors represent that they have experienced and competent staff which will enable them to ensure proper quality check on the materials, whether brought by the Contractors or supplied by the Employer to the Contractors, further the Contractors will carry out proper test as required by the specifications and will supervise the day-to-day working and execution of the contract works.  
(b) If the Contractors have any doubt about the quality of any materials or any difficulty in supervision of the day-to-day work, it shall be the duty of the contractors to report the matter in writing forthwith to the Architect and, for the time being, to suspend that portion of the work about which difficulty is experienced. The Contractors will abide by the direction of the Architect.  
(c) The Contractors are aware though the Architect representative will supervise the work weekly this will not absolve the contractors to perform their obligations under Sub-Clause (a) & (b) above.  
(d) The Contractors covenant and warrant that completed items of work as well as the entire work on completion will be in conformity with the specifications and the terms and conditions of this contract and will be of quality and description as contained in contract.
- g) Time shall be considered as the essence of this Agreement and the Contractors hereby agrees to commence this work soon after the site is handed over to him as provided for in the said conditions and to complete the entire work within \_\_\_\_\_ subject, nevertheless, to the provisions of extension of time as contained in the said condition.

- h) This agreement and Contract shall be deemed to have been made in Mumbai and any questions or dispute arising out or in any way connected with this Agreement and Contract shall be deemed to have arisen, in Mumbai and only the Court in Mumbai shall have arisen, in Mumbai and only the Court in Mumbai shall have jurisdiction to determine the same.

Contractors have to make all the arrangements for getting required permission/passes for the Labour connected with the project, prior to commencement of the work from the Bank's Authority.

All the debris lying at site shall be properly stocked and disposed off from time to time, as stipulated in the conditions of the Bank.

Signed/Sealed and delivered by the State Bank of India by the hand of

Shri .....

.....

(Name & Designation)

.....

(EMPLOYER)

In the presence of

Witness No. 1 .....

Witness No. 2 .....

Signed Sealed and delivered by

.....

.....

CONTRACTOR

In the presence of

Witness No. 1 .....

Witness No. 2 .....

SECTION – IV  
FORM OF TENDER

The Asstt General Manager,  
STATE BANK OF INDIA  
ZONE-II  
**PUNE CITY**

Name of work :               Electrical work for proposed branch office of State Bank of India at  
TALEGAON BRANCH , PUNE .

Sir,

1       Having visited the site and examined the drawings, conditions of contract, Special Conditions or Contract, General Specifications and Detailed Specification Schedule and bill of Quantities for the construction of the above named works. We offer to construct complete and maintain in the whole of the said works in conformity with the said the Drawings, Conditions, of Contract, Specification Schedules and Bill of Quantities for the sum stated in Bill of Quantities of this Tender document or such other sum as may be ascertained in accordance with the said conditions of Contract.

2       We undertake to complete and deliver the whole of the works comprised in the contract within the time stated in the Appendix hereto.

3       We have independently considered the amount of Liquidated Damages shown in the Appendix hereto and agree that it represents a fair estimate of the loss likely to be suffered by you in the event of the works not being completed in time.

4       We agree to abide by this Tender for the period of 90 days from the opening of Envelope 2 of extensions-thereof as required by the employer from the date fixed for receiving the same and it shall remain binding upon us and may be accepted at any time before the expiry of that period.

5       We confirm that the period and rates as referred in the agreement or in General Conditions of Contract are given or summarized in the appendix here to, to which we give our consent and agree to abide by the same.

6       If this tender is accepted, we undertake to enter into and execute at our cost, when called upon by the employer to do so, a contract agreement in the prescribed form. Unless and until a formal Agreement is prepared and executed this tender together with your written acceptance thereof, shall constitute a binding Contract between us.

7 We understand that if our Tender is accepted, we are to be jointly and severely responsible for the due performance of the Contract.

3.8 We understand that you are not bound to accept the lowest or any tender you may receive and may reject all or any tender, accept or entrust the entire work to one Contractor or divide the work to more than one contractor without assigning any reason or giving any explanation what so ever.

Dated this \_\_\_\_\_ day of \_\_\_\_\_ 20

Signature \_\_\_\_\_ in the capacity duly authorised to sign  
tenders for and on behalf of \_\_\_\_\_

Signature & seal of the Tenderer

## SECTION – V GENERAL CONDITIONS OF CONTRACT

Except where provided for in the description of the individual items in the schedule of the quantities and in the specifications and conditions laid down hereinafter and in the Drawings, the work shall be carried as per standard specifications and under the direction of the Bank's engineer.

### 5.1 INTERPRETATION

In constructing these conditions, the specifications the schedule of quantities, tender and Agreement, the following words shall have the meaning herein assigned to them except where the subject or context otherwise requires:

i) Bank: The term Bank shall mean State Bank of India with their office at Bandra Kurla Complex, Bandra (East), Mumbai 400 051 and any of its employees or representative authorized to act on its behalf.

iii) Engineer: The term means Engineer of the Bank deployed to look after the work.

v) Contractor: The term contractor shall mean

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(Name & Address of the Contractor) and his / their heirs, legal representative assigns and successors.

vi) Site : The site shall mean the site where works are to be executed as shown within boundary on the site plan including any building and erections thereon allotted by the Bank for the contractors use,

vii) Drawings : The work is to be carried out in accordance with drawings, specification, the Schedule of quantities and any further drawings which may be supplied or any other instruction, which may be given by the BANK during the execution of the work.

All drawings relating to work given to the contractor together with a copy of schedule of quantities are to be kept at site and the bank shall be given access to such drawings or schedule of quantities whenever necessary.

In case any detailed drawings are necessary, contractor shall prepare such detailed drawings and /or dimensional sketches thereof and have it confirmed by the Employer / Architects prior to taking up such work.

The contractor shall ask in writing for all clarifications on matters occurring anywhere in drawings, specifications and schedule of quantities or to additional instructions at least 10 days ahead from the time when it is required for implementation so that the Employer may be able to give decision thereon.

viii) "The works" shall mean the work or works to be executed or done under this contract.

ix) "Act of Insolvency" shall mean any act as such as defined by the Presidency Towns Insolvency Act or in Provincial Insolvency act or any amending statutes

x) "The Schedule of Quantities" shall mean the schedule of quantities as specified and forming part of this contract.

xi) "Price Schedule of Quantities" shall mean the schedule of quantities duly priced with the accepted quoted percentage of the contractor.

xii) Orders of precedence for any ambiguity in the schedule of quantities, general conditions, special conditions, specifications and drawings for the contractor shall be as per the decision of the employer and the same will be binding on the contractor, and shall be read as under in the decreasing order of importance:

1. Schedule of quantities.
2. Drawings.
3. Special Conditions.
4. General Conditions.
5. Technical Specification of contract.
6. CPWD Specifications.
7. Bureau of Indian Standards Specifications.
8. State PWD/General Engineering practice.

Any ambiguity observed shall be brought to the notice of Employer / Architects and be executed after obtaining approval from the Employer / Architects.

## 5.2 SCOPE

The work consists of Electrical work at ..... for State Bank of India, in accordance with the "drawings" and "Schedule of Quantities" issued for electrical work etc. within the scope of this tender. It includes furnishing all materials, labour, tools and equipment and management necessary for, and incidental to the construction and completion of the work. All work, during its progress and upon completion shall conform to the lines, elevations and grades as shown on the drawings furnished by the Employer. Should any detail essential for efficient completion of the work be omitted from the drawings and specifications it shall be the responsibility of the contractor to inform the Employer and to furnish and Install such detail with Employer's concurrence so that upon completion of the proposed work the same will be acceptable and ready for use.

Employer may in their absolute discretion issue further drawings and/or written instructions, details, directions and explanations, which are hereafter collectively, referred to as "The Employer's instructions" in regards to:

- i) The variation or modification of the design, quality or quantity of works or the addition or omission or substitution of any work.
- ii) Any discrepancy in the drawing or between the Schedule of Quantities and / or drawings and /or specification.
- iii) The removal from the site of any defective material brought thereon by the contractor and the substitution of any other material thereof.
- iv) The demolition removal and /or re-execution of any work executed by the contractor's.
- v) The dismissal from the work of any persons employed thereupon.
- vi) The opening up for inspection of any work covered up.
- vii) The rectification and making good of any defects under clauses hereinafter mentioned and those arising during the maintenance period (retention period).

The Contractor shall forthwith comply with and duly execute any work comprised in such Employer's institutions, provided always that verbal instructions, directions and explanations given to the contractor's or his representative upon the works by the Employer shall if involving a variation be confirmed in writing to the contractor(s) within seven days. No work

for which rates are not specifically mentioned in the priced schedule of quantities, shall be taken up without written permission of the Employer.

Rates of items not mentioned in the priced schedule of quantities shall be fixed by the employer in consultation with the Architects as provided in Clause "Variations".

### 5.3 TENDERER SHALL VISIT THE SITE

Intending tenderer shall visit the site and make, himself thoroughly acquainted with the local site conditions, nature and requirements of the works, facilities of transport conditions, effective labour and materials, access and storage for materials and removal of rubbish. The tenderer shall provide in their tender for cost of carriage, freight and other charges as also for any special difficulties and including police restriction for transport etc. for proper execution of work as indicated in the drawings. The successful tenderer will not be entitled to any claim of compensation for difficulties faced or losses incurred on account of any site conditions which existed before the commencement of the work or which in the opinion the Employer might be deemed to have reasonably been inferred to be so existing before commencement of work.

### 5.4 TENDERERS

The entire set of tender paper issued to the tenderer should be submitted duly proved and also signed on the last page together with initials on every page. Initial / signature will indicate the acceptance of the tender papers by the tenderers.

The schedule of quantities shall be filled in as follows :

- i) The rates column to be legibly filled in ink in both English figures and English words,
- ii) Amount column to be filled in figures for each item and the amount for each sub head as detailed in the "Schedule of Quantities".
- iii) All corrections are to be initialled.
- iv) The rate Column for alternative items shall be filled up. \_
- v) The "Amount" Column for alternate items of which the quantities are not mentioned shall not be filled up.
- vi) In case of any error / omissions in the quoted rates, the rates given in the tender marked "original" shall be taken as correct rates.

No modification over writings or corrections can be made in the tender papers by the tenderer, but he may at his option offer his comments or modifications in a separate sheet of paper attached to the original tender papers.

The bank reserves the right to reject the lowest or any tender and also to discharge any / or all of the tenders for each section or to split up and distribute any item of work to any specialist firm or firms, without assigning any reason.

The bank reserves the right to accept the tender in full or in part and the tenderer shall have no claim for revision of rate or other conditions if his tender is accepted in parts.

The tenderers should note that the tender is strictly on the item rate basis and their attention is drawn to the fact that the rates for each and every item should be correct, workable and self-supporting. If called upon by the Employer detailed Analysis of any or all the rates shall be submitted by the Contractor. The Employer shall not be bound to recognize the contractor's analysis.

The work will be paid for as "measured work" on the basis of actual work done and not as lump sum" contract.

The items of work described in the schedule of quantities are to be deemed and paid as complete works in all respects and details including preparatory and finishing works involved

directly related to and reasonably detectable from the drawings, specifications and schedule of quantities and no further extra charges will be allowed in this connection. In the case of lump sum charges in the tender in respect of any item of works, the payment of such items of work will be made for the actual work done on the basis of lump sum charge as will be assessed to be payable by the employer.

The employer has power to add to, omit from any works as shown in drawings or described in specifications or included in schedule of quantities and intimate the same in writing but no addition, omission or variations shall be made by the contractor without authorisation from the Employer. No variations shall vitiate the contract.

The tenderer shall note that his tender shall remain open for consideration for a period of 90 days from the opening of the tender.

#### 5.7 GOVERNMENT AND LOCAL RULES

The contractor shall confirm to the provisions of local bye-laws and Acts relating to the work and to the regulations etc. of the Government and Local authorities and of any company with whose system the structure is proposed to be connected. The contractor shall give all notices required by said Act, Rules, Regulations and Bye-Laws etc. Contractor will assist the Architect for getting approval and no objection certificate from local authority for their scope of work and pay all fees, and pay all fee payable to such authority / authorities for execution of the work involved. The cost, if any, shall be deemed to have been included in his quoted rates, taking into account all liabilities for licenses, fees for footpath encroachment and restorations etc. He will indemnify the Employer against such liabilities and shall defend all actions arising from such claims on liabilities.

#### 5.8 TAXES AND DUTIES

The tenderer agrees that the unit rates quoted by him are net for finished, completed and commissioned work. All cost inputs of Materials, Labour, Taxes, Duties, Freight, Octroi, Plant and Machinery, Royalty, financial and administrative charges etc., other overheads, profits and all other items (consumables and non-consumables) as required are deemed to have been taken into account and included as applicable for execution of work. The Employer shall hold the contractor responsible for non-payment of tax in time.

#### 5.9 PROVISIONAL SUM (P.S.)

All provisional sums described in the schedule of quantities as P.S. shall be exclusively allotted to the purchase of materials and not for any handling and fixing to be done by the contractor. Such costs of handling & fixing with profit (including transport charges if required) shall be separately included in the contract price as described in the schedule of quantities. The disposal of the amounts covered under this head will be absolutely at the discretion of the bank. Contractor is to make payments for these materials to the suppliers on certificate or order issued by the Employer and realize them through his bills from the bank.

#### 5.10 QUANTITY OF WORK TO BE EXECUTED

The quantities shown in the schedule of Quantities are intended to cover the entire new structure indicated in the drawings but the employer reserves the right to execute only a part or the whole or any excess thereof without assigning any reason thereof.

#### 5.11 OTHER PERSONS ENGAGED BY THE EMPLOYER

The bank reserves the right to execute any part of the work included in this contract by other Agency or persons and contractor shall allow all reasonable facilities and use of his scaffolding for the execution of such work. The main contractor shall extend all co-operation.

#### 5.13 CONTRACTOR TO PROVIDE EVERYTHING NECESSARY

The contractor shall provide everything necessary for the proper execution of the work



according to the intent and meaning of the drawings, schedule of quantities and specifications taken together whether the same may or may not be particularly shown as described there in provided that the same can reasonably be inferred there from and if the contractor finds any discrepancies there in he shall immediately and in writing refer the same to the Employer whose decision shall be final and binding. The contractor shall provide himself for ground and fresh water for carrying out of the works at his own cost. The Employer shall on no account be responsible for the expenses incurred by the contractor for hired ground or water obtained from elsewhere. The water to be tested and approved before use.

The rates quoted against individual item will be inclusive of everything necessary to complete the said items of work within the contemplation of the contract, and beyond the unit price no extra payment will be allowed for incidental or contingent work, labour and / or materials inclusive of all taxes and duties whatsoever except for specific taxes / items, if any, stipulated in the tender documents.

The contractor shall supply, fix and maintain at his own cost, for the execution of any work, all tools tackles, machinery and equipments and all the necessary centering, scaffolding, staging, planking, timbering, structuring, shorting, pumping, fencing, boarding, watching and lighting by night as well as day required not only for the proper execution and protection of the said work but also for the protection of the public and safety of any adjacent roads, streets, walls, houses, buildings., all other erections, matters and things and the contractor shall take-down and remove any or all such centering, scaffolding, planking, timbering, structuring, shorting etc as occasion shall be required or when ordered to do so and shall fully reinstate and make good all matters and things disturbed during the execution of works to the satisfaction of the Bank.

The contractor shall at all times give access to workers employed by the bank or any men employed on buildings and to provide such parties with proper, sufficient and if required special scaffolding, hoists and ladders and provide them with water and lighting and leave or make any holes, grooves etc., in any work, where directed by the employer as may be required to enable such workmen to lay or fix pipes, electrical wiring, special fittings etc. The quoted rates of the tenders shall accordingly include all these above-mentioned contingent works.

#### 5.14 TIME OF COMPLETION, EXTENSION OF TIME & PROGRESS CHART

##### 5.14.1 TIME OF COMPLETION

The entire work is to be completed in all respects within the stipulated period as mentioned in this tender. The date of commencement will be SEVEN days from the date of acceptance issued to the contractor or the day on which contractor is instructed to take possession of site, whichever is later. Time is the essence of the contract and shall be strictly observed by the contractor.

The work shall not be considered as completed until the bank have certified in writing that work has been completed and the Defects Liability Period shall commence from the date of such certificate.

##### 5.14.2 EXTENSION OF TIME

If, in the opinion of the Employer / Architect the work be delayed under the force majeure conditions namely,

a) by reason of any exceptionally inclement weather, or b) by reason of instructions from the Employer in consequence of proceedings taken or threatened by or disputes, with adjoining or neighbouring owner or ( c) by the works, or delay, of other contractors or tradesmen engaged or nominated by the Employer and not referred to in the specification or (d) by reason of any authorised extra and additions or (e) by reason of any combination of workmen or strikes or lock-out affecting any of the building trades or (f) from other cause which the Employer may consider are beyond the control of the contractor, the Employer at the completion of the time allowed for the contract, shall make fair and reasonable extension of

the time for completion in respect therefor. In the event of the Employer failing to give possession of the site upon the day specified above the time of completion shall be extended suitably.

In case of such strikes or lock outs, as are referred to above, the contractor shall, immediately give the Employer, written notice thereof. Nevertheless, the contractor shall use his best endeavours all that to prevent delay, and shall do all that may be reasonably required, to the satisfaction of the Employer to proceed with the work and on his doing so that it will be ground of consideration by the Employer for an extension of time as above provided. The decision of the Employer as to the period to be allowed for an extension of time for completion hereunder (which decision shall be final and binding on the contractor) shall be promulgated at the conclusion of such strike or lock out and Employer shall then, in the event of an extension being granted, determine and declare the final completion date. The provision in clause 5.15 with respect to payment of liquidated damages shall, in such case, be read and construed as if the extended date fixed by the Employer were substituted for the damage shall be deducted accordingly.

#### 5.14.3 PROGRESS OF WORK

During the period of construction the contractor shall maintain proportionate progress on the basis of a programme chart submitted by the contractor immediately before commencement of work and agreed to by the Employer / Architect. Contractor should also include planning for procurement for scarce material well in advance and reflect the same in the programme chart so that there is no delay in completion of the Project.

#### 5.15 LIQUIDATED DAMAGES

Should the work be not completed to the satisfaction of the bank within the stipulated period, the contractor shall be bound to pay to the Employer a sum calculated as given below by way of liquidated damages and not as penalty during which the work remain uncommenced or unfinished after the expiry of the completion date.

0.5% of the tendered amount shown in the tender per week subject to ceiling of 10.0% of the accepted contracted sum.

#### 5.16 TOOLS, STORAGE OF MATERIALS, PROTECTIVE WORKS AND SITE OFFICE REQUIREMENTS

The contractor shall provide, fix up and maintain in an approved position proper office accommodation for the contractor's representative and staff, which offices shall be open at all reasonable hours to receive instruction notices or communications and clear away on completion of the works and make good all work disturbed.

All drawings maintained on the site are to be carefully mounted on boards of appropriate size and covered with a coat of approved varnish. They are to be protected from ravages of termites, ants and other insects.

The contractor shall provide at his own cost all artificial light required for the work and to enable other contractor and sub-contractor to complete the work with in the specified time. The contractor shall provide a suitable temporary hut for the watchmen and clear away the same when no longer required and to provide all necessary attendants, lights, etc., required.

The contractor shall arrange for temporary latrines for the use of workers and field staff and keep the same in a clean and sanitary condition to the satisfaction of the public health authorities and shall cause such latrines and soil to be cleared away whenever necessary and shall make good all the works distributed by these conveniences.

Every precaution shall be taken by the contractor to prevent the breeding of mosquitoes on the works during the construction, and all receptacles, cisterns, water tanks etc., used for the

storage of water must be suitably protected against breeding of mosquitoes. The contractor shall indemnify the Employer against any breach of rules in respect of anti-material measures.

The contractor shall not fix or place any placards or advertisement of any description or permit the same to be fixed or placed in or upon any boarding, gantry, building structure other than those approved by the Employer.

#### Protective Measures

The contractor from the time of being placed in possession of the site must make suitable arrangements for watching, lighting and protecting the work, the site and surrounding property by day, by night, on all days including Sundays and other holidays.

Contractor shall indemnify the employer against any possible damage to the building, roads, or member of the public in course of execution of the work.

The contractor shall provide necessary temporary enclosures, gates, entrances, etc., for the protection of the work and materials and for altering and adopting the same as may be required and removing on completion of the works and making good all works disturbed.

#### Tools

The steel and metallic tapes and all other surveying instrument found necessary on the works shall be provided by the contractor for the due performance of his contract as instructed by the Site Engineer.

All measuring tapes shall be of steel and suitable scaffolding and ladders that may be required for safely taking measurement and shall be supplied by the contractor.

Engineer will use any or all measuring instruments or tools belonging to the contractors as he chooses for checking the works executed or being executed on the contract.

The contractor should cover in his rates for making provisions for all reasonable facilities for the use of his scaffolding, tools and plant etc., by sub-contractors for their work.

### **5.17 NOTICE AND PATENTS OF APPROPRIATE AUTHORITY & OWNERS**

The contractor shall confirm to the provisions of any Acts of the Legislature relating to the work, and to the Regulations and Bye-Laws of any authorities, and / or any water, lighting and other structures were proposed to have constructed and shall before making any variations from the drawings or specification that may be associated to so confirm, give the Employer / Architects written notices specifying the variations proposed to be made and the reasons for making them apply for instruction thereon. The employer on receipt of such intimation shall give a decision within a reasonable time.

The contractor/s shall arrange to give all notices required for by the said Act, Regulations or Bye-laws to be given to any authority, and to pay to such authority or to any public officer all fees that may be properly chargeable in respect of the work and lodge the receipts with the Employer.

The contractor shall indemnify the Employer against all claims in respect of patent rights, royalties, damages to buildings, roads or member of public in course of execution of work shall keep the Employer saved harmless and indemnified in all respects from such actions, costs and expenses.

### **5.18 CLEARING SITE AND SETTING OUT WORKS**

The site shown on the plan shall be cleared of all obstructions, loose stone, and materials rubbish of all kinds. All holes or hollows whether originally existing or produced by removal or loose stone or materials shall be carefully filled up with earth well rammed and leveled off as

directed at his own cost.

The contractor shall set out the works and shall be responsible for the true and perfect setting out of the work and for the correctness of the positions, levels, dimensions and alignment of all parts thereof. If at any time any error shall appear during the progress of any part of the work, the contractor shall at his own expenses rectify such error, if called upon to the satisfaction of the bank. The contractor shall further set out the works to the alternative positions at the site until one is finally approved and the rates quoted in his tender should include for this and no extra on this account will be entertained.

#### 5.19 CONTRACTOR IMMEDIATELY TO REMOVE ALL OFFENSIVE MATTERS

All soil, filth or other matters of any offensive nature taken out of any trench, sewer, drain, cesspool or other place shall not be deposited on the surface but shall be at once carted away by the contractor or a place provided by him.

The contractor shall keep the foundations and works free from water and shall provide and maintain at his own expenses electrically or other power driven pumps and other plant to the satisfaction of the Employer for the purpose, until the building is handed over to the Employer. The contractor shall arrange for the disposal of the water so accumulated to the satisfaction of the Employer / Architect and the local authority and no claims will be entertained afterwards if he does not include in his rates for the purpose.

#### 5.20 ACCESS

Any authorised representative of the Employer shall at all reasonable times have free access to the works and / or to the workshops, factories or other places where materials are being prepared or constructed for the work and also to any place where the materials are lying or from where they are being obtained and the contractor shall give every facility to the employer or their representatives necessary for inspection and examination and test of the materials and workmanship. Except the representatives of the Employer no person shall be allowed at any time without the written permission of the Employer.

#### 5.21 MATERIALS, WORKMANSHIP, SAMPLES, TESTING OF MATERIALS.

All the works specified and provided for in the specifications or which may be required to be done in order to perform and complete any part thereof shall be executed in the best and most workman like manner with materials of the best and approved quality of respective kinds in accordance the particulars contained in and implied by the specifications and as represented by the drawings or according to such other additional particulars and instructions as may from time to time given by the Employer during the execution of the work , and to his entire satisfaction.

If required by the Employer the contractor shall have to carry out tests on materials and workmanship in approved materials testing laboratories or as prescribed by the Employer at his own cost to prove that the materials etc., under test confirm to the relevant I.S. standards or as specified in the specification. The necessary charges for the preparation of mould (in case of concrete cube ) transporting , testing etc., shall have to be borne by the contractor. No extra payment on this account would in any case be entertained.

All the materials (except where otherwise described) stores and equipment required for the full performance of the work under the contract must be provided through normal channels and must include charge for import duties, sales tax, octroi and other charges and must be the best of their kind available and contractors must be entirely responsible for the proper and efficient carrying out of the work. The work must be done in the best workmanlike manner. Samples of all materials to be used must be submitted to the Employer when so directed by the Engineer and written approval from Employer must be obtained prior to placement of order.

During the inclement weather the contractor shall suspend concreting and plastering for such time as the Employer may direct and shall protect from injury all work when in course of execution. Any damage (during constructions) to any part of the work for any reasons due to rain, storm or negligence of contractor shall be rectified by the contractor in an approved manner at no extra cost.

Should the work be suspended by reason of rain, strike, lock-out or any other cause, the contractor shall take all precautions necessary for the protection of work and at his own expenses shall make good any damage arising from any of these causes.

The contractor shall cover up and protect from damage from any cause, all new work and supply all temporary doors, protection to windows, and any other requisite protection for the execution of the work whether by himself or special tradesmen or sub- contractor and any damage caused must be made good by the contractor at his own expenses.

#### 5.22 REMOVAL OF IMPROPER WORK

The Employer shall during the progress of the work have power to order in writing from time to time the removal from the work within such reasonable time or times as may be specified in the order of any materials which in the opinion of the Employer are not in accordance with specification or instructions, the substitution or proper re-execution of any work executed with materials of workmanship is not in accordance with the drawings and specification or instructions. In case the contractor refuses to comply with the order, the Employer shall have the power to employ and pay other agencies to carry out the work and all expenses consequent thereon or incidental thereto as certified by the Employer shall be borne by the contractor or may be deducted from any money due to or that may become due to the contractor.

#### 5.24 CONTRACTOR'S EMPLOYEES

The contractor shall employ technically qualified and competent supervisors for the work who shall be available (by turn) throughout the working hours to receive and comply with instructions of the Employer / Architects. The contractor shall engage at least one experienced Engineer as site- in- charge for execution of the work. The contractor shall employ in connection with the work persons having the appropriate skill or ability to perform their job efficiently.

The contractor shall employ local labourers on the work as far as possible. No labourer who is below the age of sixteen years and who is not an Indian National shall be employed on the work.

Any labourer supplied by the contractor to be engaged on the work on day- work basis either wholly or partly under the direct order or control to the Employer or his representative shall be deemed to be a person employed by the contractor.

The contractor shall comply with the provisions of all labour legislation including the requirements of:

1. The payment of Wages Act.
2. Employer's Liability Act.
3. Workmen's Compensation Act.
4. Contract Labour (Regulation & Abolition) Act. 1970 and Central Rules, 1971
5. Apprentices Act. 1961.
6. Minimum wages act.
7. Any other Act or enactment relating thereto and rules framed there under from time to time

The contractor shall keep the Employer saved, harmless and indemnified against claims, if any, of the workmen or any other person and all costs and expenses as may be incurred by the Employer in connection with any claim that may be made by any workmen or

any other person. The contractor shall comply at his own cost with the order of requirement of any Health officer of the State or any local authority or of the Employer regarding the maintenance of proper environmental sanitation of the area where the contractor's labourers are housed or accommodated, for the prevention of small pox, cholera, plague, typhoid, malaria and other contagious diseases. The contractor shall provide, maintain and keep in good sanitary condition adequate sanitary accommodation and provide facilities for pure drinking water at all times for the use of men engaged on the works and shall remove and clear away the same on completion of the work. Adequate precautions shall be taken by the contractor to prevent nuisance of any kind on the works or the lands adjoining the same.

The contractor shall arrange to provide first- aid treatment to the labourers engaged on the works. He shall within 24 hours of the occurrence of any accident at or about the site or in connection with execution of the works, report such accident to the Employer and also to the competent authority where such report is required by law.

#### 5.25 DISMISSAL OF WORKMEN

The contractor shall on the request of the Employer immediately dismiss from works any person employed thereon by him, who may in the opinion of the Employer be unsuitable or incompetent or who may misconduct himself. Such discharges shall not be the basis of claim for compensation or damages against the Employer or any of their officer or employee.

#### 5.26 ASSIGNMENT

The whole of the work included in the contract shall be executed by the contractor and the contractor shall not directly or indirectly transfer, assign or sublet the contract or any part, share or interest therein, nor shall take a new partner, without written consent of the Employer and no subletting shall relieve the contractor from the full and entire responsibility of the contract or from active superintendence of the work during their progress.

#### 5.27 DAMAGE TO PERSONS AND PROPERTY INSURANCE ETC.

The contractor shall be responsible for all injury to the worker or workmen or persons, animals or things and for all damages to the project work, materials, equipments, structural and / or decorative part of property which may arise from the operations or neglect of himself or of any sub-contractor or any of his or a sub-contractor's employees whether such injury or damage arise from carelessness, accident or another cause whatsoever in any way connected with the carrying out of this contract. The clause shall be held to include inter-alia, and any damage to roads, streets, footpaths or ways as well as damages caused to the buildings and the works forming the subject of this contract by rain, wind or other inclemency of the weather. The contractor shall indemnify the Employer and hold harmless in respect of all and any expenses arising from any such injury or damages to persons or property as aforesaid and also in respect of any claim made in respect of injury or damage under any acts of compensation or damage consequent upon such claim.

The contractor shall reinstate, rectify and remedy all damage of every sort mentioned in this clause, so as to deliver the whole of the contract works complete and perfect in every respect and so as to make good or otherwise satisfy all claims for damage to the property of third parties.

The contractor shall effect the insurance necessary and indemnify the Employer entire from all responsibility in this respect. The insurance must be placed with a company approved by the Employer and must be effected jointly in the name of the contractor and the Employer and the policy lodged with the latter. The scope of insurance is to include damage or loss to the contract itself till this is made over in a complete state. Insurance is compulsory and must be effected from the very initial stage. The contractor shall also be responsible for anything, which may be excluded from damage to any property arising out of incidents, negligence or defective carrying out of this contract.

The Employer shall be at liberty and hereby empowered to deduct the amount of any damages, compensations, costs, charges and expenses arising or accruing from or in respect of any such claim or damages from any sums including the total security deposit due or to become due to the contractor.

#### 5.29 ACCOUNTS, RECEIPT & VOUCHERS

The contractor shall, upon the request of the Employer furnish them with all the invoices, accounts, receipts and other vouchers that they may require in connection with the work under the said contract. If the contractor shall use materials less than what he is required under the contract, the value of the difference in the quantity of the materials he was required to use and that he actually used shall be deducted from his dues. The decision of the employer shall be final and binding on the contractor as to the amount of materials the contractor is required to use for any work under this contract.

#### 5.30 MEASUREMENT OF WORK

Before taking any measurement of any work the site Engineer or a subordinate deputed by him shall give reasonable notice to the contractor. If the contractor fails to attend at the measurements after such notice or fails to countersign or to record the difference within a week from the date of measurement in the manner required by the site Engineer then in any such event the measurements taken by the site Engineer or by the subordinate deputed by him as the case may be is final and binding on the contractor and the contractor shall have no right to dispute the same.

#### 5.31 PAYMENT

Advance against materials will not be paid. 70 % of the Running bills (Actual execution) will be paid. The balance payment shall be made after completion of the works and commissioning of the unit, including provision of all test reports, submission of 'As built' drawings, operation manuals etc.

Retention Amount of 8%, exclusive of EMD ( maximum 5% of tender value) shall be deducted from all RA Bills.

Retention Amount inclusive of EMD shall be released against virtual completion. The Retention Amount and EMD shall not carry any interest. Retention amount is 5% of the final value of the work.

#### FINAL PAYMENT

The period of final measurement will be 1 month from the date of completion of the work. The final bill shall be accompanied by a certificate of completion from the Employer, payment of final bill shall be made after deduction of Retention Money which sum shall be refunded after the completion of the Defects Liability period after receiving the Employer certificate has rectified all defects to the satisfaction of the Employer. The acceptance of payment of the final bill by the contractor would indicate that he will have no further claim in respect of the work executed

#### 5.32 VARIATION / DEVIATIONS

The contractor may when authorised and shall, when directed in writing by the employer and or omit, or vary the works shown in the drawings or described in the specifications or included in the priced schedule of quantities. The contractor on his own accord shall make no addition, omission or variation without such authorization or direction. A verbal authorization of direction by the Employer shall when confirmed correctly by the contractor in writing within 3 days shall be deemed to have been given in writing.

The contractor shall send to the Employer once in every month a statement giving particulars, as full and detailed as possible, of all claims for any additional payment to which the contractor may consider himself entitled and of all extra or additional work ordered by the employer which he has executed during the preceding month.

No final interim claim for payment for any such work or expense, will be considered which has not been included in such a statement provided always that the architect shall be entitled after taking employer's sanction to authorize payment to be made for any such work or expense, notwithstanding the contractor's failure to comply with this condition, if the contractor has at the earliest practicable opportunity, notified the architect in writing that he intends to make a claim for such work.

The rates for additional, altered, substituted work shall be arrived at in accordance with the following rules.

i) The net rates of prices in the contract schedule shall determine the valuation of (the rates for) the extra work (items) where such extra work is of similar character and is executed under similar conditions as the work priced therein.

ii) If the rates for the extra, altered or substituted (deviated) work are not provided for (available) in the schedule of quantities, they shall to the extent possible be derived out of rate given in that schedule for similar or near similar items. For the purpose of such deviation, where necessary and when so directed, the contractor shall furnish detailed analysis for the said similar or near similar items in the contract schedule. For such portions of the analysis, for the extra, altered, or substituted (deviated) work for which prices cannot be abstracted from the corresponding analysis of rates for the said similar or near similar items in the contract schedule, market rates substantiated by purchase bills / vouchers dependable printed price schedules of building materials of different types shall be adopted, using factors and constants for quantum's of materials, labour, T & P and sundries from standard analysis of rates adopted by National Building Organization, Ministry of Works & Housing, Govt. of India in preparation of all India Standard Scheduled of Rates, 1977 or analysis rates 1997 issued by Central Public Works Department and adding 15% towards profits and overheads. When called upon to do so the contractor shall submit the required purchase bill / vouchers.

iii) In respect of a course which incorporates more than one schedule, the rate applicable in case (i) above if not provided for in the schedule pertaining to the work in which the addition, alteration or substitution (deviation) occurs, shall be taken as the lowest applicable rate in other schedules. Similarly in case (ii) above if similar or near similar items cannot be found in the schedule pertaining to the work in which the addition, alteration or substitution (deviation) occurs, similar or near similar items from the other schedule shall be adopted.

iv) In the case of additional, altered or substituted (deviated) work for which rates cannot be reasonably derived as at (ii) and (iii) above, the rate shall be worked out adopting market prices, substantiated by purchase bill / vouchers., using factors and constant for quantum's of materials, labour, T & P and sundries from standard analysis of rates adopted by the National Building Organization, Ministry of Works & Housing, Govt. of India in preparation of all India Standard Schedule of Rates, 1977 and addition 15% towards profit and overheads. When called upon to do so the contractor shall submit his purchase bills/ vouchers to the architects and employer.

v) The question as to what particular items, being similar or near similar to the additional, altered or substituted (deviated) work in the contract schedule are to be adopted for deviation of rates for the additional altered or substituted (deviated) work and whether the said rates cannot be derived from similar or near similar items in the contract schedule will be decided by the Employer.

vi) In case (ii) to (iv) the contractor is required to submit his analysis of rates adopting the principle enunciated and the architect, after scrutinizing the analysis and other papers furnished will allow such rates as he consider reasonable after obtaining employer's sanctions,

vii) Where extra work is of such a nature that it cannot be properly measured or valued the contractor shall be allowed day work priced at the net rates stated in the tender or the priced scheduled of quantities or if not so stated then in accordance with the minimum local day



work rate and wage for the district notified by the concern Authority provided that in either case if required by the architects, vouchers, muster rolls and other documents, required for proper verification of the labour employed and the material deployed on the said work and cost thereof be delivered to the architect or his representative on or before the end of the week following that in which the work has been executed.

The question as to whether extra work is of such nature that it cannot be properly measured or valued will be decided by the architects and employer. The margin to be allowed on actual costs to the contractor towards profits and overhead shall be 15%.

#### 5.33 DEVIATION LIMIT FOR TENDER QUANTITIES 20%

The tender rates shall hold good for any increase in the tendered quantities upto variation of 20%. In case tender quantities of an individual item exceeds the deviation limit of 20%, the rates for excess quantities over and above the deviation limit shall be payable as per market rate analysis, substantiated by purchase vouchers / bill using constants only of material, labour, T & P etc. from All India Standard Analysis of rates published by NBO or Delhi Analysis of Rates 1997 issued by Central Public Works Department with 15% contractors profit and overheads. For non Schedule items, constant of material, labour, T & P etc, shall be decided by the Engineer-in-charge of Employer and Architect based on the actual observation at site.

#### SUBSTITUTION

Should the contractor desire to substitute any materials and workmanship, he / they must obtain the approval of the Employer in writing for any such substitution well in advance, Materials designated in this specification indefinitely by such terms as "Equal" or "Other approved" etc. specific approval of the Employer has been obtained in writing.

#### 5.34 PREPARATION OF BUILDING WORKS FOR OCCUPATION AND USE ON DEPLETION.

The whole of the work will be thoroughly inspected by the contractor and deficiencies and defects put right. On completion of such inspection the contractor shall inform the employer that he has completed the work and it is ready for inspection.

On completion, the contractor shall leave the entire building neat and clean and ready for immediate occupation and to the satisfaction of the employer.

#### 5.35 CLEARING SITE ON COMPLETION

On completion of the works, the contractor shall clear away and remove from the site all constructional plant, surplus materials, rubbish and temporary works of every kind and leave the whole of the site and the works clean and in a workman like condition to the satisfaction of the Employer & Architects.

#### 5.36 DEFECTS AFTER COMPLETION

The defects Liability period (D.P.L.) shall commence from the certified date of virtual completion issued jointly by the Employer. The contractor shall make good at his own cost and to the satisfaction of Employer all defects, shrinkages, settlements or other faults which may appear within 12 months after completion of the work. In default, the Employer may employ and pay other persons to amend and make good such damages, losses and expenses consequent thereon or incidental thereto shall be made good and borne by the contractor and such damages, loss and expenses shall be recoverable from him by the Employer or may be deducted by the employer in lieu of such amending and making good by the contractor deduct from any money due to contractor a sum equivalent to the cost of amending such work and in the event of the amount retained being insufficient, recover that balance from the contractor from the amount retained together with any expenses the Employer may have incurred in connection therewith.

#### 5.37 CONCEALED WORK

The contractor shall give due notice to the Employer whenever any work is to be buried in the earth, concrete in the bodies of walls or otherwise becoming inaccessible later on, in order that the work may be inspected and correct dimensions taken before such burial, in default whereof the same shall, at the option of the Employer be either opened up for measurement at the contractor's expense or no payment may be made for such materials. Should any dispute differences arise after the execution of any work as to measurements etc., or other matters which cannot be conveniently tested or checked, the notes of the Employer shall be accepted as correct and binding on the contractor.

#### 5.38 IDLE LABOUR

Whatever the reasons may be, no claim for idle labour, additional establishment cost of hire and labour charges of tools and plants would be entertained under any circumstances.

#### 5.39 SPECIALISTS WORKS

The Contractor shall get the L.T. panels and other panels fabricated from CPRI approved panel fabricator only. He will submit CPRI Test certificate of similar type panel Tested in last three years along with shop drawings of the panel. The shop drawings of panels will be submitted within 10 days from the date of award of work without extra charges.

#### 5.45 CONTRACT DRAWINGS GENERAL

Two copies of each of the drawings and one copy each of the conditions of the contract specification, trade preamble and bill of quantities will be provided for the use of the contractor who must satisfy himself as to the accuracy of the said copies in every detail and make all other copies necessary for the conduct of the works. Any comments on the drawings are to be given by the contractor within 7 days from receiving of drawings.

One copy of each drawing or sketch furnished to the contractor shall be kept in an office at the works and the Engineer or any person authorised by the Employer shall have free access to the drawings and sketches, whenever they desire.

#### 5.46 RIGHTS OF TECHNICAL SCRUTINITY BY CHIEF TECHNICAL EXAMINER

The work is liable to be technically audited by the Chief Technical Examiner appointed by Employer from time to time. Any defects, improvements or testing etc., pointed out by the chief technical examiner should be carried out by the contractor at his own cost and any deduction suggested by the CTE will be effected

The Employer shall have a right to cause a technical examination and audit of works and the final bills of the contractor including all supporting vouchers, abstract, etc., to be made at the time of payment of the final bill. If as a result of this examination or otherwise, any sum is found to have been over paid in respect of any work done by the contractor under the contract, the contractor shall be liable to return the amount of over payment and it shall be lawful for the employer to recover the same from him from any sum or sums due to him and in any other manner legally permissible and that it is found that the contractor was paid less than what was due to him under the contract in respect of any work executed by him under it, the amount of such under payment shall be duly paid by the Employer.

Any sum or money due and payable to the contractor (including Security deposit returnable to him) under this contract may be appropriated by the Employer for the payment of a sum of money arising out of or under any other contract made by the contractor with employer.

#### 5.47 WATCHING & LIGHTING

The contractor shall provide and maintain at his own expense all lights, guards, fencing and watching when and where necessary or required by the Architects and Employer for the protection of the works or for the safety and convenience of his employee on the works or the Public.

#### 5.49 SECURITY ARRANGEMENT

- a) Proper arrangements shall be made to keep all records under lock and key.
- b) It shall be ensured that the contractor provides for adequate fences, watch and ward and security of materials and plant.
- c) Movement of material, stores and plant, especially of those in which the Employer has got a financial interest or those, which influence progress of work, shall be strictly controlled. Checks shall be exercised at gate (entrance and exit shall be preferably through one gate only).
- d) When the work is completed and handed over to the user, the responsibility of the proper security arrangement shall rest with the users.

#### 5.50 WORKING HOURS

Site offices working hours shall normally be fixed as may be prevailing in the locality. Normally no construction work of important structural nature shall be carried out on Sundays, holidays and during the nights. In exceptional circumstances, however, the work may be carried out with proper approval of the site engineer who shall depute supervision staff to be present on such occasion.

#### 5.53 HANDING OVER BUILDING/PROJECT WORK TO THE EMPLOYER

Handing and taking over report and inventories/statement (in quadruplicate) at the time of handing over shall be prepared. The reports and inventories shall be signed by:

- (a) The contractor (Only the relevant papers.)
- (b) The Architect and
- (c) Competent authority in the Employer

The following inventories / statements shall be prepared;

- 1) Inventories of fixture & fitting of fixture & fittings of installations (electrical light fittings, fans, bells, air conditioners, and the like equipment & materials)
- 2) Surplus stores (like electrical goods including fans, tube light fixtures etc.) pending further instruction for disposal from higher authorities.
- 5) As Built Drawings, Information folders & test reports for executed work of electrical
- 6) The Engineer on behalf of the Employer associated with this operation, shall be apprised of the importance to carry out periodic inspections (at weekly interval) for defects not rectified or fresh ones that crop up and issuing notices for their rectification to the concerned contractor(s) and the final inspection just before the expiry of the defects liability period.

#### 5.54 DELINQUENCIES OF CONTRACTORS

Procedures for dealing with Delinquencies / Defaults / Misconduct Misdemeanors of Tenderers / Contractors.

- 1) The under noted delinquencies / defaults / misconduct / misdemeanors on the part of tenderer or enlisted contract will attract disciplinary action other
  - (a) Incorrect information about credentials, about his performance, equipment, resources technical staff etc.
  - (b) Irregular tendering practice.
  - (c) Revoking a tender without any valid reasons.
  - (d) Tardiness in commencing work.
  - (e) Poor organization at site & lack of his personal supervision.
  - (f) Ignoring Employer/Architect's notices for replacement / rectification of rejected materials, workmanship etc;
  - (g) Violating any of the important conditions of contract, like site facilities, insurance, labour laws etc;
  - (h) Lack of co-operation with nominated contractors or Employer's staff.
    - (i) Failure to satisfactorily rectify defects during Defects Liability period (DLP) and

discovery of latent defects in contractor's work after the expiry of DLP of his contract.

## SECTION VI

### SPECIAL CONDITION OF CONTRACT.

#### 6.1 MATERIAL PROVIDED BY EMPLOYER

i) The Employer reserve to themselves the right to provide certain materials as mentioned for the work at the time of awarding contract or during the progress of work and these shall be jointly inspected by the Engineer and Contractor before issue of materials. Suitability and sufficiency of the materials shall be checked by the contractor.

ii) After the materials are received, the contractor shall not decline to accept responsibility, for the proper quality, safety and sufficiency of the resulting work or structure by alleging defects of materials received from the Employer.

iii) The value of materials provided by the Employer shall be calculated at the prevalent market rates / invoice rate including all taxes, duties transportation, labour and other incidentals by the Engineer and the amount shall be deducted in full from the interim Bill of the contractor as and where applicable.

iv) For all Materials issued free of cost to the Contractor, the rates for such complete items shall be suitably modified / varied by the Engineer, unless otherwise provided for in the contract.

v) Wastage of extra quantity of materials used by the Contractor over and above the allowed quantity as determined by the Engineer shall be taken as unnecessary and unauthorized and such use / wastage shall be at the cost of the contractor.

vi) On loss or damage of any such materials, it shall be replaced by the Contractor with the same quality / brand with the approval of Engineer-or the value of such material would be recovered from interim bill of the contractor at the prevalent market rate, as would be appropriate in the opinion of the Engineer.

6.1.1 The contractor will be required to pay all taxes levied by the Central and or state Government on such part of his profit in respect of the contract as in chargeable therewith under the laws for the time being in force.

6.1.2 The contractor's staff will be liable to pay all taxes levied by the Central and or state Governments on such of their salaries as are chargeable there with under the laws for the time being in force and the contractor shall confirm such duties in regard to the deduction thereof as may be lawfully imposed on him.

#### 6.2 ELECTRICITY AND WATER

i) The contractor shall arrange on his own, the electric power required for carrying out work including operation and maintenance of generators of required capacity at his own cost. The Contractor shall be primarily responsible for ensuring uninterrupted supply of electric power as required for use in the works through out the construction period.

ii) The Contractor shall make his own arrangement for providing water required for an in connection with the works including adequate storage facilities at his cost. The Contractor shall ensure uninterrupted supply of water for all purpose and he shall be responsible to satisfy himself that the water arranged by him is fit for construction and consumption and he shall adequately treat such water whenever it is not found suitable for the said purpose.

6.3 If the proposed building is situated in residential area / commercial area and adjoining plot

has dilapidated structure. The contractor shall quote the rates after considering the following:

In view of the difficulties of stacking the materials at site, the Contractor should visit the site and should quote the rates after considering these and following conditions in mind. No extra payment will be made at any cost under any circumstances.

a. All material obtained from the dismantling shall be the property of Contract. Due care shall be taken to maintain the safety measures of these materials.

b. The work shall be carried out in such a way that no damage is caused to the adjoining work or to the property. Temporary enclosures/partitions shall be provided as directed by the Engineer in charge. No extra payments shall be made towards this.

c. Necessary precautions shall be taken to avoid dust/nuisance to public and other fellow occupiers.

d. The Contractor shall maintain / disconnect existing services, whether temporary or permanent where required by the Engineer-in-charge. No extra shall be payable on account of this.

6.4 No old/dismantled material shall be used by the Contractor in the contract work under any circumstances.

6.5 The contractor in consultation with the Employer shall prepare a work schedule programme in the form of a CPM Chart (indicating critical path) showing exactly the start and completion of various activities to be undertaken by the contractor in reference to his scope of work. This work schedule shall be submitted by the contractor through Consultant Architect within 7 days of receiving the work order and shall be updated by the contractor from time to time.

6.6

## SECTION - VII

### MEASUREMENT

#### MEASUREMENT OF BOOKS

1.1 The number of pages for measurements along shall be 100 per book. If convenient, the measurement book may be provided with perforated, in triplicate, for dispatch to concerned authorities. The pages shall be serially machine numbered. The book shall be in the custody of the site Engineer.

1.2 In addition to pages for measurements, pages shall be provided for index. Instructive, Certificate of condition (wholeness) of the Book and Record of handing and taking over.

1.3 Each book shall bear an identifying number.

1.4 Separate format of Measurement Book shall be used for recording measurement Books.

1.5 Stock register shall be maintained to show receipts and issues of Measurement Books.

#### 2.0 RECORDING OF MEASUREMENTS

2.1 The measurements shall be generally recorded by the site Engineer or by an employee of the Employer, specifically authorized for the purpose.

2.2 The site Engineer (or his representative) shall take joint measurement (i.e. accompanied by the contractor's authorized representative) of the work as it progresses and record them directly in the Measurement Books.

2.3 It shall be ensured that the method of measurement is in accordance with the contract.

- Any points of disagreement with the contractor pertaining to measurements shall be promptly referred to the decision of the competent authority.
- 2.4 Extra / deviated items, as claimed by the contractor, shall not be recorded in Measurement Book until they are approved by the Competent Authority.
- 2.5 In case some allegedly extra / deviated item is carried out by the contractor while complying with approved drawings and specifications, and the same is to be covered up, the Site Engineer shall check the item and its specification and record its measurements but simultaneously enter up the provision that admittance is subject to the approval by the competent authority. Both the measurements and the provision shall be got signed by the contractor.
- 2.6 The measurement Book shall not be handed over to the contractor at any time. The contractor or his representative may be permitted by the Site Engineer to see it in his presence and / or make a (concurrent) copy of his own. The contractor shall, however, be warned that his copy shall be regarded as an unofficial copy of the Employer's Measurement Book. This is the only authorized document in the matter.
- 2.7 The Measurement shall be signed at the end of each session measurement of the day's work, as the case may be, by both the parties (i. e. Measurer / Site Engineer and the contractor ).

### 3.0 CONCEALED WORK

The contractor shall give due notice to the Employer whenever any work is to be during in the earth, concrete or in the bodies of walls or otherwise, becoming inaccessible later on in order that the work may be inspected and correct dimensions taken before such burial. In default whereof the same shall, at the opinion of the Employer be either opened up for measurement at the contractor's expenses or no differences arises after the execution of any work as to measurements etc. or other matters which cannot be conveniently tested or checked, the notes of the employer shall be correct and binding on the contractor.

## SECTION - VIII

### SAFETY CODE SCAFFOLDS

- i) Suitable scaffolds shall be provided for workmen for all works that cannot safely be done from the ground, or from solid construction except in the case of short duration work which can be done safely from ladders. When a ladder is used, it shall be of rigid construction made either of good quality wood or steel. The steps shall have a minimum width of 450 mm and maximum rise of 300 mm. Suitable hand hold of good quality wood or steel shall be provided and the ladder shall be given an inclination not steeper than 1/ 4 to 1 ( 1/4 horizontal and 1 vertical ).
- ii) Scaffolding or staging more than 4 meter above the ground floor, swung or suspended from an overhead support or erected with stationery support shall have a guard rail properly bolted, braced or otherwise secured, at least 1 meter above the floor or platform of such scaffolding or staging.
- iii) Working platforms, gangways and stairway shall be so constructed that they do not sag unduly or unequally and if the height of the platform, gangway or stairway is more than 4 n above ground level or floor level, they shall be closely boarded and shall have adequate width

and be suitably fence as described in (ii) above.

iv) Every opening in the floor of a building or in a working platform shall be provided with suitable means to prevent the fall of persons or materials by providing suitable fencing of railing whose minimum height shall be 1 m.

Wherever there are open excavations in ground, they shall be fenced off by suitable railing and danger signals installed at night so as to prevent persons slipping into the excavations.

v) Safe means of access shall be provided to all working places. Every ladder shall be security fixed. No portable single ladder shall be over 9 m. in length while the width between side rails in rung ladder shall. In no case be less than 290 mm. For ladder up to and including 3 m. in length for longer ladders this width shall be increased at least 20 mm for each additional meter of length.

vi) A sketch of the ladders and scaffolds proposed to be used shall be prepared and approval of the Engineers obtained prior to construction.

#### OTHER SAFETY MEASURES

vii) All personnel of the contractor working within the plant site shall be provided with safety helmet. All welders shall wear welding goggles while doing welding work and all metal worker shall be provided with safety gloves. Persons employed on metal cutting and grinding shall wear safety glasses.

viii) Adequate precautions shall be taken to prevent danger from electrical equipment. No materials on any of the sites of work shall be so stacked or placed as to cause danger or inconvenience to any person or the public.

#### EXCAVATION & TRENCHING

ix) The contractor shall take all measures on the site of the work to protect the public from accidents and shall be bound to bear the expenses of defense of every suit, action or other proceeding at law that may be brought by any persons for injury sustained owing to neglect of the above precautions and to pay any such persons or which may with the consent of the contractor, be paid by compromise any claim by any such person.

#### DEMOLITION

x) Before any demolition work is commenced and also during the process of the work;

a) All road and open areas adjacent to the work site shall either be closed or suitably protected.

b) No electric cable or apparatus which is liable to be a source of danger over a cable or apparatus used by the operator shall remain electrically charged.

c) All practical steps shall be taken to prevent danger to persons employed from the risk of fire or explosion or flooding. No floor, roof or other part of the building shall be so over-loaded with debris or materials as to render it unsafe.

#### PERSONAL SAFETY EQUIPMENTS

xi) All necessary personal safety equipment as considered adequate by the Engineer should be kept available for the use of the person employed on the site and maintained in a condition suitable for immediate use, and the contractor should take to ensure proper use of equipment by those concerned.

a) Workers employed on mixing asphalted materials. Cement and lime mortars shall be provided with protective footwear and protective goggles.

b) Those engaged in while washing and mixing or stacking of cement bags or materials which is injurious to the eyes shall be provided with protective goggles.

- c) Those engaged in welding works shall be provide\*, with welder's protective eyesight lids.
- d) Stone breakers shall be provided with protective goggles and protective clothing and seated at sufficiently safe intervals.
- e) When workers are employed in sewers and manholes, which are in use, the contractor shall ensure that the manhole covers are opened and are ventilated at least for an hour before the workers are allowed to get into manholes and the manholes so opened shall be cordoned off with suitable railing and provided with warning signals or boards to prevent accident to the public.
- f) The contractor shall not employ men below the age of 18 years and women on the work of painting with products containing lead in any form. Whenever men above the age of 18 years are employed on the work of lead painting, the following precautions should be taken:
  - i) No paint containing lead or lead products shall be used except in the form of paste or ready made paint.
  - ii) Suitable face make should be supplied for use by the workers when paint is applied in the form of spray or a surface having lead paint dry rubbed and sc rapped.
  - iii) Overalls shall be supplied by the contractor to the workman and adequate facilities shall be provided to unable the working painters to during the cessation of work.
  - xii) When the work is done near any public place where there is risk of drawings all necessary equipments should be provided and kept ready for use and all necessary steps taken for prompt rescues of any person in danger and adequate provision should be made for prompt first aid treatment of all injuries likely to be sustained during the course of the work.

#### HOISTING MACHINE

- xiii) Use of hoisting machines and tackle including their attachments encourage and support shall confirm to the following standards or conditions:
  - 1) a) These shall be good mechanical constructions sound material and adequate strength and free from patent defect and shall be kept in good repair and in good working order.
  - b) Every rope used in hoisting or lowering materials or as means of suspension shall be of durable quality and adequate strength and free from patent defects.
  - 2) Every crane driver or hoisting appliance operator shall be properly qualified and no person under the age of 21 years shall be in charge of any hoisting machine including any scaffolding which or give signals to operator.
  - 3) In case of every hoisting machine and of every chain ring hook, shackle shovel and pulley block used in hoisting or as means of suspension the safe working load shall be ascertained by adequate means. Every hoisting machine and all gear referred to above shall be plainly marked with the safe working load, each safe working load and the conditions under which it is applicable shall be clearly indicated. No part of any machine or i ny gear referred to above in this paragraph shall be loaded beyond the safe working load except for the purpose of testing.
  - 4) In case of departmental machines, the safe working load shall be notified by the Engineer. As regards contractor's machines, the contractor shall notify the safe working load of the machine to the Engineer whenever he brings any machinery to site of work and get it verified by the Engineer concerned.



xiv) Motors, gearing, transmission, electric wiring and other dangerous parts of hoisting appliances should be provided with efficient safeguards, hoisting appliance should be provided with such means as will reduce to the minimum of the risk of any part of a suspended load becoming accidentally displaced. When workers are employed on electrical installations which are already energized, insulating mats, wearing apparel, such as gloves, selves and boots as may be necessary, should be provided. The workers should not wear any rings, watches and carry keys or other materials which are good conducts of electricity.

xv) All scaffolds, ladders and other safety devices mentioned or described herein shall be maintained in safe condition and no scaffold, ladder or equipment shall be altered or removed while it is in use.

Adequate washing facilities should be provided at or near places of work.

xvi) These safety provisions shall be brought to the notice of all concerned by display of a notice board at a prominent place at work spot. The person responsible for compliances of the safety code shall be named therein by the contractor.

xvii) To ensure effective enforcement the rules and regulations relating to safety precautions the arrangement made by the contractor shall be open to inspection by the Labour Officer, Engineers of the Department or their representatives.

xviii) Notwithstanding the above clause from (i) to (xvii), there is nothing in these to exempt the contractor from the operations of any other Act or Rule in force in the Republic of India.

#### Safety Code

1. First aid appliances including adequate supply of sterilized dressings and cotton wool shall be maintained in a readily accessible place.
2. An injured person shall be taken to a public hospital without loss of time, in cases where the injury necessitates hospitalization.
3. Suitable and strong scaffolds should be provided for workmen for all work that cannot safely be done from ground.
4. No portable single ladder shall be over 8 meters in length. The width between the side rails shall not be less than 30 cm (clear) and the distance between two adjacent rungs shall not be more than 30 cm. When a ladder is used an extra mazdoor shall be engaged for holding the ladder.
5. The excavated material shall not be placed within 1.5 meters of the edge of the trench or half of the depth of trench, whichever is more. All trenches and excavations shall be provided with necessary fencing and lighting.
6. Every opening in the floor of a building or in a working platform shall be provided with suitable means to prevent the fall of persons or materials by providing suitable fencing or railing, minimum height shall be one meter.
7. No floor, roof or other part of the structure shall be so overloaded with debris of materials as to render it unsafe.
8. Workers employed on mixing and handling material such as asphalts, cement mortar or concrete and lime mortar shall be provided with protective footwear and rubber hand gloves.
9. Those engaged in welding works shall be provided with welder's protective eye shields and gloves.
10. i) No paint containing lead or lead products shall be used except in the forms of paste or readymade paint.  
ii) Suitable face masks shall be supplied for use by the workers when the paint is applied in the form of spray or surface having lead paint dry rubbed and scrapped.

11. Overall shall be supplied by the Contractor to the painters and adequate facilities shall be provided to enable the working painters to wash during the period of cessation of work.
12. Hoisting machines and tackle used in the works, including their attachments, anchorage and support shall be in perfect condition.
13. The ropes used in hoisting or lowering material or a means of suspension shall be of durable quality and adequate strength and free from defects.

## SECTION -X GENERAL SPECIFICATIONS

### GENERAL;

These specifications are for work to be done, item to be supplied and materials to be used in the works as shown and denned on the drawings and described herein, to the satisfaction of the Owners / Architects.

1.1 The workmanship is to be the best possible and of a high standard. The contractor shall take all steps immediately to make up deficiency if any noticed by the Owners / Architects. Use must be made of special tradesmen in all aspects of the work and allowance must be made in the rates for the same.

1.2 The materials to be provided by the contractor shall be in accordance with the samples already got approved from the Owners / Architects by the contractor and in conformity with specification and approved list of manufacturers and brand. The contractor shall produce all invoices, vouchers or receipts for any material if called upon to do so by the Owners / Architects.

1.3 Samples of all materials are to be submitted to the Owners / Architect for their approval before the contractor orders or delivers the material to the site. Samples together with their packing are to be provided free of charge by the contractor and should any materials be rejected they will be removed from the site at the contractors expense. All samples will be retained by the Owners / Architects for comparison with materials which will be delivered at site. Also the contractor will be required to submit specimen finishes of colours, fabrics, etc., for the approval of the Owners / Architects before proceeding with the work.

1.4 The contractor shall be responsible for providing and maintaining temporary coverage's required for the protection of finished work. He is also to clean out all wood shavings, cut ends and other waste from all parts of the works before covering or infilling are constructed.

1.5 Contractor shall maintain unformed quality and consistency in workmanship throughout the execution of the work.

## SECTION - XI

### TECHNICAL SPECIFICATIONS (Electrical – part I)

The Electrical installation work shall confirm to the following I.S. Standards (latest additions), Local Supply Authorities Rules and Regulations and Fire Safety Norms.

- 1) IS:732 Code of Practice for Electrical wiring installation.  
(System Voltage not exceeding 650V)
- 2) IS:1646 Code of Practice for fire safety of buildings

(General Electrical Installation).

- 3) IS:9537, PART-II 1981 Rigid steel conduits for electrical wiring.
- 4) IS:2667 Fittings for rigid steel conduits for electrical fittings.
- 5) IS:2509 Rigid non-metallic conduits for electrical installations.
- 6) IS:1293 Pin Plugs and Sockets.
- 7) IS:694 PVC insulated cables with copper conductors for voltages up to 1100 volts.
- 8) IS:9532 Specification for conduits for Electrical Installation.
- 9) IS:3854 5A & 15A Switch socket and accessories.
- 10) IS:3043 (1981) Earthing.
- 11) IS:2026 Specification for power transformer.
- 12) IS:3639 Specification for fittings and accessories for power transformers.
- 13) IS:2099 Specification for high voltage porcelain bushings.
- 14) IS:335 Specification for insulating oil.
- 15) Indian Electricity Act, 1956 and Rules and Fire Insurance Regulations.

A-01. POINT WIRING

a) METAL CONDUITS

All conduit pipes shall confirm to IS 9537, PART-II 1981. Metal conduits shall be ERW black enameled 20mm/25mm as the case may be depending upon the number of wires permitted as table-1. The conduits shall be fixed to walls/ceiling with MS saddles and spacers at an interval of 0.45 meter and on either side of bends, junction boxes, pull boxes etc.,

All conduit accessories shall be 16 gauge & bends shall be of inspection type. All bends, couplers, threaded portions etc., shall be painted with anti-corrosive paint. Bends in the pipes shall be done with bending hickies.

All pipes shall be cleaned for sharp burrs. Switch boxes shall be of GI 16/14 gauge. The switch boxes shall be concealed as per site requirement & as per Architect's/Consultant's Instructions.

Point shall be controlled with 5A switch or directly from DB as specified in schedule of quantities. Where plate type switches are not specified the switch board shall have 3mm thick hylum sheet on which switches shall be mounted.

The point wiring shall be carried out with multi stranded PVC insulated copper wires of 1.5 sq mm. 2nos (for Phase & Neutral) & 2.5sqmm(for Earth) . In all cases the earth shall be of green colour and neutral shall be of black colour. All wires used shall be of 660 V grade. The point wiring shall be inclusive of circuit wiring from Distribution Board to the switch board unless otherwise stated in schedule of quantities. The circuit wiring shall be with 3 nos. of 2.5 sqmm PVC insulated multi stranded copper conductors colour coded as detailed above. The

rate shall also be inclusive of any chasing as directed by the Architects/Consultant/Client's Engineer to conceal the drops and finishing the same.

In case of group control directly from Distribution Board, the primary point shall be considered from DB to the first point and secondary point shall be from first point to the next looped point. The point shall terminate into the 3 plate-ceiling rose.

While laying the conduits in the slab before casting the slab, all drops shall be laid accurately to fall in position of the switchboard. Junction boxes shall be fixed with sand-cement mortar. All joints shall be airtight. Conduits shall be fastened to the re-enforcement properly so that the conduits do not get dislocated while casting the slab. All conduits shall have 18 swg fish wire.

#### **b) PVC CONDUITS**

The PVC Conduits shall conform to latest IS standards and shall be of medium gauge unless otherwise specified. The conduits shall be joined with PVC adhesive at Joints. The Conduits shall be fixed to walls/ceilings with GI spacers and saddles at an interval of 45 cms & on either side of bends, junction boxes, pull boxes etc., The number of wires drawn in the conduits shall be as per table 1. The point wiring shall be controlled as in (a) above. The wiring shall be done with 2 nos. of 1.5 sqmm (for Phase & Neutral) & 2.5sqmm (for earth) pvc insulated, copper conductors, multi stranded and colour coded with green as earth and black for neutral.

The circuit wiring shall be with 3 nos. of 2.5 sqmm pvc insulated, copper conductors, multi stranded wires laid from distribution board to switch board and the rate shall be included in the point wiring unless otherwise stated in the schedule of quantities. All other details shall be as per metal conduits.

#### **C) CASING CAPPING/ TRUNK AND TRUNKLING**

PVC casing shall be fixed to wooden partitions by means of screws spaced not more than 45 cms apart. Holes for fixing the PVC capping shall be done by drilling machine only and these holes shall be plugged with PVC plugs or grips to which the screws shall be fastened. Nowhere less than 1 inch PVC casing shall be used. All bends, tees, joints etc., shall be done in workman like manner with standard accessories. The number of wires in PVC casing capping shall be limited to a fill factor of not more than 60%. The point shall be controlled by 5 amp switch. The switch boards shall either be flush mounted with partitions or surface mounted or concealed mounted as per site requirements and as directed. The wiring shall be carried out as described in (a) and (b) above.

Casing Capping wiring shall not be done for concealed wiring & for wiring over the false ceiling work.

#### **A.02. DISTRIBUTION BOARDS**

This specification covers the design, manufacture, assembly, testing at works, supply, installation and commissioning of distribution boards at site.

The system and accessories shall be complete in all respects and any device not included specifically in this specification, but essential for proper operation of the equipment and also to meet statutory requirements shall deemed to be within the scope of the specification whether it is mentioned in the Technical Specification, or not.

If the vendor finds that it is required to undertake any work which is not sufficiently defined in this specification, or discovers that this specification conflicts with any other codes, standards and regulations which shall be required to comply, the same shall be clarified in writing from the Owner/Consultant before undertaking the work involved for avoiding the delay.

These shall be of sheet metal and of standard design with copper bus bars. The board shall

be fixed at accessible heights. The boards shall be solidly fixed on MS brackets to walls/partitions, concealed or open as directed. All connections inside the distribution board shall be neatly arranged and tied with PVC strings. The MCB's shall be of 9KA for fault level. The distribution boards shall be suitably earthed. Legend shall be written on DB with paint for identification of DB & Circuits.

#### A.2.1 CONSTRUCTION

The distribution boards shall be fabricated out of 14/16 swg CRCA sheet steel, metal clad, totally enclosed dust damp and vermin proof, dead front, hinged door type of bolted/welded construction suitable for wall or floor mounting.

#### A.2.2 BUSBARS

The busbar shall be air insulated and made up of high conductivity high strength aluminium or copper busbars liberally sized with high safety factor for the required rating. The neutral busbars shall have adequate number of terminals for all number of outgoing single phase circuits and the holes shall be suitable for multi strand wires. In the same way suitable earth bus shall be provided inside each distribution board for earthing of the lighting/power circuits and also earthing of distribution board. In the case of 3 phase distribution boards used for single phase outgoing, three independent neutral bars shall be provided.

#### A.2.3 MINIATURE CIRCUIT BREAKERS

Miniature circuit breakers (MCB) shall be of heat resistant, moulded type designed, manufactured and tested as per IS-8828.

The MCBs shall have inverse tripping characteristic against overloads and instantaneous trip against short circuits. The MCB shall be of fault current limiting device also.

The MCB shall be slip on type to the DIN rail. The ON & OFF positions of the switch handle shall be clearly marked. The MCB shall be suitable for operating in an ambient temperature of 45 deg centigrade without de-rating. The MCB shall be suitable for 415V, 3 phase, 415Volts, 50Hz system with a fault level of 9-10KA (rms) symmetrical. The terminals of MCBs shall be suitable for use with eye lugs. The 4 pole, 3 pole and 2 poles MCBs knobs shall be trunked with adequate strength tandem pin.

Each distribution board shall have individual hinged/bolted gasketed doors with suitable screws. Removable conduit entry plates shall be provided at top and bottom of the DB to facilitate drilling the conduit holes at site to suit individual requirements or knock out shall be provided.

Protective hylem / bakelite insulated cover plate shall be provided inside the panel to shroud all the live parts. Only the operating handle of the switch and the operating knob of the miniature circuit breakers shall be projecting outside the cover plate in case of ordinary IP20 DB and shall be inside the front door in case of dust tight IP42 DB. The unused outgoing holes / knockouts / cutouts of DB shall be suitably blanked with PVC plates at no extra cost. The incoming switch terminal should be suitably shrouded to avoid accidental contact. Each outgoing in the MCB DB shall have shrouding between Phases. The distribution board shall be factory wired and assembled and local fabricated DB shall not be accepted.

For TPN Distribution Board, four pole isolator shall be provided as incomer. For single phase and neutral Distribution Board, double pole isolator / ELMCB shall be provided as incomer. Earth leakage circuit breaker(s) to be provided wherever called for.

Suitable labels shall be provided to mark the circuit numbers of outgoing circuits.

Wiring Diagram shall be provided inside the DB.

#### A.2.4 EARTHING

The DB's shall be provided with two numbers of brass earthing terminals with suitable nuts, washers, etc., for connecting to earth bus. The Earth terminals shall be brought outside the

DB. In case of flush mounting DB, these shall be provided inside the DB.

#### A.2.5 PAINING

The DB sheet steel surface shall be chemically cleaned to remove scale etc., rinsed dried and shall be finished with two coat of powder coat paint over two coats of red oxide / epoxy zinc primer.

#### A.2.6 TESTS

All necessary factory routine tests shall be performed on the equipment before despatch. The test results shall be sent along with the supply of DB.

#### A-03. CABLES

Cables shall confirm to IS 1554-1976. Cables shall be heavy duty, armoured, pvc insulated & pvc sheathed 1.1 KV grade aluminum or copper. Cable shall be fixed with GI spacers & saddles at an interval of 30/45 cms and on every side of bends. The bending radius of cables shall be as per manufacturers instructions and in no case it shall be less than 12 times the overall diameter of the cable. Cable shall be so installed that they are not subject to any mechanical damage. If there is a bend in the cable enclosed in a conduit, care has to be taken to prevent undue compression of insulation. This applies also to the top of vertical runs of length longer than 5 meters where there could be compression caused by the weight of unsupported vertical cables. Cables may rest without fixing in horizontal runs or ducts or trunkings. The cables run in cable trays shall be fixed with cable ties at intervals of not more than 30 cms. No joints in the cables shall be permitted unless the cables exceed the standard drum length. Joints, if so necessary shall be located in accessible position. Termination of the cables shall be done with heavy duty copper/Aluminum lugs and brass cable glands.

Cables laid under ground shall be to a minimum depth of 750 mm. It shall be ensured that cables laid under ground are free of water lines, sewage lines etc. The trenches shall be at least 30 cm wide & filled with 10 cms thick of layer of dry sand on which the cable shall be laid. Further, 10 cms thick sand layer shall be put on the cable over which a brick layer shall be provided. The trench shall then be back filled with soft earth, rammed and consolidated to it's original level. Cable route indicators shall be laid at intervals of 15 meters and at all change in directions.

For cables laid on walls aluminum tags shall be fixed showing the size of the cable and the feeder number of the cable. These tags shall be provided at each ends and at least one or two places at intermediate positions.

The mode of measurement of the cables shall be as follows:

- i) For top entry of the cable, the measurement shall be taken up to the bottom of that switch-gear.
- ii) For bottom entry of the cable, the measurement shall be taken up to the top of that switch board. No wastage shall be allowed for measurements.

#### A-04. SWITCH FUSE UNITS

Switch Fuse Units shall be of sheet metal or iron clad with HRC fuses as described in schedule of quantities. The unit shall be of robust construction of standard specified make, design to withstand adverse working conditions. It shall have quick break type mechanism with ON and OFF position indicators of the operating handle. The switch shall be interlocked so that the unit cannot be opened in ON condition. The interior shall be so arranged that clearances from live parts are adequate and shrouded. Manufacturer's instructions shall be followed for installation of switch fuse units. The switch shall be solidly earthed. The switch shall be mounted on walls on angle iron support grouted to wall. The supports shall be treated for rust treatment & painted with 2 coats of synthetic enamel paint. The height of the switch board shall be such that it is accessible for operation & maintenance.

#### A-05. POWER PANELS

The Power panels shall be fabricated from MS sheet steel 14/16 gauge and shall be of compartmental design. The main supporting framework shall be of angle iron or of heavier gauge sheet metal. The panel shall be self-supporting design, dust and vermin proof, dead front and fully inter locked with isolating switches. The panel-mounted switches shall have Interlock defeat arrangement for testing and inspection.

The panel shall be designed so as to facilitate inspection, cleaning and repairs. The clearance between phase to phase and phase to earth or metal parts shall be as per relevant IS standards. The metering instruments like volt meter, ammeter etc. shall be flush mounted and shall be of 1.0 class accuracy and of standard design size of 96 mm x 96. All indication lamps shall be of neon /LED type.

The busbars shall be air insulated and made up of high conductivity, electrolytic aluminium / copper bars complying with the requirement of IS 5082:1981 and shall have a fault withstand capacity of 50 KA/1 Sec. All busbars shall be fully screened by means of PVC heat shrinkable sleeves in their own compartment running throughout the length of the Panel. Suitable allowance should be made for bus expansion.

The panel shall have separate cable alley and a bus bar chamber. The bus bars shall be rigid hard drawn tinned electrolytic copper wherever specified & sleeved with heat shrinkable sleeves. The current density shall not exceed 1.25 amp per sqmm and the neutral bus shall be rated for capacity of phase bus unless otherwise stated in schedule of quantities/drawings. However, the minimum size of bars shall be 25mmx3mm. Minimum electrical clearance shall be maintained between phases, neutral and body as per IS 4237:1982. All outgoing feeders shall have neutral link of appropriate capacity at cable termination end. For Incomers as SFUs or MCCBs wherein cable is directly connecting at switchgear end the neutral link to be mounted adjacent to switchgear.

The panel shall be powder coated comprising of degreasing and de-scaling in sulphuric acid etc with synthetic enamel paint for smooth finish. The color of paint shall be battleship grey or as directed. The Panel shall be tested at site before commissioning. The Panel drawings shall be got first approved from Consultants before taking up for fabrication.

All wiring inside the panel shall be done with switchboard copper conductors/cables and/or with solid copper links. The insulators for supporting the Bus-Bars shall be epoxy based cast resin. All hinged doors shall be earthed with flexible braided copper earth. An earth bus of copper shall be fixed along the length of the panel at the lower section. Adequate ventilation for the panel shall be provided. Logic diagram of operation of switches shall be painted on the panel. The name plates for each feeder shall be of engraved design and pasted to the respective switch gear. The letters shall not be less than 10 mm size for individual feeders and not less than 18 mm for the main feeders. All switchgear to be mounted in the panel shall be as per schedule of quantities.

#### A-06. EARTH PITS/STATION

The Earthing station shall be done as per IS 3043 (1981) and as per drawing no. E1. The earth pit shall be at least 2.5mtrs deep with CU/GI Plate electrode. The GI plate electrode shall be hot dipped of 600x600x6 mm thick. The size for copper electrode shall be

600x600x3mm thick. An alternate layer of salt and charcoal shall be filled up to 200 mm above the top of the electrode. The electrode shall be connected with 32x6 mm thick GI Flat (for copper earth electrode size of flat shall be 25x3 mm) which shall be terminated with nuts and bolts into brick masonry chamber on top. The brick masonry chamber shall be of size 300x300x450mm deep which will carry the funneling arrangement for watering. A GI Flat of 32x6 mm from brick masonry chamber to the switch gear inside the switch room shall be laid

under ground and/or fixed to walls. The rate for laying GI/ CU strip from earth pit to switch room shall be paid under separate item.

All the main earth conductor above the ground level shall be painted with two coats of enamel paint. The following colour codes have to be followed:

- |                                    |   |   |
|------------------------------------|---|---|
| (a) Main body earth bus            | - | Green colour                                    |
| (b) Main neutral earth bus         | - | Black colour                                    |
| (c) Lightning protection earth bus | - | Red colour or as preferred by Owner/Consultant. |

Earthing system of equipment earthing, neutral earthing, Data Networking earthing and lightning protection earthing should not be mixed together above the ground. These systems/connections shall be tested in accordance with IS 3043-1987. Earth resistance of the individual system shall be measured after connecting all the electrodes to the bus and the combined value shall be less than 1 ohm (One ohm).

#### A-07. INSTALLATION OF ELECTRIC FITTINGS

All electrical fittings shall be fixed with down rods or on round blocks as stated in schedule of quantities. The down rods shall be of 19/20 mm dia and with 1.6mm wall thickness of ERW black enameled MS or GI. The down rods shall be fixed with ball and socket joints, check nuts etc. Special fixtures like spot lights etc; shall be fixed to the false ceilings as per manufacturer's recommendations. The fittings shall be connected with 3 core 0.5 sqmm flexible copper cord/cable from ceiling rose and suitable earthed.

#### A-08. POWER FACTOR CORRECTION PANEL

The power factor correction panel shall be fabricated from sheet steel & powder coated. The panel shall be compartmentalized with tinned copper bus bars TP as described for power panels.

The power capacitors shall be APP type, low loss, 3 phase, delta connected & self discharged type.

The power factor control shall be done by automatic power factor control relay for controlling the power factor within the set limits by auto switching of required capacitor Banks. The required Capacitors / PF Banks shall be as per schedule of quantities. The P.F. shall be automatically corrected to near Unity.

The C.T. ratio given in the Schedule/diagram is indicative. The same shall be matched for correct operation depending upon the operating load. The relay shall be totally microprocessor based for setting the desired target power factor band. The APFC relay shall have indications like power ON, low current etc & shall be of required stages as per schedule of quantities. The P.F Panel shall have Auto Manual switching facility.

The general specification shall be as follows:

- i) System supply voltage 415 volts.
- ii) C.T. secondary rating 5A, 5VA Burden.
- iii) Output switching capacity 5A at 230 V AC & 2A at 440V AC, Operating temperature 10 degree Centigrade to 50 degree Centigrade. Accuracy better than 1%. Low current release 10% of full rated C.T.
- iv) Switching time between stages 4 to 6 seconds.
- v) Range of indications of PF 0.5 lag to 0.5 lead digital.
- vi) Display LED indications.
- vii) Range of target P.F. setting 0.7 to 0.99.
- viii) Switch for auto/manual operation.
- ix) Indications for selection of stages.
- x) Selection of dead band.



#### A-09. TESTING OF ELECTRICAL INSULATION

The following tests shall be carried out during execution and after completion of the electrical installation work.

- 1) Insulation Resistance Test.
- 2) Polarity Test of Switches.
- 3) Earth Continuity Test.

1) Insulation Resistance Test: The insulation resistance shall be measured by applying between earth and whole system of conductors or any section thereof with all fuses in place and all switches closed (except in earthed concentric wiring) all lamps in position & both poles electrically connected together, or direct current pressure of not less than twice the working pressure, provided that it need not exceed 500 volts for medium voltage circuits, be applied. Where the supply is derived from 3 wire DC or Poly phase A.C. System, the neutral pole of which is connected to the earth either direct or through added resistance, the working pressure shall be deemed to be that which is maintained between the phase conductor and the neutral. The insulation resistance measured in mega-ohms between all conductors connected to one pole of phase conductor of the supply and all the other conductors and switches in off position it's value shall be not less than as specified below:

The insulation resistance measured in mega ohms shall not be less than 50 mega-ohms divided by the number of outlets or when PVC insulated cables are used for wiring, 12.5 mega-ohms divided by the outlet subject to a minimum value of 1 mega-ohm.

A preliminary and similar test may be made before lamps etc. are installed and in this event the insulation resistance to earth shall not be less than 100 mega ohms divided by the number of outlets or when PVC insulated cables are used 25 mega ohms divided by the number of outlets subject to a minimum of 1 mega ohm.

2) Polarity Test of Switches: In a 2 wire system a test shall be made to verify that all switches in every circuit are fitted in the same conductor through out and such conductors shall be labeled or marked for connection to the phase conductor or to the non earthed conductor of supply.

In a 3 wire or 4 wire insulation a test shall be made to verify that every non linked single pole switch is fitted in a conductor which is labeled or marked to one of the phase conductor of supply.

3) Earth Continuity Test: The Earth Continuity Conductor including metal conduits and metallic envelopes of cables in all cases shall be tested for electric continuity and electrical resistance of the same along with the earthing lead but excluding any added resistance or earth leakage circuit breaker measured from connection with earth electrode to any point in the earth continuity conductor in the completed insulation shall not exceed 1 ohm.

#### TECHNICAL SPECIFICATION OF TESTING AND COMMISSIONING

The scope of work for testing and commissioning of the total installation shall be for the capital equipments like transformers, switchgears, cables etc., and also for the associated equipments like relays CTs, PTs, etc.

The scope of work for testing and commissioning of electrical equipment for the above shall include but not be limited to the following:

- a) Providing sufficient number of experienced Engineers, Supervisors, Electricians so that the installation can be commissioned in stipulated time.

- b) All the instruments, tools and tackles required for carrying out the testing and commissioning shall be provided by the bidder.
- c) The testing of electrical equipment shall be carried out as per the relevant Indian Standards/Code or Practices/Manufacturer's instructions.
- d) Cleaning of electrical equipment, contacts cleaning and greasing etc. All the equipment and material required for above shall be supplied by the bidder.
- e) Connecting the panel/equipment wiring for proper functioning of the schemes required/called for.
- f) Installation and wiring of additional equipment on panels like auxiliary contactors, timers, etc. which may be additionally required for proper functioning of the schemes.
- g) Checking of equipment earthing and system earthing as a whole.
- h) Testing of all the cables.
- i) Co-ordination with other contractors for testing and commissioning of interface cables.

#### TESTS TO BE CONDUCTED

- i) All tests shall be performed in the presence of the bidder and customer/consultant. For all types of visual inspections, checkings, pre-commissioning, commissioning test and acceptance tests, IS Code to be followed for the tests given therein in addition to the instructions in this technical specification. The intention of giving the few test procedures, described below, is to provide a guideline for the bidder. However, bidder shall not restrict themselves in carrying out only the tests described in this document.
- j) Bidder shall submit their proposed test procedures for approval and shall not commence testing such approval is given.
- k) Bidder shall check and test all electrical equipment and systems installed and supplied them, including equipment supplied by the Owner.
- l) Bidder shall supply all necessary test equipment and personnel both craft and supervisory category to carryout the work without danger to personnel or damage to equipment.
- m) Bidder shall ensure that no tests are applied which may stress equipment above the limits for field testing recommended by the manufacturer. Bidder shall be responsible for any damage to personnel or equipment resulting from improper test procedure.
- n) All defective materials furnished by the bidder and defects due to poor workmanship revealed through field testing, shall be corrected at bidder expense without affecting the completion of the project.
- o) Client/Consultant reserves the right to interpret and approve all test results prior to energisation of circuits or apparatus.
- p) Bidder shall visually inspect all equipment for defects immediately upon arrival at site including those supplied by the Owner.
- q) Relay coordination chart and final setting before/commissioning.

#### MECHANICAL CHECKOUTS

After installation, but before any power supply is connected, the contractor shall make a complete mechanical checks of all installed electrical equipment and systems. This shall include but not to be restricted to the following:

- a) Check equipment numbers against drawings/documents.
- b) Check name plates of transformers, switchgears etc., for conformity with the data given in the drawings and specifications.
- c) Check all equipment bus joints and connections for tightness.
- d) Check all cable and wire connections for tightness.
- e) Check phase sequence.
- f) Check all bushings/insulators to ensure they are clean and unchipped. Inspect tank cooling tubes and radiators for leaks.

- g) Check silicagel for dryness where breathers are supplied. If the colour of the silicagel is pink, remove from the breather and dry out following manufacturer's recommended procedure, until a light blue colour is restored and then replace it.
- h) Check valve in the connecting pipe between the conservator and transformer tank to ensure that valve is in 'open' position.
- i) Check interlocking on access doors for mechanical and electrical safety. Check that key and electrical interlocking system functional and accomplish their purpose.
- j) Check all plug-in contacts for alignment and 'grip'.
- k) Check all contactors for free manual operation.
- l) Remove all locking devices installed for shipment.
- m) Check all the coils for their continuity and proper voltages.
- n) Check the arc chutes, arcing horns, main contacts of breakers are clean and undamaged. Check the carriages ride smoothly and reliably on their guide rails. Check for proper operation of circuit breaker operation mechanism, controls and adjustments.
- o) Check for the fuses whether correctly rated and installed, undamaged and fit for operation.
- p) Check all relays and instruments are clean, correctly connected and undamaged. Check test plugs are installed in all protective relays. Check relays for free manual operation, if applicable.
- q) Check instrument transformer ratings against drawings. Check for proper installation and connection.
- r) Check interlock and auxiliary devices and the operation of the circuit breaker with the protection relay circuit.
- s) Clean the equipment by vacuum cleaner before energising.

#### EARTHING

- a) Bidder shall test the buried earth grid and shall record the values.
- b) Bidder shall inspect and test all earthing work carried out by him, including all interconnections between ground loops, grounding of equipment and ensure all connections are permanent and that the earthing circuit is continuous.
- c) Bidder shall megger and record earth resistance at various earth connection points.

#### SWITCHGEAR

- a) Switchgears rated 433 volts or more shall be tested with a 1000 volts megger.
- b) Auxiliary wiring rated less than 415 volts shall be tested with a 500 volts megger.
- c) All protective relays shall be tested at sufficient points to establish their proper functioning in accordance with the manufacturer's specification and curves.
- d) Operation checks and functional checks on all switchgear panels.
- e) For current transformers insulation test, polarity test, ratio test, secondary injection test, operating current check, service setting in consultation with Client / Consultant.
- f) For potential transformers, ratio test, insulation test, etc.
- g) Contact resistance for breaker contacts between male and female.

#### WIRES AND CABLES

- a) Continuity testing of all cables.

- b) Wires and cables rated for 433 volts or more shall be tested with a 1000 volts megger. Cables rated less than 433 volts shall be tested with a 500 volts megger.
- c) No wires or cable having resistance between conductors or between conductors and ground of less than 100 mega-ohm shall be accepted.

#### FUNCTIONAL TESTING

- a) All circuit breakers, contactors, relays, remote devices, etc.,

#### PRECOMMISSIONING TESTS

- a) All pre-commissioning tests stated as per IS for respective items.

LIST OF APPROVED MANUFACTURERS FOR LT ELECTRICAL WORKS		
S.N.	MATERIALS	APPROVED MANUFACTURERS
1	Moulded Case Circuit Breaker (MCCB)	Legrand/L & T/Siemens
2	Switch Fuse Unit (SFU)	L & T/ Siemens/ABB
3	Contactors	L & T/ Siemens/Schneider
4	Meters	L & T/ IMP
5	LT cable	RR KABLE/ Finolex/Havells/CCI/ policab
6	Cable Termination	Dowells/Comet
7	Cable Tray	Profab/Asian Ancillary Corporation/ Metalemm
8	Conduit Steel / PVC	Precision/BEC/AKG/ DIAMOND
9	Wires	FINOLEX/RR KABLE/HAVELLS/POLICAB
10	Modular Switches & Sockets	Legrand MDS/MK INDIA/GM/PHILIPS
11	Distribution Board, MCB & ELMCB	Legrand/SIEMENS/HAGER/EATON
12	Data Cable & accessories	D-Link/AMP
13	Telephone cable/WIRES	Delton/FINOLEX
14	Light Fixtures	WIPRO / PHILIPS/ HPL / HAVELLS / SYSKA
15	Tubes,	Philips/OSRAM
16	Fans	CG/Havells/Almonard/orient
17	Exhaust Fan	CG/HAVELLS/Almonard
18	Speakers	BOSCH/AHUJA/PHILIPS
19	Amplifier	BOSCH/AHUJA/PHILIPS
20	PF RELAY	L&T/BELUK/SYNTRON
21	ENERGY METERS	ENERCON/AE/MECO