INDIAN INSTITUTE OF BANKING & FINANCE

BID DOCUMENT

Furnishing / Renovation / Fit out work
of Institute's office premises at
C-5/30, Safdarjung Development
Area, New Delhi -110016

TECH BID

Last date of Submission :- 18 /11/2019

OFFICE INVITING BIDS

Zonal Head,
Indian Institute of Banking & Finance
Professional Development Centre - NZ,
109 - 113, Vikrant Tower Ist floor,
4, Rajendra Place, New Delhi - 110 008

This tender document contains 134 Pages

TABLE OF CONTENTS

TENDER NOTICE

Tender No. IIBF/RENO/NIT-01/ 2019-20

Indian Institute of Banking & Finance invites bids under two bid systems on item rate basis from eligible contractors / Agencies empanelled in Govt. / Public Sector / PSU Banks for the work mentioned below

1.	Name of Work	:	**"Furnishing / Renovation / Fit out work of Institute's office premises at C-5/30, Safdarjung Development Area, New Delhi-110016.**
2.	Estimated Cost		Rs. 3,00,00,000/- Rupees Three Crore Only)
3.	Earnest Money Deposit (1% of Estimated cost)	:	**Rs. 3,00,000/- Rupees Three Lakh Only)** by crossed Bank Draft / Banker's Cheque drawn in favour of Indian Institute of Banking & Finance payable at New Delhi. **(To be enclosed in sealed envelope as a part of Technical Bid).**
4.	Initial Security Deposit	:	2% of the accepted value of the tender including EMD.
5.	Participation Fees	:	A non-refundable amount of **Rs. 2000/- (Rupees Three Thousand only)** in the form of DD / Banker's Cheque in favour of **Indian Institute of Banking & Finance** Payable at New Delhi
6.	Issue of Tender documents		From 21.10.2019 to 18.11.2019 Tender to be downloaded from the **website www.iibf.org.in.** No hard copy shall be issued.
7.	Dates for Site Inspection		30/10/2019 & 31/10/2019 (Wednesday & Thursday) @ 11.00 am to 3.00 pm
8.	Pre Bid Meeting		01.11.2019 @ 11.00 AM at Professional Development Centre - NZ, 109 - 113, Vikrant Tower Ist floor, 4, Rajendra Place, New Delhi - 110 008
9.	Last date and time of receipt of Tenders	:	**18.11.2019** up to 3.00 PM
10.	Address at which the Tenders are to be submitted	:	Zonal Head, Indian Institute of Banking & Finance, Professional Development Centre - NZ, 109 - 113, Vikrant Tower Ist floor, 4, Rajendra Place, New Delhi - 110 008
11.	Date and time of opening of Tenders (Technical Bid only)	:	**18.11.2019** at 3.30 PM
12.	Place of opening Tenders	:	Indian Institute of Banking & Finance, Professional Development Centre - NZ, 109 - 113, Vikrant Tower Ist floor, 4, Rajendra Place, New Delhi - 110 008
13.	Defects Liability Period	:	12 months from the date of handing over of the project to the satisfaction of IIBF

14.	Validity of Offer	:	120 days from the date of opening the Tenders.
15.	Liquidated Damages	:	At the rate of 0.5% of the Contract Value per week which subject to a maximum of 5% of the accepted Contract Value.

Place: New Delhi

Zonal Head

LETTER OF ACCEPTANCE FOR SUBMISSION OF TENDER

From,

_____

_____

_____

To:
The Zonal Head ,
Indian Institute of Banking & Finance,
Professional Development Centre - NZ,
109 - 113, Vikrant Tower Ist floor,
4, Rajendra Place, New Delhi - 110 008

Sub:- FURNISHING / RENOVATION / FIT OUT WORK OF INSTITUTE'S OFFICE PREMISES AT C-5/30, SAFDARJUNG DEVELOPMENT AREA, NEW DELHI-110016.

Dear Sir,

Having examined the tender document contained hereto relating to the Furnishing / Renovation / Fit out work of Institute's office premises comprising of the Tender Notice, General and Special Conditions of Contract, Specifications, Schedule of Quantities etc., having understood the provisions and requirements relating to the project, having conducted a thorough study of the job, location of site, availability of power supplies, transportation and communication facilities, availability and accessibility of materials, and all other factors governing the project, we hereby submit our offer for the execution of the proposed work in accordance with the terms and conditions and within the time period specified in the time schedule, specifications, designs, drawings as specified in tender document at the rates (all inclusive) quoted by me / us in the accompanying BOQ of Financial BID.

I / We undertake to do all extra works which may be assigned to us as a part of this contract, at the rates quoted in the tender document. If after the tender document is accepted, I / We fail to commence the execution of the works within 10 days, we agree that the IIBF shall have full authority to forfeit the earnest money deposited and award the contract to any other contractor they deem fit.

General description of work	Tender for **Furnishing / Renovation / Fit Out Work Of Institute's Office Premises At C-5/30, Safdarjung Development Area, New Delhi-110016.**
EMD	EMD shall be **Rs.3,00,000.00** payable in form of Demand Draft / Pay Order favoring Indian Institute of Banking & Finance, payable at New Delhi.
Initial security deposit	The amount of ISD shall be 2% of the accepted value of the tender including EMD. payable in form of **Demand Draft / Pay Order** favoring Indian Institute of Banking & Finance,

	payable at Delhi **Or Bank Guarantee** from scheduled bank in favor of IIBF
Date of commencement	Within 7th Calendar day from the date of Issue of work order
Time for completion of work	As per time schedule given in tender document i.e. **4 months**.
Retention money to be deducted from the bills	8% of the certified gross value of each running bill, till accumulating total security deposit including ISD.
Total Security Deposit / Retention Money	5% of Contract amount
Defect Liability Period	365 days (twelve months) from the date of virtual completion of the work.
Period of Final Measurement	2 months.
Liquidated damages	At the rate of 0.5% of the Contract Value per week which subject to a maximum of 5% of the accepted Contract Value.
Value of works for Interim Certificates	Value not less than Rs.50 Lakh (Fifty Lakh only) or as decided by the IIBF.
Payment after virtual completion	50% of total security deposit will be returned after (i) issue of virtual completion certificate by the project architect. (ii) contractor's removal of his material, equipments, cleaning of site and against Bank Guarantee. Balance 50% of retention money shall be released 14 days after satisfactory completion of defect liability period.
Period for honoring interim certificate.	An adhoc payment of 75% of the value of work done as assessed by the Architect / PMC/ IIBF shall be released within 20 working days by the Employer, after certification by the Architect / PMC/ IIBF who will certify within 7 working days of submission of Bill including furnishing of all relevant documents. Balance amount shall be certified by the Architect / PMC/ IIBF within 10 working days of submission of bill and payment shall be released by the Employer within 20 working days of certificate receipt.
Recovery towards taxes.	As per rules applicable from time to time.

Should this tender be accepted, I / We hereby agree to abide by and fulfill all terms and conditions referred above / in the tender and in default thereof, to forfeit and pay to the Indian Institute of

Banking & Finance such sums of money as are stipulated in the conditions contained in the tender document.

I / We agree to abide by this tender for a period of 120 days from the date of opening of the financial bid. I / we also agree to pay the ISD as specified in the Tender.

If I / We fail to commence the work as specified in the memorandum above or if I / We fail to deposit the amount of initial security deposit specified in the memorandum I / We agree that the said the Indian Institute of Banking & Finance , without prejudice to any other right or remedy, be at liberty to forfeit the said Earnest money in full.

The said Indian Institute of Banking & Finance shall also be at liberty to cancel the Work Order of tender if I / We fail to execute an agreement or to start the work as stipulated in the tender documents or fail to deposit the amount of initial security deposit as specified in the memorandum.

I / We agree that the Indian Institute of Banking & Finance reserves the right to accept the tender in whole or in part or split the works under separate contracts or accept or reject any or all the tenders without assigning any reason whatsoever thereof.

I / We are aware that the quantities mentioned in the tenders are indicative and the same can be increased or decreased depending on the requirement of the Institute and as per the site conditions. I / we will not seek compensation for the same and execute the additional quantities at the tender rates.

The names of the partner of the firm or the person authorized to sign the contract having power of attorney to sign are, ---------- (Certified copy of the power of attorney is enclosed hereto).

Yours Faithfully

Signature of the tenderer with seal Place Date

Witness –Signature : Address:

Name in Block letters: Occupation:

ARTICLES OF AGREEMENT

(On stamp paper of Rs.100/-)

ARTICLE OF AGREEMENT made this .....day of Two Thousand Nineteen BETWEEN the Indian Institute of Banking & Finance, a company registered under section 25 of Companies act 1913 having its Corporate Office at 2nd Floor , Tower 1 , Kohinoor City , Commercial II, Kurla West, Mumbai - 400 005 and Northern Zone, Professional development Centre at 109 - 113, Vikrant Tower Ist floor, 4, Rajendra Place, New Delhi - 110 008 hereinafter called "Employer" (which expression shall include its successors and assigns wherever the context or meaning shall so require or permit, of the one part and .... (hereinafter called the "Contractor") (which expression shall include its successors and assigns wherever the context or meaning shall so require or permit) of the other part.

WHEREAS the Employer is desirous of carryout Furnishing / Renovation / Fit Out Work of Institute's Office Premises at C-5/30, Safdarjung Development Area, New Delhi-110016. and has got drawings, specifications and the bill of quantities prepared by their Architects / Consultants which have been signed or on behalf of the parties hereto.

AND WHEREAS the Contractor has agreed to execute upon and subject to the conditions set forth herein and to the conditions set forth in the special conditions and in the Bill of Quantities and conditions of contract (all of which are collectively hereinafter referred to as "The said terms & conditions", the works, shown upon the said drawings and/or described" in the said specifications and included in the said bill of quantities at the respective rates therein set forth amounting to the sum as therein arrived at or such other sum as shall become payable there under (herein after referred to as the said "contract value").

NOW IT IS HEREBY AGREED AS FOLLOWS:

1. In consideration of the said Contract Value to be paid at the times and in the manner set forth in the said terms & conditions; the contractor shall upon and subject to the said terms & conditions execute and complete the works shown on the said drawings, and described in the specifications and/or bill of quantities.
2. The Employer shall pay the contractor The Said Contract Value or such other sum as shall become payable at times and in the manner specified in the said terms & conditions.
3. The said terms & conditions and Appendices thereto shall be read and construed as forming part of this Agreement and the parties hereto shall respectively abide by submit themselves to the said terms & conditions and perform the agreements on their part respectively in the said terms & conditions contained.
4. The contract is neither a fixed lump sum contract nor a piece work contract but is a contract to carry out the work in respect of the entire work as defined in the contract documents to be paid for according to actual measured quantities at the rates contain in the bill of quantities or as provided in the said contract documents.
5. The contract shall afford every reasonable facility for the carrying out of all works relating to the work in the manner laid down in the said conditions, and shall make good any damages done to walls, floors, etc. after the completion of such works.

6. The Employer reserves to itself the right of altering the Drawings and nature of the work by adding to or omitting any items of work or having portions of the same carried out without prejudice to this Contract.

7. Time shall be considered as the essence of this Contract and the Contractor hereby agrees to commence the work from date of Work Order and to complete the entire work within **4 Months** subject nevertheless to the provision for extension of time.

8. All payments by the Employer under this contract will be made only by NEFT/RTGS/ Net banking.

9. All disputes arising out of or in any connected with this agreement shall be deemed to have arisen at New Delhi and only court in New Delhi shall have jurisdiction to determine the same.

10. That the several parts of this Contract have been read by the Contractor and fully understood by the Contractor. The Contractor shall not be entitled for the payment for the quantities beyond the tendered quantities unless ordered for by specific written instructions from the Architect / Engineer.

IN WITNESS WHEREOF THE Employer through its authorized officials and the Contractor have set their respective hands to these presents and two duplicates hereof the day and year first hereinabove written. (If the contractor is a partnership or an individual).

IN WITNESS WHEREOF the Employer has set its hand to these presents through its duly authorized official and the Contractor has caused its common seal of to be affixed hereunto and the said two duplicates/has caused these presents and the said two duplicates hereof to be executed on its behalf, the day and year first hereinabove written (If the Contractor is a company).

Signature Clause

SIGNED AND DELIVERED by the Indian Institute of Banking & Finance by the hand of

Shri_____

(Name and Designation)

_____ in

the presence of

(1)_____

Address_____

(2)_____

Address_____

Witness

SIGNED AND DELIVERED BY

_____

in the presence of

(1) _____

If the party is a partnership firm should be signed by all or an authorized person on behalf of all partners.

Address _____

(2) _____

Address _____

Witness
THE COMMON SEAL OF _____
Was hereunto affixed pursuant to the resolutions passed by its Board of Directors at the meeting held on _____ in the presence of

(1) _____

(2) _____

Directors who have signed these presence in token thereof in the presence of

(1)
_____

(2)
_____

If the contractor signs under its common seal the signature clause should tally with the sealing clause in the Articles of Association.

SIGNED AND DELIVERED by
the contractor by the hand of
Shri

_____

And duly constituted attorney

If the Contractor is signing by the hand of power of attorney whether a company or individual.

GENERAL CONDITIONS OF CONTRACT

1. Definition and Interpretation:-

In construing these conditions, the Specifications, Bill of quantities and Contract Agreement etc. the following words shall have the meaning herein assigned to them except where the subject or context otherwise requires.

i (a) **The Institute:-** The term Institute shall mean Indian Institute of Banking & Finance , a company registered under section 25 of Companies act 1913 having its Corporate Office at 2nd Floor , Tower 1 , Kohinoor City , Commercial II, Kurla West Mumbai - 400 005 and Northern Zone Professional, development Centre at 109 - 113, Vikrant Tower Ist floor, 4, Rajendra Place, New Delhi - 110 008 the employer or their authorized representative to act on their behalf.

i (b) **Architects**:- The term Architects shall mean **M/s VASTU SADAN PVT LTD,** having its office at 122A/12, Gautam Nagar, New Delhi-110049 and their authorised nominees and representatives or such other firms / persons, as shall be nominated by the Employer. "PMC" means Project Management consultant in case appointed by the institute for the project.

i (c) **Engineer**:- Architect / PMC/ IIBF's Engineer appointed by the Employer for the supervision of the work..

ii (a) "Contractor" shall mean:-

a) In the case of a Partnership firm :- ---------- ---------- and ----------trading as partners in the name and style of ---------- ---------- and having a place of business at --- ---------- and shall include the partners for the time being of the said firm and the legal representatives of a deceased partner.

b) In the case of individual Contractor :- Shri _____ trading in the name and style of _____ and shall include his heirs, successors and legal successors and legal representatives.

c) In the case of Company :- _____ a company incorporated under _____19___ and having its registered office at _____ and office at _____ and shall include its successors and assignee.

iii) The tenderers are advised to read all the instructions, term & conditions, additional & general conditions, contract clauses, nomenclature of items, additional specifications, drawings etc. contained in the tender document carefully and visit the site to see existing site conditions and services & inspect the existing building before quoting the rates & no extra claim shall be entertained by the client.

The Contractors are advised to inspect and examine the site and satisfy themselves with the nature of site, the means of access to the site, the constraints of space for stacking material / machinery, labour etc. constraints put by local regulations, if any, weather conditions at site, general ground / subsoil conditions etc. or any other circumstances which may affect or influence their tenders.

(iv) "Site" shall mean the site of the contract works including any building and erections thereon and any other land (inclusively) as aforesaid allotted by the Employer for the Contractor's use.

(v) "Contract" shall mean the following documents, all duly signed, collective in that order of precedence.

a) Articles of Agreement
b) Letter of acceptance of tender / award of work
c) Special Conditions of Contract
d) General conditions of contract including clarifications / conditions accepted after the Pre-bid Meeting.
e) Drawings
f) Specifications
g) Bill of Quantities

(vi) "Notice in writing" or "written notice" shall mean a notice in written, typed or printed characters sent (unless delivered personally or otherwise proved to have been received) by registered post to the last known private or business address or registered office of the addressee and shall be deemed to have been received when in the ordinary course of post it would have been delivered.

(vii) "Act of Insolvency" shall mean any Act of Insolvency as defined by the Presidency Towns insolvency Act, or the Provincial Insolvency Act or any Act amending such original.

viii) "Works" means the permanent works described in the "Scope of Work" and / or to be executed in accordance with the Contract and includes materials, apparatus, equipment, temporary supports, fittings, and things of all kinds to be provided, the obligations of the Contractor hereunder and work to be done by the Contractor under the contract.

(ix) "Drawings" means the drawings prepared by the Architects and issued by the Architect / PMC/ IIBF and referred to in the Specifications and any modification of such drawings and such other drawings as may be issued by the Architect / PMC/ IIBF from time to time.

(x) "Bill of Quantities" means the Schedule and Quantities of items, materials & rates, summaries, etc. as finally accepted.

(xi) "Specification" means the specifications given in these documents including relevant Indian standard specification where so required and where such a specification is not available, the specification approved by the Architect.

(xii) "Temporary Works" means all temporary works of every kind required in or about the execution, completion or maintenance of the works.

(xiii) "Materials" means the materials, apparatus, equipments, fittings, fixtures and all such other material which are incorporated in the 'work".

(xiv) "Virtual Completion of the Works" means the completion of the whole of the works substantially in all respects as evidenced by issuance of a Certificate of Virtual Completion by the Architect / PMC/ IIBF in pursuance of Clause 31 & 39 of the General Conditions of Contract.

xv) "Period of Maintenance / Defect Liability Period" shall mean the period of 365. (Three hundred sixty five) days calculated from the date of virtual completion of the works as certified by the Architect / PMC/ IIBF.

(xvi) "Urgent Works" means any urgent works, which in the opinion of the Architect / PMC / Employer becomes necessary at the time of execution and / or during the progress of work to obviate any risk of accident or failure or to obviate any risk of damage to the structure or services or required to accelerate the progress of work

for which becomes necessary for safety and security or for any other reason, the Architect / PMC/ IIBF / Employer may find it necessary.

(xvii) "Market Rate" means the rate as decided by the Architect / PMC/ IIBF / Employer on the basis of cost of materials at site inclusive of any tax, duty, octroi etc. at the time of execution of work.

(xviii) "Approved" means approved in writing; "Approval" means approval in writing.

(xix) "Month" means calendar month.

(xx) "Week" means seven consecutive calendar days.

(xxi) "Day" means a calendar day beginning and ending at 00 Hours and 24 hours respectively.

(xxii) "Contract Value" means the total value of the tender as accepted by the Employer.

(xxiii) Interpretations / Marginal Note / Heading / Catch Lines.

The Marginal Notes, Headings and in the catch lines hereto and in the annexures hereto are meant only for convenience of reference and shall not in any way be taken into account in the interpretation of these presents and the annexures hereto. The Contractor will have to carry out and complete the said work in every respect in accordance with this contract.

Words imparting the singular only also include the plural and vice versa where the context requires.

2. **Language(s)**

The language in which the Contract documents shall be drawn up shall be English only.

3. **Errors, Omissions and Discrepancies**

a) In case of errors, omissions and / or disagreement between written and scaled dimensions on the drawings or between the drawings and specifications etc., the following order of precedence shall apply:

(i) Between scaled and written dimension (or description) on a drawing, the later shall be adopted.

(ii) Between the written or shown description or dimensions in the drawings and the corresponding one in the specification the former shall be taken as correct.

(iii) Between the written description of the item in the specifications & descriptions in the Bill of Quantities of the same item, the former shall be adopted.

(b) In case of difference between the rates written in figures and words, the rate in words shall prevail.

(c) Between the duplicate / subsequent copies of the tender and original tender, the original tender shall be taken as correct.

(d) In all cases of omissions and / or doubts or discrepancies in any of the items or specifications, a reference shall be made to the Architect whose elucidation; elaboration or decision shall be considered as authentic and binding.

4. **Scope of Contract**

The Contract comprises the Furnishing / Renovation / Fit Out Work, completion and maintenance of the works and except in so far as the Contract otherwise stipulates the provision of all labour, materials, constructional plant, machinery temporary works and everything whether of a temporary or permanent nature required in and for such construction, completion and maintenance so far as necessary for providing the same as specified in or reasonably to be inferred from the Contract.

5. (i) **Work Order / Award**

Before signing of the Contract, the Employer shall issue by registered post or by otherwise depositing at the registered office of the Contractor, Work Order / Award to enter into a Contract with the Contractor for the execution of the works in accordance with the contract. Until a formal contract agreement is prepared and executed, the tender documents i.e. Volume I, II, III & set of drawings together with the relevant correspondence exchanged from receipt of the tender to acceptance and together with the Employer's Work Order / Award shall constitute a binding contract between the parties.

(ii) **Contract Agreement**

On receipt of intimation from the Employer of the acceptance of his / their tender, the successful tenderer shall be bound to implement the contract and within seven days thereof, the successful tenderer shall sign an agreement in accordance with the draft agreement.

iii) **Integrated Programme Chart**

The Contractor shall prepare and submit to the Architect / PMC/ IIBF -in-charge, an integrated programme chart within Ten days of the Work Order. The integrated programme chart submitted by the contractor shall not have any discrepancy with the time of completion in the contract agreement. The contractor shall execute the work according to the programme submitted to and approved by the Architect / PMC/ IIBF -in-Charge.

i) The Contractor shall prepare the integrated programme chart for the execution all the BOQ items showing clearly all activities from the start of work to the completion, with details of requirements of materials, man power, equipments and machinery deployment, required for the completion of the work within the stipulated period and submit the same to the Architect / PMC/ IIBF within seventh days after the issue of letter for commencement of work. The Contractor shall also submit monthly programme and progress reports and up to date / re-schedule on the 5th day of the every month. These shall be submitted by the contractor through electronic media besides forwarding hard copy of the same.

ii) The integrated programme chart should include the following:

a. Descriptive note explaining sequence of various activities

b. BAR CHART.

c. Programme for procurement / deploying of materials and labour including specialized agencies by the Contractors according to the requirements.

d. Programme of procurement / deploying of number of machinery / equipments having adequate capacity, commensurate with the quantum of work to be done within the stipulated period, by the Contractor. If at any time it appears to the Architect / PMC/

IIBF that the actual progress of the work does not conform to the approved programme referred above, the Contractor shall prepare and submit a revised programme showing the modification of the approved programme to ensure completion of the work within the stipulated time for completion by deploying additional resources as required to adhere to the stipulated time limit. The Contractor shall therefore control the duration of time for the activities falling on the critical path by generating required resources. Nothing extra shall be payable on this account.

e. The approval by the Architect / PMC/ IIBF of such programmes or the furnishing of such particulars shall not absolve or relieve the Contractor of any of his duties or responsibilities under the contract to complete the whole work within the prescribed / stipulated time limit. This is without prejudice to the right of the Architect / PMC/ IIBF representative to take action against Contractor as per terms and conditions of the contract agreement.

6. **Custody of Drawings & Specifications**

The Contract shall be executed in quadruplicate and the Architect / PMC/ IIBF and the Contractor shall be entitled to one executed copy each for their use. The Contractor on the signing hereof shall be furnished by the Architect / PMC/ IIBF free of cost two copies of all tender Drawings and all further Drawings issued during the progress of the works. Any further copies of such Drawings required by the Contractor shall be obtained by him from the Architect on payment of necessary charges to be fixed by the Architect. The Contractor shall keep one copy of all Drawings at the works site and the Architect / PMC/ IIBF representative shall at all reasonable time have access to the same. Before the issue of the final certificate to the Contractor, he shall forthwith return to the Architect / PMC/ IIBF all Drawings and Specifications.

Integrated Service Drawings

Before taking up the work, the contractor shall prepare integrated drawings for various civil and all other services showing details of lay out plan including sectional elevations and submit the same for the approval of Architect / PMC/ IIBF. Integrated drawings shall be prepared and submitted by the Contractor as per local Bye- laws and as per the site conditions to facilitate convenient installation as well as maintenance. Nothing extra shall be payable on this account.

For completing the work in time, the Contractor might be required to work in two or more shifts (including night shifts). No claim whatsoever shall be entertained on this account, not with-standing the fact that the Contractor may have to pay extra amounts for any reason, to the labourers and other staff engaged directly or indirectly on the work according to the provisions of the labour and other statutory bodies regulations and the agreement entered upon by the Contractor with them. Nothing extra shall be paid by the employer on this account.

7. **Disruption of Progress**

The Contractor shall give adequate but not less than 4 weeks time written notice to the Architect / PMC/ IIBF whenever planning or progress of the Works is likely to be delayed or disrupted unless any further drawing or order, including a direction, instruction or approval, is required to be issued by the Architect / PMC/ IIBF. The notice shall include details of the drawing or order required explaining why and by when it is required and of any delay or disruption likely to be suffered if it is late.

8. **Further Drawings and Instructions**

The Contractor shall carry out and complete the said work in every respect in accordance with this Contract and with the directions of and to the satisfaction of the Architect / PMC/ IIBF. The Architect / PMC/ IIBF may in his absolute discretion and from time to time issue further drawings and / or written instructions, details, directions and explanations which are hereafter collectively referred to as "Architect / PMC/ IIBF's Instructions" in regard to:-

(a) Any discrepancy in the Drawings or between the Bill of Quantities and / or Drawings and / or Specification. BOQ will supersede drawings in case of discrepancy.

(b) Removal from the site of any material brought by the Contractor which is rejected by Architect / PMC.

(c) Removal and / or re-execution of any works executed by the Contractor if found not as per specifications / BOQ.

(e) The dismissal from the works of any persons employed thereupon.

(f) The opening up for inspection of any work covered up.

(g) The amending and making good of any defects under Clause 30 hereof.

The Contractor shall forthwith comply with and duly execute any work comprised such Architect / PMC/ IIBF 's instructions provided always that verbal instructions, directions and explanations given to the Contractor or his representative upon the works by the Architect / PMC/ IIBF shall, if involving a variation, be confirmed in writing by the Contractor within seven days, and if not dissented from in writing within a further seven days by the Architect / PMC/ IIBF , such shall be deemed to be Architect / PMC/ IIBF 's instructions within the scope of the Contract.

9. **Duties of Architect**

The duties of the Architect generally are as below but not restricted to these only:
* Watch, monitor and supervise the works.
* Test and examine materials to be used in the works.
* Check workmanship of the items executed.
* Record and check the measurements.
* Order variation of quantities, items etc. with prior approval of Employer
* Extension of time limit with the approval of Employer
* Record extra item of the work
* Documentation
* Correspondence with contractor
* Ensure compliance with contract conditions and specifications.

The Architect / PMC / IIBF may from time to time in writing delegate to the Architect / PMC / IIBF's representative any of the powers and authorities vested in the Architect / PMC / IIBF and shall furnish to the Contractor a copy of all such written delegations of powers and authorities. Any written instruction or approval given by the Architect / PMC/ IIBF's Representative to the Contractor within the terms of such delegation (but not otherwise) shall bind the Contractor and Employer as though it had been given by the Architect / PMC/ IIBF Representative.

If the Contractor shall be dissatisfied by reasons of any decision of the Architect / PMC's / IIBF Representative he shall be entitled to refer the matter to the Institute who shall thereupon confirm, reverse or vary such a decision.

10. **Contractor's General Responsibilities**

The Contractor shall provide at his cost everything necessary for the proper execution of the works according to the intent and meaning of the Drawings, Bill of Quantities and Specifications taken together with whether the same may or may not be particularly shown or described therein provided that the same can reasonably be inferred there from, and if the Contractor finds any discrepancy in the Drawings or between the Drawings, Bill of Quantities and Specifications, he shall immediately and in writing refer the same to the Architect / PMC/ IIBF Representative who shall decide which is to be followed after consultation with Architect.

The successful tenderer is bound to carry out any items of work necessary for the completion of the job even though such items are not included in the Bill of Quantities and rates. Instructions in respect of such additional items and their quantities will be issued in writing by the Architect / PMC/ IIBF representative with the prior consent in writing of the Employer.

The Contractor must co-operate with the other contractors appointed by the Employer so that the work shall proceed smoothly to the satisfaction of the Architect / PMC/ IIBF.

The Contractor must bear in mind that all the work shall be carried out strictly in accordance with the Specifications as given in these documents and also in compliance of the requirements of the local public authorities and to the requirements / satisfaction / direction of the Architect / PMC/ IIBF and no deviation on any account will be permitted.

The Contractor shall have to use materials from the makes / manufacturers specified in the list of materials of approved brand and / or manufacture contained in contract documents and as approved by Employer / Architect.

11. **Safety of Site Operations**

The Contractor shall take full responsibility for the safety, stability and adequacy of all site operations and methods of construction including all temporary works, provided that the Contractor shall not be responsible, except as may be expressly provided in the Contract, for the design or specification of the permanent works. The contractor shall maintain safety as per Standard Industrial Safety Code or any other Code approved by the Architect / PMC/ IIBF .

12. **Watching & Lighting**

The Contractor shall in connection with the Works provide and maintain at his own cost adequate lights, guards, fencing, warning signs and watch & ward staff when and where necessary or as directed by the Architect / PMC/ IIBF or as directed by duly constituted authority for the protection of the works or for the safety and convenience of the public or pilferage of materials from site.

Common facility shall be provided by the main furnishing contractor without any additional cost, which shall also be used by other vender / agencies involved in the project.

13. **Care of Works**

From the commencement to the certified completion of the whole of Works, the contractor shall take full responsibility for the care thereof and of all Temporary Works and in case any damage loss or injury shall happen to the works or to any part thereof or to any Temporary Works from any cause whatsoever the Contractor shall at his own cost repair and make good the same so that on completion, the works shall be in good order and condition and in conformity to every respect with the requirements of the Contract and the Architect / PMC/ IIBF representative's instructions. The Contractor shall also be liable for any damage to the Works occasioned by him including his subcontractors in the course of any operations carried out by him for the purpose of completing any outstanding work and complying with his obligations under Clause 32 hereof. The Contractor shall indemnify the Employer from all risks on this account.

14. (i) **Contractor's Senior Representative for Execution & Coordination of Works**

The Contractor shall have on site at all times during working hours throughout the course of the Contract at least one competent senior representative who shall be empowered to make decisions binding on the Contractor in respect of all matters likely to arise in connection with the execution & coordination of the Works at site and shall keep the Architect / PMC and the Employer informed at all times about the name and designation of such representative. Contractor's Senior Representative shall have the power to take joint measurement and sign the measurement books / bills.

Any directions, explanations, instructions or notices given by the Architect / PMC/ IIBF to such representative shall be held to be given to the Contractor.

(ii) **Contractor's Employees**

The Contractor shall provide and employ after approval from the Architect / PMC/ IIBF on the site in connection with the execution, completion and maintenance of the Works all Enginners / technical assistants as are qualified, skilled and experienced in their respective trades, foremen and leading hands as are competent to give proper supervision, ensuring quality & output to the work they are required to supervise, and also such skilled, semi-skilled and unskilled labour as are necessary for the proper and timely execution, completion and maintenance of the works.

(iii) **Removal of Contractor's Employees**

The Contractor shall on the direction of the Architect / PMC/ IIBF immediately dismiss from the works any person employed thereon by him who may, in the opinion of the Architect / PMC/ IIBF, be incompetent or misconduct himself and such person shall not be again employed on the works without the permission of the Architect / PMC/ IIBF .

(iv) **Unauthorized Persons**

No unauthorized persons are to be allowed on the site. The Contractor shall instruct all such persons to keep out and shall take steps to prevent trespassing.

15. **Compliance with Statutes, Regulations, Etc.**

The Contractor shall conform to the provisions of any Act of the legislature relating to the works, and to the regulations and bye-laws of any authority, and of any water, electric supply and other companies and / or authorities with whose systems the structure is proposed to be connected, and shall, before making any variations from the Drawings or Specifications that may be necessitated by so regulations, give to the Architect / PMC/

IIBF written notice, specifying the variation proposed to be made and the reason for making it and apply for instructions thereon. In case, the Contractor shall not within ten days of submission of such notice, receive such instructions, he shall proceed with the work conforming to the provisions, regulations, or bye-laws in question, and any variation so necessitated shall be dealt with under Clause 28 thereof.

The Contractor shall bring to the attention of the Architect / PMC/ IIBF all notices required for execution by the said Acts, regulations or bye-laws to be given to any authority and pay to such authority, or to any public office all fees that may be properly chargeable in respect of the works, and lodge the receipts with the Architect / PMC/ IIBF for reimbursement at actual.

16. **Setting Out**

The Contractor shall set out the works and shall be responsible for the true and perfect setting out of the same and for the correctness of the positions, levels, dimensions, and alignment of all parts thereof. If at any time any error in this respect shall appear during the progress of the works or within the defects liability period the Contractor shall, if so required, at his own expense rectify such error to the satisfaction of the Architect / PMC/ IIBF .

17. (i) **Quality of Materials & Workmanship & Test**

All materials and workmanship shall be the best of the respective kinds described in the Con-tract and in accordance with the Architect / PMC/ IIBF's instructions and shall be subjected from time to time to such tests as the Architect / PMC/ IIBF's may direct at the place of manufacture or fabrication or on the Site or at an approved testing laboratory.

The Contractor shall upon the instruction of the Architect / PMC/ IIBF furnish him with documentation to prove that the materials & goods comply with the requirements of contract and for requirement stated above. The Architect / PMC/ IIBF may issue instruction in regard to removal of material from site or any work, if these are not in accordance with the Contract. The Contractor shall provide such assistance instruments, machinery, labour and materials as are normally required for examining, measuring, sampling and testing any material or part of work before incorporation in the works for testing as may be selected and required by the Architect / PMC/ IIBF.

(ii) **Samples**

All samples of adequate numbers, sizes, shades & pattern as per specification shall be supplied by the Contractor without any extra charge. Apart from adhering to any special provision made in the specifications regarding submission of samples the contractor shall within 7 days of his receipt of Work Order, provide to the Architect samples along with the detailed literature of all materials he proposes to use in the work irrespective of the fact that a specific make / material might have been stipulated. If certain items proposed to be used are of such nature that samples cannot be presented or pre pared at the site, detailed literature / test certificate of the same shall be provided to the satisfaction of the Architect / PMC/ IIBF. Before submit ting the samples / literature, the contractor shall satisfy himself that the material / equipment for which he is submitting the samples / literature meet with the requirement of the specification. The Architect / PMC/ IIBF shall check the samples and give his comments and / or approval to the same. Only when the samples are approved in writing by the Architect / PMC/ IIBF, the contractor shall proceed with the procurement and installation of the particular material / equipment. The approved samples shall be signed by the Architect / PMC/ IIBF for identification and shall

be kept on record at site office until the completion and acceptance of the work and shall be available at the site for inspection / comparison at any time. The contractor shall keep with him a duplicate of such samples to enable him to process the matter.

For items of work where the samples are to be made at the site, the same procedure shall be followed. All such samples shall be prepared at a place where it can be left undisturbed until the completion of the project.

The Architect / PMC/ IIBF shall communicate their comments / approval to the Contractor to the samples at his earliest convenience. Any delay that might occur in approving of the samples for reasons of its not meeting with the specifications or other discrepancies, inadequacy in furnishing samples of best qualities from various manufacturers and such other aspects causing delay on the approval of the materials / equipments, etc. shall be to the account of the contractor. In this respect the decision of the Architect / PMC/ IIBF shall be final.

On delivery of the supplies of materials / equipment for permanent works at the site, the contractor shall specifically arrange to get the supply inspected by the Architect / PMC/ IIBF and compared with the approved sample and his specific approval obtained before using the same in the work.

(iii) **Cost of Tests**

The cost of making any test shall be borne by the Contractor if such test is intended by or provided for in the Specification or Bill of Quantities.

(iv) **Costs of Tests not provided for, etc.**

If any test is ordered by the Architect / PMC/ IIBF which is either

(a) not so intended by or provided for or

(b) (in the cases above mentioned) is not so particularised, or

(c) though so intended or provided for but ordered by the Architect / PMC/ IIBF to be carried out by an independent person at any place other than the site or the place of manufacture of fabrication of the materials tested or any Government / approved Laboratory, then the cost of such test shall be borne by the Contractor.

18. **Absence of Specification**

If the specifications do not contain particulars of materials and works which are obviously necessary for the proper completion of the works, and the intention to include, which is inferred, all such materials and works shall be supplied and executed by the Contractor without extra charge. If the Contractor requires additional information, he shall, in pursuance of Clause 7.0 hereof, so request in writing well in advance to commencement of the particular work to the Architect / PMC/ IIBF who will issue such detailed information as necessary within a reasonable time.

19. **Obtaining Information Related to Execution of Work**

No claim by the contractor for additional payment will be entertained which is consequent upon failure on his part to obtain correct information as to any matter affecting the execution of the works, nor will any misunderstandings or the obtaining of incorrect information or the failure to obtain correct information relieve him from any risks or from the entire responsibility for the fulfillment of the contract.

20. **Contractor's Superintendence**

The Contractor shall give all necessary personal superintendence during the execution of the works, and as long, thereafter, as the Architect / PMC/ IIBF may consider necessary until the expiry of the "Defects Liability Period" stated hereto.

21. **Access for Inspection**

The Employer, the Architect / PMC and their respective representatives shall at all reasonable times have free access to the work and / or to the workshops, factories or other places where materials are lying or from which they are being obtained and the Contractor shall give to the Employer, the Architect / PMC and their representatives every facility necessary for checking measurements, inspection and examination and test of the materials and workmanship. No person not authorised by the Employer or the Architect / PMC except the representatives of public authorities shall be allowed on the works at any time.

22. (i) **Examination of Work Before Covering Up**

No work shall be covered up or put out of view without the approval of the Architect / PMC/ IIBF and the Contractor shall afford full opportunity for the Architect / PMC/ IIBF to examine and measure any work which is about to be covered up or put out of view and to examine foundations before permanent work is placed thereon. The Contractor shall give due notice to the Architect / PMC/ IIBF of any such work or foundations is or are ready or about to be ready for examination and the Architect / PMC/ IIBF shall without unreasonable delay, unless he considers it unnecessary and advises the Contractor accordingly, attend for the purpose of examining and measuring such work or for examining such foundations.

(ii) **Uncovering and making openings**

The Contractor shall uncover any part or parts of the Works or make openings in or through the same as the Architect / PMC/ IIBF may from time to time direct and shall reinstate and make good such part or parts to the satisfaction of the Architect / PMC/ IIBF. If any such part or parts have been covered up or put out of view after compliance with the requirements of sub-clause (i) of this Clause and are found to be executed in accordance with the contract the expenses of uncovering, making openings in or through reinstating and making good the same shall be borne by the Employer but in any other case all such expenses shall be borne by the Contractor and shall be recoverable from him by the Employer or may be deducted by the Employer from any monies due or which may become due to the Contractor.

23. **Assignment**

The whole of the works 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 thereof or any interest therein without the prior written consent of the Employer / Architect and no undertaking shall relieve the Contractor from the full and entire responsibility of the contract or from active superintendence of the works during their progress.

24. **Quantities**

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 therefor.

25. **Works to be Measured**

The Architect / PMC/ IIBF representative may from time to time intimate to the Contractor that he requires the works to be measured, and the Contractor shall forthwith attend or send a qualified Representative to assist the Architect / PMC/ IIBF representative in taking such measurements and calculations and to furnish all particulars or to give all assistance required by any of them.

Should the Contractor not attend or neglect or omit to send such Representative, then the measurement taken by the Architect / PMC/ IIBF or a person approved by him shall be taken to be correct measurements of the works. Such measurements shall be taken in accordance with the Mode of Measurements detailed in the Specifications.

The Architect / PMC/ IIBF shall take joint measurements with the contractor and the measurements shall be entered in the measurement book / sheet by the Architect / PMC/ IIBF's representative.

The Contractor or his Representative may at the time of measurement take such notes and measurements as he may require.

All authorised extra works, omissions and all variations made without the Architect / PMC/ IIBF's knowledge, but subsequently sanctioned by him in writing (with the prior approval in writing of the Employer) shall be included in such measurements.

26. **Claims**

The Contractor shall send to the Architect / PMC/ IIBF once in every month an account giving particulars as complete and fully detailed as required of all claims for any additional expenses claims, to which the Contractor may consider himself entitled and of all extra or additional / substituted work ordered by the Architect / PMC/ IIBF which he has executed during the preceding month subject of provisions under relevant clauses of contract hereof, and no claim for payment for any such work will be considered which has not been included in such particulars. Provided always that the Architect / PMC/ IIBF shall be entitled to authorise payment to be made for any such work notwithstanding the Contractor's failure to comply with this condition, if the Contractor has, at the earliest practicable opportunity notified the Architect / PMC/ IIBF in writing that he intends to make a claim for such work and thereafter send complete and detailed particulars of the claim to the Architect / PMC/ IIBF as directed by the Architect / PMC/ IIBF but not later than 10 days from the date of notification of his claim.

27. **Variations**

No alteration, omission or variation ordered in writing by the Architect / PMC/ IIBF shall vitiate this contract. In case the Employer / Architect / PMC/ IIBF thinks proper at any time during the progress of the works to make any alterations in, or additions to or omissions from, the works or any alteration in the kind or quality of the materials to be used therein, the Architect / PMC/ IIBF shall give notice thereof in writing to the Contractor or shall confirm in writing within seven days of giving any such oral instructions. The Contractor shall alter, add to, or omit from, as the case may be, in accordance with such notice, but the Contractor shall not do any work extra to or make any alterations or additions to or omissions from the works or any deviation from any of the provisions of the Contract, stipulations, Specification or Contract Drawings without the previous consent in writing of the Architect / PMC/ IIBF and the value of such extras, alterations, additions or omissions shall in all cases be determined by the Architect / PMC/

IIBF in accordance with the provisions of Clause 28 hereof, and the same shall be added to or deducted from the Contract value, as the case may be.

28. **Valuation of Variations**

No claim for an extra shall be allowed unless it shall have been executed under authority of the Architect / PMC/ IIBF representative with the concurrence of the Employer as herein mentioned. Any such extra is herein referred to as authorised extra and shall be made in accordance with the following provisions.

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

(ii) Rates for all items, wherever possible, should be derived out of the rates given in the Priced Bill of Quantities.

(b) The net prices of the original tender shall determine the value of the items omitted, provided if omissions do not vary the conditions under which any remaining items of works are carried out, otherwise the prices for the same shall be valued under sub-clause (c) hereof.

(c) Where the extra works are not of similar character and / or executed under similar conditions as aforesaid or where the omissions vary the conditions under which any remaining items or works are carried out, then the contractor shall within 7 days of the date of receipt of order to carry out the work, inform the Architect / PMC/ IIBF of the rate which he intends to charge for such items of work, supported by analysis of the rate or rates claimed and the Architect / PMC/ IIBF shall fix such rate or prices as in the circumstances in his opinion are reasonable and proper, based on the market rate.

(d) Where extra work cannot be properly measured or valued, the Contractor shall be allowed day work prices at the net rates stated in the tender of the Priced Bill of Quantities or, if not so stated, then in accordance with the local day work rates and wages for the district; provided that in either case, vouchers specifying the daily time (and if required by the Architect / PMC/ IIBF, the workman's names) and materials employed be delivered for verification to the Architect / PMC/ IIBF at or before the end of the week following that in which the work has been executed.

(e) It is further clarified that for all such authorised extra items where rates cannot be derived from tender, the Contractors shall submit rates supported by rate analysis worked on the "market rate basis", for material, labour, hire / running charges of equipment and wastages etc. plus 15% towards establishment charges, contractor's overheads and profit. Such items shall not be eligible for escalation.

The measurement and valuation in respect of the Contract shall be completed within the "Period of Final Measurement" stated in the Appendix or if not stated then within six months of the completion of the Contract works as defined in Clause 39 hereof.

29. **Work is to be Carried Out to the Satisfaction of Architect / PMC/ IIBF**

The Contractor shall carry out all the works strictly in accordance with Drawings, detailed Specifications and instructions of the Architect / PMC/ IIBF. If in the opinion of the Architect changes have to be made in the works, the Contractor

shall carry out the same, and payment, if any, arising out of these shall be made as per the terms of the contract.

30. (i) **Removal of Improper Work & Materials**

The Architect / PMC/ IIBF shall, during the progress of the works, have power to order in writing from time to time the removal from the works within such reasonable time or times as may be specified in the order, of any materials which in the opinion of the Architect / PMC/ IIBF are not in accordance with the Specifications or the instructions of the Architect / PMC/ IIBF, the substitution of proper materials, and the removal and proper re-execution of any work executed with materials or workmanship not in accordance with the Drawings and Specifications or instructions, and the Contractor shall forthwith carry out such order at his own cost. In case of default on the part of the Contractor to carry out such order, the Employer shall have the power to employ and pay other persons to carryout the same, and all expenses consequent thereon, or incidental thereto, as certified by the Architect / PMC/ IIBF representative shall be borne by the Contractor, or may be deducted by the Employer from any moneys due, or that may become due, to the Contractor.

(ii) **Default of Contractor in Compliance**

If the Contractor after receipt of written notice from the Architect / PMC/ IIBF requiring compliance within ten days fails to comply with such further drawings and / or Architect / PMC/ IIBF representative's instructions the Employer may employ and pay other persons to execute any such work whatsoever that may be necessary to give effect thereto, and all costs incurred in connection therewith shall be recoverable from the Contractor by the Employer on the Certificate of the Architect / PMC/ IIBF representative as a debt or may be deducted by him from any moneys due to the Contractor.

(iii) **Inspection & Testing During Manufacture**

The Architect / PMC/ IIBF shall be entitled during manufacture to inspect, examine and test on the Contractor's premises during working hours the materials and workmanship and check the progress of manufacture of all fabrication materials / items to be supplied under the Contract, and if part of the said materials / items are being manufactured on other premises the Contractor shall obtain for the Architect / PMC/ IIBF permission to inspect, examine and test as if the said Plant were manufacturing on the Contractors premises. Such inspection, examination or testing if made shall not relieve the Contractor from any obligation under the Contract.

(iv) **Dates for Inspection & Testing**

The Contractor shall agree with the Architect / PMC/ IIBF the date on and the place at which any plant / works will be ready for testing as provided in the Contract and unless the Architect / PMC/ IIBF shall attend at the place so named on the date agreed the Contractor may proceed with the tests, which shall be deemed to have been made in the Architect / PMC/ IIBF's presence, and shall forthwith forward to the Architect / PMC/ IIBF duly certified copies of the test readings. The Architect / PMC/ IIBF shall give the Contractor 24 hours notice in writing of his intention to attend the tests. All costs of testing shall be borne by the contractor. All outstation

travel expenses shall be borne by the owner but in case re-inspections are required as per clause No. 30 (ix) the travel expenses shall be on contractors account.

(v) **Facilities for Testing at Manufacturer's Works**

Where the Contract provides for tests on the premises of the Contractor or of any sub-contractor the Contractor shall provide such assistance, labour, materials, electricity, fuel, stores, apparatus and instruments as may be requisite and as may be reasonably demanded to carry out such tests efficiently.

(vi) **Certificate of Testing**

As and when fabricated materials shall pass the tests referred in this, the Architect / PMC/ IIBF shall furnish to the Contractor a certificate in writing to that effect.

(vii) **Rejection**

If as a result of such inspection, examination or test of the works (other than a Test on Completion under Clause 17.0) the Architect / PMC/ IIBF shall decide that such material is defective or not in accordance with the Contract he shall notify the Contractor accordingly stating in writing his objection and reasons therefore. The Contractor shall with all speed make good the defect or ensure that the material complies with the Contract. Thereafter, if required by the Architect / PMC/ IIBF representative, the tests shall be repeated under the same terms and conditions save that all reasonable expenses to which the Employer may be put by the repetition of the tests shall be deducted from the Contract Sum.

(viii) **Delivery of Materials & Equipment**

Unless the Architect / PMC/ IIBF shall otherwise direct, no material shall be delivered to site until the Architect / PMC/ IIBF shall have issued, in respect of such material, a certificate under Clause 30 (vi) (Certificate of Testing). Likewise Fabricated Materials or Contractor's Equipment shall be delivered to Site only upon an authorisation in writing applied for and obtained by the Contractor from the Architect / PMC/ IIBF .

The Contractor shall be responsible for the reception on site of all Materials and Contractor's Equipment delivered for the purposes of the Contract.

(ix) **Inspection & Testing and Re-inspection & Re-testing**

All deficiencies revealed by testing and inspection shall be rectified by the Contractor at his own expense and to the satisfaction and approval of the Architect / PMC/ IIBF. Rectified components shall be subject to retesting and re-inspection.

(x) **Inspection Reports**

The Contractor shall provide the Architect / PMC/ IIBF with five copies of reports of all inspections and tests.

31. **Virtual Completion Certificate**

The Architect / PMC/ IIBF shall issue the virtual completion certificate when in his opinion, the works have been substantially completed in all respects and necessary approvals are obtained by the Contractor. The Defects Liability Period shall commence from the date of virtual completion as certified by the Architect / PMC/ IIBF.

32. **Defect Liability Period**

Any defect or other faults which may appear within the "Defects Liability Period" stated in the Appendix hereto or, if none stated, then within 365 days after the date of the virtual completion of the works as certified by the Architect / PMC/ IIBF, arising in the opinion of

the Architect / PMC/ IIBF from materials or workmanship not in accordance with the contract, shall upon the direction in writing of the Architect / PMC/ IIBF , and within such reasonable time as shall be specified therein, be amended and made good by the Contractor, at his own cost and in case of default the Employer may employ and pay other persons to amend and make good such defects or other faults, and all damages, loss and expenses consequent thereon or incidental thereto shall be made good and borne by the Contractor and such damage, loss and expenses shall be recoverable from him by the Employer or may be deducted by the Employer, upon the Architect / PMC/ IIBF 's Certificate in writing, from any money due or that may become due to the Contractor, or the Employer may in lieu of such amending and making good by the Contractor deduct from any monies due to the Contractor, a sum, to be determined by the Architect / PMC/ IIBF equivalent to the cost of amending such work and in the event of the amount retained under Clause 46 hereof being insufficient, recover the balance from the Contractor, together with any expenses the Employer may have incurred in connection therewith. Should any defective work have been done or material supplied by any Sub-Contractor employed on the works who has been nominated or approved by the Architect / PMC/ IIBF, the Contractor shall be liable to make good in the same manner as if such work or material had been done or supplied by the Contractor and been subject to the provisions of this Clause and Clause 29 hereof. The Contractor shall remain liable under the provisions of this Clause notwithstanding the signing of any certificate or the passing of any accounts, by the Architect / PMC/ IIBF. The Contractor will not be responsible for defects arising out of fair wear & tear & damage caused by Employer's personnel during the use of the building after being occupied.

33. **Approval Only by No Dues Certificate**

(i) **Final Completion Certificate**

On successful completion of entire works covered by the Contract to the full satisfaction of Employer / Architect / PMC/ IIBF representative, the Contractor shall ensure that the following works have been completed to the satisfaction of Architect / PMC/ IIBF : (a) clear the site of all scaffolding, wiring, pipes, surplus materials, Contractor's labour, equipment and machinery (b) demolish, dismantle and remove all Contractor's site offices and other temporary works, structures and constructions and other items and things whatsoever brought upon or erected at the site or any land allotted to the Contractor by the Owner and not incorporated in the permanent works (c) remove all rubbish, debris etc. from the site and the land allotted to Contractor and shall clear, level and dress, compact the site as required and said land to the satisfaction of the Architect / PMC/ IIBF (d) shall put the Owner in undisputed custody and possession of the site and all land allotted by the Owner to the Contractor (e) All defects / imperfections have been attended & recti-fied to full satisfaction of the Architect / PMC/ IIBF during the Defect Liability Period.

Unless the Contractor shall have fulfilled the provisions of the clause, the works shall not be deemed to have been completed.

Upon the satisfactory fulfillment by Contractor as stated above, the Contractor shall be entitled to apply to the Architect / PMC/ IIBF for a Final Completion Certificate in respect of the entire work.

If the Architect / PMC/ IIBF is satisfied of the completion of the work relative to which the Completion Certificate has been sought, the Architect / PMC/ IIBF shall within 14 (fourteen) days of the receipt of the application for Completion Certificate, issue a

Completion Certificate in respect of the works for which the Completion Certificate has been applied.

This issuance of a Completion Certificate shall be without prejudice to the Employer's rights and Contractor's liabilities under the Contract, including the Contractor's liability for the Defect Liability Period nor shall the issuance of a Completion Certificate in respect of the works or work at any site be construed as a waiver of any right or claim of the Employer against the Contractor in respect of work or the works at the site and in respect of which the Final Completion Certificate has been issued.

(ii) **No Dues Certificate**

The Contract shall remain valid and shall remain incomplete until no dues Certificate shall have been signed by the Architect / PMC/ IIBF representative and delivered to the Employer with a copy to the contractor. Such a certificate shall be given by the Architect / PMC/ IIBF representative within 30 days of completion of defects liability period (the last period to be considered if different periods to be considered if different parts of the work) or within 30 days from the date of payment of final bill whichever is later.

34. (i) **Basic Cost**

The material(s) required for execution of any item for which a sum has been provided as a basic cost price in the tender, shall be procured by the contractor on Employer's instruction from an agency nominated by the Employer. Every sum in the bill of quantities which contains either as a whole or part the amount as prime cost price of the materials shall be varied by substitution of the actual cost of the materials.

No variation shall be made in respect to the percentage quoted for labour and to cover for overheads & profits on account of variation in the prices, as above. The basic price of the material shall be inclusive of all taxes and the cost has to be verified from the actual purchased bills. The billed amount shall be finalized as per the basic cost in both ways i.e. plus or minus from the quoted rates. The contractor has to provide the purchase bill with GST detail

35. **Work by Other Agencies**

The Employer / Architect reserves the right to use premises and any portions of the site for the execution of any work not included in this contract which it may desire to have carried out by other persons simultaneously, and the Contractor shall allow all reasonable facilities for the execution of such work and carry out his work in coordination / cooperation with other agencies, but shall not be required to provide any plant or material for the execution of such work except by special arrangement with the Employer. Such work shall be carried out in such manner as not to impede the progress of the works included in the Contract and the Contractor shall not be responsible for any damage or delay which may happen to or occasioned by such work

36. **Insurance Policies**

The Contractor shall be responsible for all injury or damage to persons, animals or things, and for all damage to property which may arise from any factor / omission on the part of the Contractor or any Sub-Contractor or any nominated Sub-Contractor or any of their employees. The liability under this clause shall cover also, interalia any damage to structures, whether immediately adjacent to the works or otherwise, any damage to roads, streets, footpaths, bridges as well as damage caused to the building and other structures and works forming the subject matter of this contract. The Contractor shall also

be responsible for any damage caused to the buildings and other structures and works forming the subject matter of this contract due to rain, wind, fire, flood or high tide or other inclemency of weather. The Contractor shall indemnify and keep indemnified the Employer and hold him harmless in respect of all and any loss and expenses arising from any such injury or damage to persons or property as aforesaid and also against any claim made in respect of injury or damage, whether under any statute or otherwise and also in respect of any award or compensation or damage consequent upon such claims. The Contractor shall, at his own expense, effect and maintain till issue of the virtual completion certificate under this contract, with an insurance company approved by the Employer, an All Risks Policy (CAR Policy) for Insurance for an amount equal to 125% of Contract value including earthquake risk in the joint names of the employer and the contractor (the name of the former being placed first in the policy) against all risk as per the standard all risk policy for Contractors and deposit such policy or policies with the employer before commencing the works.

The Contractor shall reinstate all damage of every sort mentioned in this clause so as to do delivery of the whole of the works complete and perfect in every respect and so as to make good or otherwise satisfy all claims for damage to property or third parties.

The Contractor shall also indemnify and keep indemnified the Employer against all claims which may be made against the Employer by any person in respect of anything which may arise in respect of the works or in consequence thereof and shall at his own expense, effect and maintain until the virtual completion of the contract, with an Insurance Company approved by the employer a third party insurance policy in the joint names of the Employer and the contractor (name of the former being placed first in the policy) against such risks and deposit such policy or policies before commencement of the works. The minimum limit of the coverage under the policy shall be Rs. 5.00 lacs per person for any one accident or occurrence and Rs. 20.00 lacs in respect of damage to property for any one accident or occurrence. The Contractor shall also indemnify the employer against all claims which may be made upon the Employer, whether under the Workmen's Compensation Act or any other statute in force, during the currency of this contract or at Common Law in respect of any employee of the Contractor or of sub-contractor and shall be at his own expense effect and maintain until the virtual completion of the contract, with an Insurance Company, approved by the Employer, a policy of Insurance against such risks and deposit such policy or policies with the Employer from time to time during the currency of this contract.

In default of the contractor insuring as provided above, the employer may so insure and may deduct the premiums paid from any money due or which may become due to the contractor.

The contractor shall be responsible for any liability which may not be covered by the Insurance Policies re-ferred to above and also for all other damages to any person, animal or defective carrying out of this contract, whatever, may be the reasons due to which the damage shall have been caused.

The contractor shall also indemnify and keep indemnified the Employer against all and any costs, charges or expenses arising out of any claim or proceedings relating to the works and also in respect of any award of damage or compensation arising there from.

Without prejudice to the other rights of the employer against contractors in respect of such default, the employer shall be entitled to deduct from any sums payable to the

contractor the amount of any damages, compensation costs, charges & other expenses paid by the employer and which are payable by the contractor under this clause.

The Contractor shall upon settlement by the Insurer of any claim made against the insurer pursuant to a policy taken under this clause, proceed with due diligence to rebuild or repair the works destroyed or damaged. In this event all the monies received from the Insurer in respect of such damage shall be paid to the Contractor and the Contractor shall not be entitled to any further payment in respect of the expenditure incurred for rebuilding or repairing of the materials or goods destroyed or damaged.

The Contractor, in case of re-building or reinstatement after damage shall be entitled to such extension of time for completion as the Architect / PMC/ IIBF may deem fit, but shall, however, not be entitled to reimbursement by the employer of any shortfall or deficiency in the amount finally paid by the insurer in settlement of any claim arising as set out herein.

Without prejudice to his liability under this clause, the contractor shall also cause all nominated sub-contractors to effect, for their respective portions of the works, similar policies of insurance in accordance with the provisions of this clause and shall produce or cause to produce to the employer such policies. The contractor shall not permit a nominated sub-contractor to commence work at the site unless the said insurance policies are submitted. In the event of failure of the sub-contractor to take out such a policy of insurance before commencing the works at the site, the contractor shall be responsible for any claim or damage attributable to the said sub- contractor.

37. **Commencement of Works**

Within 7 Calendar days from the date of issue of Work Order, the contractor shall begin the works and shall regularly proceed with and complete the same on or before the "Date of Completion" stated in the Appendix subject nevertheless to the provisions for extension of time hereinafter contained.

38. (i) **Possession of Site**

Save in so far as the Contract may prescribe the extent of portions of the Site of which the Contractor is to be given possession from time to time and the order in which such portions shall be made available to him and subject to any requirement in the Contract as to the order in which the Works shall be executed, the Employer will within 3 days from the Architect / PMC written request to commence the Works give to the Contractor possession of so much of the Site as may be required to enable the Contractor to commence and proceed with the programme referred to in Clause 50 hereof (if any) and otherwise in accordance with such reason able proposals of the Contractor as he shall, by notice in writing to the Architect / PMC/ IIBF, make & will from time to time as the Works proceed give to the Contractor possession of such further portions of the Site as may be required to enable the Contractor to proceed with the construction of the Works with due dispatch in accordance with the said programme or proposals (as the case may be).

If the Contractor suffers delay or incurs expense from failure on the part of the Employer to give possession in accordance with the terms of this clause the Architect / PMC/ IIBF shall grant an extension of time for the completion of the works without any compensation for delay.

(ii) **Way leaves, etc.**

The Contractor shall bear all expenses and charges for special or temporary way leaves required by him in connection with access to the Site. The Contractor shall also provide at his own cost any additional accommodation outside the Site required by him for the purpose of the Works.

39. **Time for Completion**

The entire work i.e. works mentioned in the tender document is to be completed in all respects within the time stated in Appendix to "Form of Tender" or such extended time as may be allowed under clause 40 hereof. Time is the essence of the contract and shall be strictly observed by the contractor.

If required in the contract or as directed by the Architect / PMC/ IIBF, the contractor shall complete certain portion of the work before the completion of the whole of the work. However the completion date for whole of the work shall not change.

40. **Extension of Time for Completion**

If in the opinion of the Architect / PMC/ IIBF the works be delayed for reasons beyond the control of the contractor, the Architect / PMC/ IIBF may make a fair and reasonable extension of time for completion of the contract works.

If the Contractor needs an extension of time for the completion of the work or if the completion of work is likely to be delayed for any reasons beyond the due date of completion stipulated in the contract, the Contractor shall apply to the Employer for extension of time in writing at least 30 days before the expiry of the scheduled time and while applying for extension of time, Contractor shall furnish the reasons in detail and his justification, if any, for the delays. While granting extension, the Architect / PMC/ IIBF shall notify the contractor the period of time which will not qualify for levy of liquidated damages.

For the balance period in excess of original stipulated period and authorized extension of time granted i.e. period not qualifying for levy of liquidated damages, by the Employer, the provision of liquidated damages as stated under Clause 43 will become applicable.

Further, the contract shall remain in force even for the period beyond the due date of completion irrespective whether the extension is granted or not.

41. (i) **Rate of Progress**

The whole of the materials, plant and labour to be provided by the Contractor and the mode, manner and speed of execution and maintenance of the Works are to be of a kind and conducted in a manner to the satisfaction of the Architect / PMC/ IIBF. Should the rate of progress of the Works or any part thereof be at any time be in the opinion of the Architect / PMC/ IIBF too slow to ensure the completion of the whole of the Works by the prescribed time or extended time for completion, the Architect / PMC/ IIBF shall so notify the Contractor in writing and the Contractor shall thereupon take such steps as considered necessary by the Architect / PMC/ IIBF to expedite progress so as to complete the Works by the prescribed time or extended time for completion. Such communications from the Architect / PMC/ IIBF neither shall relieve the contractor from fulfilling obligations under the contract nor he will be entitled to raise claims arising out of such directions.

(ii) **Work during Night or on Holidays**

Subject to any provision to the contrary contained in the Contract none of the permanent work shall save as herein provided be carried on during the night or on Holidays without the permission in writing of the Architect / PMC/ IIBF, save when the work is unavoidable

or absolutely necessary for the saving of life or property or for the safety of the Works in which case the Contractor shall immediately advise the Architect / PMC/ IIBF. Provided always that the provisions of this clause shall not be applicable in the case of any work, which becomes essential to carry out by rotary or double shifts in order to achieve the progress & quality of the part of the works being technically required / continued with the prior approval of the Architect / PMC/ IIBF.

All work at night shall be carried out without unreasonable noise & disturbance and with the approval of the Architect / PMC/ IIBF & in addition that of the local authority, if so applicable. The Contractor shall indemnify the Employer from and against any liability for damages on account of noise or other disturbance created while or in carrying out the work and from and against all claims, demands, proceedings, costs, charges & expenses whatsoever in regard or in relation to such liability.

42. **Suspension of Work**

The Contractor shall on the written order of the Architect / PMC/ IIBF suspend the progress of the Works or any part thereof for such time or times and in such manner as the Architect / PMC/ IIBF may consider necessary and shall during such suspension properly protect and secure the work so far as is necessary in the opinion of the Architect / PMC/ IIBF. The extra cost including all running wages to be paid on the Site, salaries, depreciation and maintenance of plant, Site on costs and overhead costs of the Contract relatable to the works done or incurred by the Contractor in giving effect to the Architect / PMC/ IIBF's instructions under this Clause shall, be borne and paid by the Employer unless such suspension is :

(a) otherwise provided for in the Contract

or

(b) necessary by reason of inclement weather conditions affecting adversely the safety or quality of the Works.

or

(c) necessary by reason of some default on the part of the contractor

Provided that the Contractor shall not be entitled to recover any such extra cost unless he gives notice in writing of his intention to claim to the Architect / PMC/ IIBF within 28 days of the Architect / PMC/ IIBF's order. The Architect / PMC/ IIBF shall settle and determine such extra payment and / or extension of time under relevant Clause hereof to be made to the Contractor in respect of such claim as shall in the opinion of the Architect / PMC/ IIBF be fair and reasonable and the Architect / PMC/ IIBF's decision shall be final and binding.

43. **Incentive for early completion and Liquidated Damages for Delay:**

If the Contractor fails to complete the works by the period stated in the Appendix or within any extended time under Clause 40 hereof and the Architect / PMC/ IIBF certifies in writing that in his opinion the same ought to have been reasonably completed by the original completion date or extended completion date, as the case may be, the Contractor shall pay the Employer the sum named in the Appendix as "Liquidated Damages" for the period during which the said works shall so remain incomplete or the Employer may deduct such damages from any monies due to the Contractor.

44. (i) **Default of Contractor**

If the Contractor being an individual or a firm commits any "act of insolvency", or shall be adjudged an insolvent or being an Incorporated Company shall have an order for

compulsory winding up made against it as pass an effective resolution for winding up voluntarily or subject to the supervision of the Court and the Official Assignee or the Liquidator in such acts of insolvency or winding up, as the case may be, shall be unable within seven days after notice to him requiring him to do so, to show to the reasonable satisfaction of the Architect / PMC/ IIBF that he is able to carry out and fulfill the Contract and to give security therefore, if so required by the Architect / PMC/ IIBF.

Or if the Contractor (when an individual, firm or incorporated Company) shall suffer execution or other process of Court attaching property to be issued against the Contractor.

Or shall suffer any payment under this Contract to be attached by or on behalf of any of the creditors of the Contractor.

Or shall assign or sublet this Contract without the consent in writing of the Employer.

Or shall charge or incumber this Contract or any payments due or which may become due to the Contractor hereunder.

Or if the Architect / PMC/ IIBF shall certify in writing to the Employer that the Contractor.

(a) Has abandoned the Contract, or

(b) Has failed to commence the works, or has without any lawful excuse under these conditions suspended the progress of the works for fourteen days after receiving from the Architect / PMC/ IIBF's notice to proceed with the work

or

(c) Has failed to proceed with the works with such due diligence and failed to make such due progress as would enable the works to be completed within the time agreed upon,

or

(d) Has failed to remove materials from the site or to pull down and replace work for seven days after receiving from the Architect / PMC/ IIBF written notice that the said materials or work were condemned and rejected by the Architect / PMC/ IIBF under these conditions,

or

(e) Has neglected or failed persistently to observe and perform all or any of the acts, matters or things by this contract to be observed & performed by the Contractor for seven days after written notice shall have been given to the Contractor requiring the Contractor to observe or perform the same.

Then and in any of the said cases the Employer may, notwithstanding any previous waiver, after giving seven days notice in writing to the Contractor, determine the Contract, but without thereby affecting the powers of the Architect / PMC/ IIBF or the obligations and liabilities of the Contractor, the whole of which shall continue in force as fully as if the Contract had not been so determined, and as if the works subsequently executed had been executed by or on behalf of the Contractor. And further, the Employer by his agents or servants may enter upon and take possession of the works and all plants, tools, scaffoldings, sheds, machinery, steam and other power utensils and materials lying upon the premises or the adjoining lands or roads and use the same as his own property or may employ the same by means of his own servants and workmen in carrying on and completing the works or by employing any other Contractor shall not in any way interrupt or do any act, matter or thing to prevent or hinder such other Contractor or other person or persons employed for completing and finishing or using the materials and plant for the works. When the works shall be completed or as soon, thereafter,

as convenient the Architect / PMC/ IIBF shall give a notice in writing to the Contractor to remove his surplus materials and plant and should the Contractor fail to do so within a period of fourteen days after receipt thereof by him, the Employer may sell the same by public auction, and give credit to the Contractor for the net amount realized. The Architect / PMC/ IIBF shall, thereafter, ascertain and certify in writing under his hand what (if anything) shall be due or payable to or by the Employer, for the value of the said plant and materials so taken possession of by the Employer and the expense or loss which the Employer shall have been put to in procuring the works to be completed and the amount, if any, owing to the Contractor and the amount which shall be so certified shall thereupon be paid by the Employer to the Contractor or by the Contractor to the Employer, as the case may be, & the Certificate of the Architect / PMC/ IIBF shall be final and conclusive between the parties.

45. **Security Deposit / Retention Money**

In addition to the Initial Security Deposit further security for the due fulfillment of the contract by the Contractor, 8% of the value of the work done will be deducted by the Employer from each payment to be made to the Contractor towards retention money until the retention money amounts to 5% of the contract value (excluding the cost of Operation & Annual Maintenance Contract) including the initial Security Deposit. On the Architect / PMC/ IIBF's issuing a certificate of virtual completion of the works, 50% of the security deposit shall be released to the contractor, and the remaining 50% will be released by the Employer after the Contractor obtains the no dues certificate from the Architect / PMC/ IIBF subject to Clause 33. The amounts retained by the Employer shall not bear any interest.

All compensation or other sums of money payable by the Contractor to the Employer under the terms of this contract may be deducted from the security deposit if the amount so permits and the Contractor shall, unless such deposit has become otherwise payable, within ten days after such deduction make good in cash the amount so deducted.

The security deposit of the contractor will be forfeited if he fails to comply with any of the conditions of the contract.

46. **Certificates & Payment**

(i) **Secured Advance on Materials at Site**

The Contractor will be paid secured advance against the materials brought and stacked at site for use in permanent works and in the opinion of the Architect / PMC/ IIBF are required to be procured in advance. The advance paid for the materials stacked at site shall be maximum 75% of the cost of the materials or 60% of the relevant item rate, whichever is less at the discretion of Architect / PMC/ IIBF and the Contractor shall produce necessary vouchers / documents in support of cost of each material. No advance shall be admitted for perishable and materials procured prematurely as decided by the Architect / PMC/ IIBF.

Where in any Certificate (of which the Contractor has received payment), the Architect / PMC/ IIBF has included the value of any unfixed materials intended for and / or placed on or adjacent to the works such materials shall become the property of the Employer and they shall not be removed except for use upon the works, without the written authority of the Architect / PMC/ IIBF. The Contractor shall be liable for any loss of or damage to, such materials.

The materials shall also be in conformity with contract specifications and of approved quality as stated in relevant clauses hereof. These advance shall be made on the basis of the quantity of each material lying at site at the time of preparation of each interim bill. The Contractor shall sign indemnity bond for any loss either due to theft or fire etc.

(ii) **Running Bill Payments**

a) The Contractor shall be paid by the Employer from time to time by installments under Interim Certificate to be issued by the Architect / PMC/ IIBF representative to the Contractor on account of the works executed when in the opinion of the Architect / PMC/ IIBF representative, work to the approximate value named in the Appendix to form of tender "Minimum value of Work for Interim Certificate" (or less at the sole discretion of the Architect / PMC/ IIBF) has been executed in accordance with this contract, subject to a retention of the percentage of such value named in the Appendix to form of tender hereto as 'Retention Percentage for Interim Certificates' until the total amount retained shall reach the sum named in the Appendix to form of tender as 'Security Deposit'.

b) The contractor shall be paid two bills in a month, which shall include work done and secured advance against material. If in the opinion of the Architect / PMC/ IIBF representative the progress of the work warrants a third payment in a month, the same shall be so arranged by the Employer.

c) After submission of bill along with complete information, vouchers, etc. to the satisfaction of the Architect / PMC/ IIBF & after making necessary deductions toward Income Tax & other recoveries deductible at source, the bill will be paid as follows:

i) An adhoc payment of 75% of the value of work done as assessed by the Architect / PMC/ IIBF shall be released within 20 working days by the Employer, after certification by the Architect / PMC/ IIBF representative who will certify within 7 working days of submission of Bill including furnishing of all relevant documents.

ii) Balance amount shall be certified by the Architect / PMC/ IIBF representative within 10 working days of submission of bill and payment shall be released by the Employer within 20 working days of certificate receipt.

(iii) **Final Bill**

a) The Contractor shall submit final bill within 45 days from the date of issue of virtual completion certificate with all relevant information and details including as-built drawings, operation and maintenance manual, photographs etc. complete. The last date of submission of all relevant documents shall be reckoned as the date of final submission.

b) The Architect / PMC/ IIBF representative within 45 days of submission of the final bill, shall issue a certificate of payment against the final bill to the Employer who shall thereupon, within 45 days from the date of receipt of the certificate, shall release the balance payment to the contractor after effecting all recoveries, including advances & payments against interim certificates.

(iv) The Architect / PMC/ IIBF shall have power to withhold Certification if the works or any parts thereof are not being carried out to his satisfaction.

(v) The Architect / PMC/ IIBF may by any Certificate make any correction in any previous Certificate, which shall have been issued by him.

(vi) No payment shall be made to the Contractor if the Contractor fails to insure the works & keep them insured till the issue of the Virtual Completion Certificate.

47. **Settlement of Disputes and Differences**

a) The Contractor shall try to settle all matters pertaining to this contract first with the Architect / PMC/ IIBF representative. The decision of the Architect / PMC/ IIBF representative may be in the form of a certificate, instruction or otherwise. The decision, opinion, direction, certificate for payment with respect to all or any of the matters under Clauses 18, 30, 31 and 32 hereof (which matters are hereinafter referred to as excepted matters) of the Architect / PMC/ IIBF representative shall be final and conclusive and binding on the Contractor and Employer and shall be without appeal.

b) All other disputes and differences of any kind whatsoever between the Contractor and the Architect / PMC/ IIBF representative arising out of or in connection with the contract or carrying out the works (whether during progress of work or within defects liability period and whether before or within 365 days of determination / abandonment / breach of the contract) shall then be referred by the Contractor to the Employer giving interalia full details of matter under dispute and the reasons thereof. The Employer shall within a period of 60 days from the receipt of such reference from the contractor, give his decision in writing. If the Contractor is dissatisfied with the decision of the Employer, he can refer the matter for arbitration by serving a written notice on the Employer, through the Architect / PMC/ IIBF representative within a period of 28 days of such decision. The notice shall specify the matters with full details and amount, which are in dispute and referred for arbitration.

48. **Arbitration**

All disputes or difference of any kind whatsoever which shall at any time arise between the parties hereto touching or concerning the works or the execution thereof of this maintenance thereof of this contract or the construction remaining operation or effect thereof or to the rights or liabilities of the parties or arising out of or in relation thereto whether during or after determination, foreclosure or breach of the contract (other than those in respect of which the decision of any person is by the contract expressed to be final and binding) shall after written notice by either party to the contract to the other of them and to the *Appointing Authority who shall be appointed for the purpose by the Employer (Indian Institute of Banking & Finance) be referred for adjudication to a sole Arbitrator to be appointed as hereinafter provided.

*** Appointing Authority**

The Appointing Authority will be the Deputy CEO, Indian Institute of Banking & Finance Corporate Office at 2nd Floor , Tower 1 , Kohinoor City , Commercial II, Kurla West Mumbai - 400 005

The names of the Arbitrator will be selected from one of the following disciplines, in order of preference:

(a) Retired High Court / Supreme Court Judges, who have experience in handling Arbitration cases.

(b) Members of the Council of Arbitration.

(c) Fellow of Institution of Architects.

(d) Eminent retired Chief Architect from State / Centre / P.W.D. / Public Sector undertakings of good reputation and integrity.

For the purpose of appointing the sole Arbitrator referred to above, the Appointing Authority will send within thirty days of receipt by him of the written aforesaid notice, to the contractor a panel of three names of persons who shall be presently unconnected with the organization for which the work is executed.

The contractor shall on receipt by him of the names as aforesaid, select any one of the persons named to be appointed as a sole Arbitrator and communicate his name to the Appointing Authority within thirty days of receipt by him of the names. The Appointing Authority shall thereupon without any delay appoint the said person as the sole Arbitrator. If the Contractor fails to communicate such selection as provided above within the period specified, the Appointing Authority shall make the selection and appoint the selected person as the Sole Arbitrator.

If the Appointing Authority fails to send to the Contractor the panel of three names as aforesaid within the period specified, the Contractor shall send to the Appointing Authority a panel of three names of persons who shall all be unconnected with either party. The Appointing Authority shall on receipt by him of the names as aforesaid select any one of the persons named and appoint him as sole Arbitrator. If the Appointing Authority fails to select the person and appoint him as the sole Arbitrator within 30 days of receipt by him of panel and inform the Contractor accordingly, the contractor shall be entitled to appoint one of the persons from the panel as the sole Arbitrator and communicate his name to the Appointing Authority.

If the Arbitrator so appointed is unable or unwilling to act or resigns his appointment or vacates his office due to any reason whatsoever another sole Arbitrator shall be appointed as aforesaid.

The work under the Contract shall, however, continue during the arbitration proceedings and no payment due or payable to the contractor shall be withheld on account of such proceedings.

The Arbitrator shall be deemed to have entered on the reference of the date he issues notice to both parties fixing the date of the first hearing.

The Arbitrator may from time to time, with the consent of the parties, enlarge the time for making and publishing the award.

The Arbitrator shall give a separate award in respect of each dispute or difference referred to him. The Arbitrator shall decide each dispute in accordance with the terms of the contract and give a reasoned award. The venue of arbitration shall be such place as may be fixed by the Arbitrator in his sole discretion.

The fees, if any, of the Arbitration shall, if required to be paid the award is made and published, be paid half by each of the parties. The costs of the reference and of the award including the fees, if any, of the Arbitration who may direct to and by whom and in what

manner such costs or any part thereof shall be paid and may fix or settle the amount of costs be so paid.

The award of the Arbitrator shall be final and binding on both parties.

Subject to aforesaid the provision of the Arbitration Act 1996 or any statutory modification or re-enactment therefor and the rules made there under, and for the time being in force, shall apply to the arbitration proceeding under this Clause.

In all cases the arbitrator shall give reasons for the award.

It is also a term of the contract that if contractor(s) do / does not make any demand for arbitration in respect of any claim(s) within 90 days of receiving intimation from IIBF/ Architect that the bill after due verification is passed for payment of a lesser amount, or otherwise, the contractor's right under this agreement to refer to arbitration shall be deemed to have been forfeited and IIBF / Architect shall be relieved and discharged of their liability under this agreement in respect of such claim(s). Further it is agreed that for the purpose of this clause, such notice is deemed to have been received by the contractor(s) within 2 days of posting of the letter by IIBF / Architect or when delivered by hand immediately after receipt thereof by the contractor(s), whichever is earlier. Further, letter signed by the officials of IIBF / Architect that the letter was so posted to the contractor(s) shall be conclusive.

49. **Programme of Works**

(i) **Detailed Programme to be Furnished**

Within 15 days of receiving Work Order / Award the Contractor shall prepare and submit a detailed programme of works in the form of a Bar Chart / Mile stone network showing all activities & the order of procedure in which he proposes to carry out the works including labour histogram, cash flow and deployment of equipments. Within 15 days from the date of submission, the Architect / PMC/ IIBF shall convey to the Contractor his comment / approval on the programme.

The contractor shall be required to submit the PERT / CPM chart for the various activities involved in this work including dependencies etc., and regularly monitor the progress of works accordingly.

(ii) **Programme to be Modified**

Subject to the provisions of Clause 39 hereof, if at any time it should appear to the Architect / PMC/ IIBF that the actual progress of the works does not conform to the approved programme referred to in sub-clause (i) of this Clause, the Contractor shall produce a revised & detailed pro-gramme showing the modifications to the original programme necessary to ensure the completion of the works within the time for completion as defined in Clause 39 hereof.

(iii) **Progress Report**

Four copies of monthly progress reports containing the following shall be submitted by the Contractor to the Employer through the Architect / PMC/ IIBF representative on or before the 5th day of the next month.

(a) Monthly detailed progress report showing the progress of individual activities of programme as achieved at site till such period and being suitably marked on the approved network diagram, or as directed by the Architect / PMC/ IIBF representative, shall be provided by the Contractor indicating the actual state of progress during the course of the contract, together with other details of

procurement & delivery schedules of materials / equipments, as required by the Architect / PMC/ IIBF .

(b) Labour report in the form prescribed by the Architect / PMC/ IIBF.

(c) Equipment & machinery report in the form pre scribed by the Architect / PMC/ IIBF.

(d) Supervisory staff report in the form prescribed by the Architect / PMC/ IIBF.

(e) Remedial Measures for covering up delay, if any,.

(f) Bottlenecks and hindrances,

(g) Minimum 5 nos. of colour photographs of 7" x 5" with each report showing the progress of works.

Apart from the above the Contractor shall submit daily report indicating regular deployment of his staff and workers, equipments, important stages of progress, procurement of construction materials etc. as approved by the Architect / PMC/ IIBF.

50. Urgent Repairs

If by reason of any accident or failure or other event occurring to in or in connection with the Works, or any part thereof, either during the execution of the Works or during the Period of Defect Liability / Maintenance any remedial or other work or repair shall, in the opinion of the Architect / PMC/ IIBF be urgently necessary for security and safety of life or for the works or of adjoining property, and the Contractor is unable or unwilling at once to do such work or repair, the Employer may employ his own or other workmen do such work or repair, as the Architect / PMC/ IIBF or the Architect / PMC/ IIBF's representative may consider necessary. If the work or repair so done by the Employer which is in the opinion of the Architect / PMC/ IIBF representative, the Contractor was liable to do at his own expense under the Contract, all costs and charges incurred by the Employer in so doing shall on demand be paid by the Contractor to the Employer or may be deducted by the Employer from any monies due or which may become due to the Contractor. Provided always that the Architect / PMC/ IIBF or the Architect / PMC/ IIBF's representative (as the case may be) shall, as soon after the occurrence of any such emergency, as may be reasonably practicable notify, the Contractor thereof in writing.

51. Contractor to Search

The Contractor shall, if required by the Architect / PMC/ IIBF in writing, search, test as shall be necessary to determine the cause of any defect, imperfection or fault under the directions of the Architect / PMC/ IIBF. Unless such defect, imperfection or fault shall be one for which the Contractor is liable under the contract the cost of the work carried out by the Contractor in searchings as aforesaid shall be borne by the Employer. But if such defect, imperfection or fault shall be one for which the Contractor is liable as aforesaid, the cost of the work carried out in searching as aforesaid shall be borne by the Contractor and he shall in such case repair rectify and make good such defect, imperfection or fault at his own expense in accordance with the provisions of Clause 30 hereof.

52. Interference with Traffic and Adjoining Properties

All operations necessary for the execution of the Works and for the construction of any Temporary Works shall so far as in compliance with the requirements of the Contract permits be carried on so as not to interfere unnecessarily or improperly with the public convenience or the access to use and occupation of public or private roads and footpaths

or to or of properties whether in the possession of the Employer or of any other person and the Contractor shall save harmless and indemnify the Employer in respect of all claims, demands, proceedings, damages, costs, charges and expense whatsoever arising out of or in relation to any such matters in so far as the Contractor is responsible.

53. (i) Extraordinary Traffic

The Contractor shall use every reasonable means to prevent any of the highways or bridges communicating with or on the routes to the Site from being damaged or injured by any traffic of the Contractor or any of his sub-contractors and in particular shall select routes and use vehicles and restrict and distribute loads so that any such extraordinary traffic as will inevitably arise from the moving of plant and material from and to the site shall be limited as far as reasonably possible and so that no unnecessary damage or injury may be occasioned to such highways and bridges.

(ii) Special Loads

Should it be found necessary for the Contractor to move one or more loads of pre-constructed units or parts of units of work over the building and in no way should damage the existing structure unless special protection or strengthening is carried out then the Contractor shall adopt proper & adequate measures and shall be responsible for all the costs and consequences thereof.

(iii) Settlement of Extra Ordinary Traffic Claims

If during the carrying out of the works at any time or thereafter the Employer shall receive any claim arising out of the execution by the Contractor of the Works in respect of damage or injury to highways or bridges he shall immediately report the same to the Architect / PMC/ IIBF and the Contractor and thereafter the Contractor shall negotiate the settlement of and pay all sums due in respect of such claims and shall indemnify the Employer in respect thereof and in respect of all claims, demands, proceedings, damages, costs charges and expenses in relation thereto provided always that if and so far as any such claims or part thereof shall in the opinion of the Architect / PMC/ IIBF be due to any failure on the part of the Contractor to observe and perform his obligations then the amount certified by the Architect / PMC/ IIBF to be due to such failure shall be paid by the Contractor.

54. (i) Contractor to Keep Site Clear

During the progress of the works the Contractor shall keep the site reasonably free from all unnecessary obstruction and shall store or dispose of any constructional plant and surplus materials and clear away and remove from the site any wreckage, rubbish or temporary works which are no longer required.

(ii) Clearance of Site on Completion

On the 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 works clean and in a workmanlike condition to the full satisfaction of the Architect / PMC/ IIBF / local authorities not later than 30 days from the virtual completion of the works or by such other later date as fixed by the Architect / PMC/ IIBF.

55. (i) Labour Laws

The Contractor shall observe and strictly adhere to all prevailing labour laws inclusive of Contract Labour (Regulation and Abolition) act of 1970 (latest revision) and other safety regulations.

(ii) Supply of Water

The Contractor shall having regard to local conditions provide on the Site to the satisfaction of the Architect / PMC/ IIBF an adequate supply of drinking and other water for the use of the construction purpose and for Contractor's staff, workmen, for the work.

Contractors have to make his own arrangement for the water as directed for local authorities MCD for the furnishing / construction purpose and in no case contractor will be allowed to use the water available / source of water available in IIBF premises.

(iii) Festivals & Religious Customs

The Contractor and sub-contractor's agents and employees shall in all their dealings with their workmen and labourers for the time being employed on or in connection with the works have due regard to all recognised festivals and religious and other customs.

(iv) Epidemics

In the event of any outbreak of illness of an epidemic nature the Contractor shall comply with and carry out such regulations, orders and requirements as may be made by the Government or the local medical or sanitary authorities for the purpose of overcoming the same.

(v) Disorderly Conduct

The Contractor shall at all times take all reasonable precautions to prevent any unlawful, riotous or disorderly conduct by or amongst his or his sub- contractor's employees and for the preservation of peace and protection of persons and property in the neighbourhood of the works against the same but the contractor shall not interfere with member of any authorised Police Force who shall have free & undisputed access at all times to any part of the Works in the execution of their duties.

(vi) Accidents

The Contractor shall immediately on occurrence of any accident at or about the Site or in connection with the execution of the work report such accident to the Architect / PMC/ IIBF 's representative. The Contractor shall also report such accident immediately to the competent authority whenever such report is required to be lodged by law & take appropriate actions thereof. The Contractor shall submit to the Architect / PMC/ IIBF safety statistics as per the format given in "Annexure F".

vii) Fair Wages

The Contractor shall in respect of all persons employed by him in factories, workshops or other places occupied or used by him for the execution of the Contract including the Works, pay rates or wages, emoluments and expenses and observe hours and conditions of labour not less favorable than those established for the trade or industry in the district where the work is carried out to which the organizations of employers and trade unions representatives or a substantial proportions of the employers and workers engaged in the trade or industry in the district are affiliated. In the absence of such established rates and conditions the Contractor shall pay rates or wages and observe hours and conditions of labour which are not less favourable than the general level of wages, hours and conditions observed in the trades or industries similar to those in which the Contractor is engaged.

The Contractor shall comply with the provision of all labour legislation including the latest requirements of all the Acts, Laws, any Regulation or Bylaws or any local or other statutory Authority applicable in relation to the execution of works, such as:

(i) Minimum wages Act, 1948 (Amended)

(ii) Payment of Wages Act, 1936 (Amended)
(iii) Workmen's Compensation Act, 1923 (Amended Act No 65 of 1976)
(iv) Contract Labour Regulation & Abolition Act, 1970 and Central Rules 1971 (Amended)
(v) Apprentices Act 1961
(vi) Any other Act or enactment relating thereto and rules framed thereunder from time to time
(vii) Industrial Employment (standing order) Act, 1946 (Amended)
(viii) Personal Injuries (Compensation Insurance) Act, 1963 and any modifications thereof & rule made thereunder from time to time.
(ix) Employees' Provident Fund & Miscellaneous Provisions Act, 1952 and amendment thereof.
x) ESIC

viii) Workmen's Compensation

If, for any reason, the Employer is obliged, by virtue of the provisions of the Workmen's Compensation Act, 1923, or any statutory modification or reenactment thereof to pay compensation to a workman employed by the Contractor in execution of the works, the Employer shall be entitled to recover from the Contractor the amount of compensation so paid and without prejudice to the rights of the Employer under the said Act. The Employer shall be at liberty to recover such amount or any part thereof by deducting it from the security deposit or from any sum due by the Employer to the Contractor under this Contract or otherwise. The Employer shall not be bound to contest any claim made against it under the said Act, except on the written request of the contractor and upon his giving to the Employer full security to the satisfaction of the Employer for all costs for which the Employer might become liable in consequence of contesting such claim.

ix) Observance by Sub-Contractors

The Contractor shall be responsible for the observance by sub-contractors employed by him in the execution of this Contract of the provisions hereof and applicable laws, rules and regulations.

56. Safety Code

a) First aid appliances including adequate supply of sterilized dressings and cotton wool shall be kept in a readily accessible place.
b) An injured person shall be taken to a public hospital without loss of time, in cases where the injury necessitates hospitalisation.
c) Suitable and strong scaffolds should be provided for workmen for all works that cannot safely be done from ground.
d) 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.
e) The excavated material shall not be placed within 1.5 metres 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.
f) Every opening in the floor of a building or in a working platform be provided with suitable means to prevent the fall of persons or materials by providing suitable fencing / railing of minimum height of one metre.
g) All staff and workers employed in the work shall be provided with safety shoes, helmet, belt, etc.

h) No floor, roof or other part of the structure shall be so overloaded with debris or materials as to render it unsafe.

i) Those engaged in welding works shall be provided with welder's protective eye-shields and gloves.

j) (i) No paint containing lead or lead products shall be used except in the form of paste or readymade paint.
(ii) Suitable facemasks should 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.

k) Overalls shall be supplied by the Contractor to the painters and adequate facilities shall be provided to enable the working painters to wash during the periods of cessation of work.

l) Hoisting machines and tackle used in the works, including their attachments, anchorage and supports shall be in perfect condition.

m) The ropes used in hoisting or lowering materials or as a means of suspension shall be of durable quality and adequate strength and free from defects.

n) Contractor shall appoint "Safety Officer" to maintain safety records to the satisfaction of the Architect / PMC/ IIBF.

57. Force Mejeure

Conditions of Force Majeure

The terms "Force Majeure" as employed herein shall mean act of God, war, revolt, riot, fire, flood and Acts & Regulations of respective Governments of the two parties namely the Employer and the Contractor.

Note : "Typhoon" is covered under act of God".

In the event of either party being rendered unable by force majeure to perform any of obligation required to be performed by them under the Contract, the relative obligation of the party affected by such Force Majeure shall upon notification to the other party be suspended for the period of delay which is directly caused by such Force Majeure event.

Upon the occurrence of such cause and upon its termination, the party alleging that it has been rendered unable as aforesaid thereby, shall notify the other party in writing within (72) seventy two hours of the alleged beginning and ending thereof giving full particulars and satisfactory evidence in support of its claim.

Time for performance of the relative obligation suspended by the Force Majeure shall then stand extended by the period of delay which is directly caused by Force Majeure event. The party who has given such notice shall be executed from timely performance of its obligations under the Contract, for so long as the relevant event of Force Majeure continues and to the extent that such parties performance is prevented, hindered or delayed, provided the party or parties affected by the event of Force Majeure shall use reasonable efforts to mitigate the effect thereof upon its performance of the Contract and so to fulfill its obligations under the Contract.

If works to be executed by the Contractor are suspended by Force Majeure conditions lasting for more than (2) two months, the Employer shall have the option of cancelling or terminating this Contact in whole or part thereof at Employer's discretion. Upon such termination provisions of Clause 45 shall apply.

Delay or non-performance by a party hereto caused by the occurrence of any of Force Majeure shall not:

a) Constitute a default or breach of the Contract,

b) Give rise to any claim for damages or additional cost or expense occasioned thereby : if such delay or non-performance is caused by the occurrence of any event of Force Majeure. Force Majeure conditions shall not be payable under any circumstances.

58. **Shop Drawings For Electrical & Modular Furniture work**

The Contractor shall prepare and submit to the Consultants / Architect for their approval detailed shop drawings within 15days of signing of the contract or before 7 days of particular work or whichever is earlier. The shop drawings shall clearly indicate;

a) The general arrangement and schematic diagram of all distribution boards, switch boards, feeder pillers etc. clearly stipulating the material, size of sheet steel, bus bar, inter connections detail, make and rating of switchgear and other equipment etc.

b) Number, size and route of the conduits, location of junction / inspection / pull boxes. Size of switch boxes and number, make and size of wires carried in each conduit along with the installation mode.

c) Total number of cable runs, size, make, material and type of cables with clear routing, trenches / treys detail, installation mode, starting and termination point of each and individual cable etc.

d) The shop drawings shall also show all setting out details and physical dimensions of all components used in the system, location of manholes fixing, cutout details etc.

Completion Drawing

The Contractors shall submit, either within one month of completion of work or before issuance of certificate of virtual completion or before submission of final bill three sets and a reproductive (original) copy with a soft copy of completion drawings drawn at approved scale along with three properly bound sets of manuals of every equipment used to complete the work clearly showing the following information to Consultant.

a) Distribution scheme for the whole area;

b) Location of distribution and sub-distribution boards;

c) All types of cables (HT. /LT./Control etc.) layout;

d) Layout of substation and switchgears and associated equipment;

External and internal lighting drawings complete with conduit layout;

Installation manuals of all the items used.

Description of how equipment and systems operate with trouble shouting manuals.

Line diagram of each system including main feature of equipment and showing method of setting controls.

Spares reference and service manuals provided by manufacturer.

Site Management

The Contractor shall employ a competent, licensed qualified full time Civil & electrical engineer/ foreman/supervisors to direct the work of electrical installations in accordance with the drawings and specifications. The same shall be available at all times on the site to receive instructions from the Architect / PMC/ IIBF representative in the day to day activities throughout the duration of the Contract or as long as there after the consultants

may consider necessary until the expiration of the "Defect Liability Period". The Foreman/Supervisor shall correlate the progress of the work in conjunction with all the relevant requirements of the supply authority. The skilled workers employed for the work should have requisite qualifications and should possess competency certificate from the Electrical Inspectorate of the Local Government. The Contractor shall on the request of the consultants immediately dismiss from the works any person employed there on who may, in the opinion of the consultants, be unsuitable or incompetent or who may misconduct himself and such person shall not be again employed or allowed on the work without the permission of consultants.

Works Visits

The contractor shall arrange all works visits for Architect/ PMC / Consultant / IIBF for all the major equipment supplied by him.

Site Cleanliness

The contractor shall, from time to time during the works remove all rubbish, waste, redundant material etc. from the site and deposit all such rubbish and waste tidily at a position to be indicated by Consultant / Architect. On completion of the works, the contractor shall ensure that all tools, equipment, surplus material and rubbish has been removed from the site.

Contractor shall maintain at site the following tools and instruments, but not limited to the list below in working conditions.

a) Clip-on Ammeter and voltmeter
b) 1000 V Meggar and 5 kV Meggar
c) Steel tapes of various lengths
d) Spirit Level
e) Hydraulic Crimping Tool
f) Earth Testing Meggar
g) Pipe bending Tool, thread cutting die, bench vice etc.
h) Cable jointing kit

The Contractor shall provide at least four permanent benchmarks at site, which shall be preserved till the completion of works. These are essential for laying of cables at correct levels.

SPECIAL CONDITIONS OF CONTRACT

1.0 Scope of Work

The scope of work is to carry out the **Furnishing / Renovation / Fit out work of Institute's office premises.**

2.0 Address of site

The site is located at **C-5/30, Safdarjung Development Area, New Delhi-110016.**

3.0 Dimension and Levels

All dimensions and levels shown on the drawing shall be verified by the contractor on the site and he will be held responsible for the accuracy and maintenance of the entire dimension and the levels.

Figured dimensions are in all cases to be accepted and no dimension shall be scaled. Large-scale details shall take precedence over small – scale drawing. In case of discrepancy the contractor shall ask for clarification from the Architect / Consultant before proceeding with the work.

4.0 Notice of Operation

The contractor shall not carry out any important operation without the consent in writing from the Architect / Consultant.

5.0 Construction Records

The contractor shall keep and provide to the Architect / Consultant full and accurate records of the dimension and positions of all new work and any other information necessary to prepare complete drawings recording details of the work as constructed.

6.0 Temporary Works

Before any temporary works are commenced, the contractor shall submit at least 7 days in advance to the architect / consultant for approval complete drawings of all temporary works he may require for the execution of the works. The contractor shall carry out the modifications relating to strength, if required by the architect / consultant may require in accordance with the conditions of contract at his own cost. The contractor shall be solely responsible for the stability and safety of all temporary works an unfinished works and for the quality of the permanent works resulting from the arrangement eventually adopted for their execution.

7.0 Water, Power and Other Facilities

a) The rate quoted by the contractor shall include all expenses that are required for providing all the water required for the work and the contractor shall make his own arrangements for the supply of good quality water suitable for the construction and good quality drinking water for their workers. If necessary, the contractor has to sink a tube well / open well and bring water by means of tankers at his own cost for the purpose. The IIBF will not be liable to pay any charges in connection with the above.

Contractors have to make his own arrangement for the water as directed for local authorities MCD for the furnishing / construction purpose and in no case contractor will be allowed to use the water available / source of water available in IIBF premises.

The rate quoted in the tender shall include the expenses for obtaining and maintaining power connections and shall pay for the consumption charges.

The contractors for other trades directly appointed by the IIBF shall be entitled to take power and water connections from the temporary water and power supply obtained by the contractor. However, the concerned contractor shall make their own arrangements to draw the supply and pay directly the actual consumption charges at mutually agreed rates

between them. All municipal charges for drainage and water connection for construction purposes shall be borne by the contractor and charges payable for permanent connections, if any, shall be initially paid by the contractor and the IIBF will reimburse the amount on production of receipts.

b) The IIBF as well as the Architect / Consultant shall give all possible assistance to the contractors to obtain the requisite permission from the various authorities, but the responsibility for obtaining the same in time shall be of the contractor.

8.0 Temporary Services

The Contractor shall provide and maintain all temporary services on or about the site, if any required for the execution of the works and shall remove them on completion.

9.0 Office Accommodation

a) The contractor shall provide and maintain all necessary offices, workshops, stores, shelters, sanitary facilities, canteens and other temporary structures for themselves in connection with the work at the site own cost after getting the approval from the architect / consultant.

b) All temporary buildings and facilities as mentioned above shall be removed on completion of the work or at any other earlier date as directed by the architect / consultant without any extra cost.
All the expenses for obtaining statutory approvals and maintenance of the above facilities as well as running expense shall be borne by the contractor at no extra cost. It is also the responsibility of the contractor to obtain statuary approvals for providing the above facilities.

10.0 Facilities for Contractors' Employees

The contractor shall make his own arrangement for the housing and welfare of his staff and workmen including adequate drinking water facilities. The contractor shall also make his arrangements at his own cost for transport where necessary for his staff and workmen to and from sites of the works. The necessary drinking water and sanitary facilities for Employer's & Architect / PMCs representative, staff & labour & visitors at site shall be provided and maintained by the contractor at no extra cost.

11.0 Lighting of Works

The contractor shall at all times provide adequate and approved lighting as required for the proper execution and supervision and inspection of works.

12.0 Fire Fighting Arrangements

i) The contractor shall at all times provide suitable arrangements for the fighting at his own cost. For this purpose he shall provide requisite number of fire extinguishers and adequate number of buckets, some of which are of be always kept filed with sand and some with water. These equipments shall be provided at suitable prominent and easily accessible places and shall be properly maintained.

ii) Any deficiency in the fire safety or unsafe conditions shall be corrected by the contractor at his own cost and to the approval of the relevant authorities. The contractor shall make the following arrangements at his own cost but not limited to the following :

a) Proper handling, storage and disposal of combustible materials and waste.
b) Worked operations which can create fire hazards.
c) Access for the fire fighting equipments.
d) Types, number and location of containers for the removal of surplus materials and rubbish.
e) Type size, number and location of fire extinguishers or other fire fighting equipment.
f) General house keeping.

13.0 Site Order Book.

A site order book shall be maintained at site for the purpose of quick communication between the Architect / Consultant. Any communication relating to the works may be conveyed through Records in the site order book. Such a communication from one party to the other shall be deemed to have been adequately served in terms of contract. Each site order book shall have machine numbered pages in triplicate and shall carefully maintained and preserved by the contractor and shall be made available to the Architect / Consultant as and when demanded. Any instruction which the Architect / Consultant may like to issue to the contractor or the contractor may like to bring the architect / Consultant may like to issue to the Contractor or the Contractor may like to bring to the Architect / Consultant two copies of such instructions shall be taken from the site order book and one copy will be handed over to the party against proper acknowledgment and the second copy will be retained for their record.

14.0 Site Meetings

Site meetings will be held to review the progress and quality evaluation. The contractors shall depute a senior representative alongwith the site representative staff of approved sub-contractors and suppliers as required to the site meetings and ensure all follow up actions. Any additional review meetings shall be held if required by the Architect / Consultant.

15.0 Disposal of Refuse

The contractor shall cart away all debris, refuse etc. arising from the work from the site and deposit the same as directed by the Architect / Consultant at his own cost. It is the responsibility of the contractor to obtain from the local authorities concerned to the effect that all rubbish arising out of contractor's activities at the construction site or any other off-site activities borrow pits has been properly disposed off.

This certificate from the authority shall be dated not later than the (last) Certificate of Completion of Works and is to be enclosed with the Payment Certificate in which the Contractor re quests for payment of any Retention money due to him.

16.0 Contractor to Verify Site Measurement

The contractor shall check and verify all site measurements whenever requested by other specialists contractors of other sub contractors to enable them to prepare their own shop drawings and pass on the information with sufficient promptness as will not in any way delay the works. A copy of all such information passed on shall be given to the Architect/ PMC/ IIBF representative.

17.0 Approved Make/ Agencies

The Contractor shall provide all materials from the list of approved makes or as mentioned in BOQ and also appoint the specialist agency from the approved list / BOQ as provided in the Tender. The Architect / Employer may approve any make / agency within the approved list / BOQ after inspection of their samples / mock-ups and after ascertaining their spare capacities and recent past performances.

The items which are not covered in the List of Approved Makes shall be as per Samples approved by the Architect.

Colours or type if not mentioned elsewhere shall be as approved by the Architect.

18.0 Procurement of Materials

The Contractor shall make his own arrangements to procure all the required materials for the work. All wastage's and losses in weight shall be to the contractors account.

19.0 i) Excise and sales, service Taxes, Work Contract Taxes, Levies etc.

The contractors shall pay and be responsible for payment of all taxes, duties, levies, royalties, fees cess, or charges in respect of the works including but not limited to excise duty and octroi, payable in respect of materials, equipments plant and other things

required for the contract **excluding GST**. All of the aforesaid taxes, duties, levies, fees and charges shall be to the contractors account and the Employer shall not be required to pay any additional or extra amount on this account. Variation of taxes, duty fees, levies etc if any, till completion of work shall be deemed to be included in the quoted rates and no extra amount on this account will in any case be entertained.

ii) If a new tax or duty or levy or cess or royalty or octroi is imposed under as statue or law during the currency of contract the same shall be borne by the contractor.

20.0 ESCALATION

The rate quoted shall be firm throughout the tenure of the contract (including extension of time, if any, granted) and will not be subject to any fluctuation due to increase in cost of materials, labour, sales tax, excise duty, and octroi, etc., unless specifically provided in these documents. Variation clause enclosed in the tender.

21.0 Guarantee and Maintenance during Defect Liability Period.

In pursuant to Clause no. 32 of GCC, the contractor shall guarantee all materials furnished and workmanship for a period of 365 days from the date of virtual completion of work i.e during Defect Liability Period. All failed parts or parts exhibiting unusual wear and tear during guarantee period shall be replaced without any cost to the Owner, and such replacement shall be factory approved new, equal or better than original. All labour, tools, materials, transportation, insurance, etc. required in performance of guarantee work shall be at the contractor's expense.

22.0 Project Execution and Management

In pursuant to Clause No. 14 (i) of GCC, the Sr. Representative shall be assisted by adequate number of Engineers / Supervisors at site on full time basis.

For quality control and monitoring of workmanship, contractor shall assign at least one full time Engineer / Architect who would be exclusively responsible for ensuring strict quality control, adherence to specifications and ensuring top class workmanship.

23. Tools and Tackles

All tools, tackles, supports, scaffolding and staging etc. required for erection and assembly of the equipment and installation covered by the contract shall be provided by the Contractor himself. In addition, all other materials such as foundation bolts, nuts etc. required for the installation of the equipment shall also be provided by the contractor at his cost.

24. Safety Precautions

1) A competent and authorised supervisor shall be on the site whenever the contractor's men are at work. The supervisor should ensure that all plant and machinery used on the site are rendered safe for working and meet with the Indian or International safety standards applicable for the use and operation of such machinery. The supervisor should also ensure that the workmen at site are made to use safety appliances such as safety belts, lifelines, helmets etc.

2) Smoking shall be altogether strictly prohibited in all areas of work as well as where combustible and inflammable goods / materials are stored or lying about.

3) Any hot job such as welding, soldering, gas cutting shall not be carried out without the permission of the Architect / PMC/ IIBF . Such jobs shall not be carried out where inflammable materials are stored or lying about.

All electric connections shall be through adequately sized mechanically protected cables without any joints and with proper and adequate terminals boxes. All power supplies shall be through properly rated fuses with isolating devices. No such hot jobs shall be carried out on holidays and without the presence of the Contractor's Supervisor and Owners permissions.

4) It is entirely the responsibility of the Contractor to practice the principles of 'SAFETY FIRST' during the entire tenure of work with adequate insurance covering injury or death to workmen, loss by theft or damage to materials and property and third party.

5) The Contractor should clear the site of all debris every day to avoid accidents. In case this is not done, the Owners may engage necessary labour to maintain the cleanliness of the premises and removal of debris and recover all or part of the expenditure so incurred from the Contractor.

6). Contractor shall at his own cost ensure that all of his personnel, employees, work men and other associated persons working with him at site are adequately insured as per labour laws and statutory provisions. The Contractor shall be responsible for all injuries / damages to men, materials and properties etc. which may arise from the operations or negligence of himself and / or his sub contractors and indemnify the Owners for all such expenses which shall be solely to contractor's own account.

7) Contractor shall at his own cost, provide and maintain a full-fledged first-aid-box to give immediate medical aid to the workers / supervisory staff, in case of emergencies.

8) The contractor shall carry out the work strictly as per the safety aspects.

25. Technical Audit

The Employer shall have a right to cause a technical examination and audit of work and running and final bills of the contractor including all supporting vouchers, abstract etc. to be made at the time of the bill. If as a result of this examination or otherwise any sum is found to have been overpaid 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 will be lawful for the employer to recover the same from any sum or sums due to him and in any other manner legally permissible and if 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 the contract, the amount of such under payment shall be duly considered / paid by the employer.

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

26.0 Special Conditions

26.01 The Contractor shall keep himself fully informed of all acts and laws of the Central & State Employers, all local bye laws, ordinances, rules and regulations, all orders, decrees of statutory bodies, tribunals having any jurisdiction or authority, which in any manner may affect those engaged or employed on the work or which any way affect the execution of work. Contractor shall at all times, observe and comply with all such laws, ordinances, rules, regulations, orders and decrees, and shall give all notices and pay out of his own money any fees or charges to which he may be liable. He shall protect and indemnify the employer and its officers and employees against any claim or liability arising out of violations of any such law, ordinances, legislations, order or decree, whether by himself or by his employees & authorized representatives. The Contractor shall also adhere to all traffic restrictions notified by the local authorities. All statutory taxes, levies, charges (including water and sewerage charges, charges for temporary service connections and / or any other charges) payable to such authorities for carrying out the work, shall be borne by the Contractor. Nothing extra shall be payable on these accounts. The fee payable to statutory authorities for obtaining the various permanent service connections and Occupancy certificate for the building shall be borne by the Employer.

a) **INSURANCE POLICIES**

Before commencing the execution of work, the Contractor shall, without in any way limiting his obligations and liabilities, insure at his own cost and expense against any

damage or loss or injury, which may be caused to any person or property, at site of work. The Contractor shall obtain and submit to the Architect / PMC/ IIBF proper Contractor All Risk Insurance Policy for an amount 1.25 times the contract amount for this work, with IIBF as the first beneficiary. The insurance shall be obtained in joint names of IIBF and the Contractor (who shall be second beneficiary). Also, he shall indemnify the Employer from any liability during the execution of the work. Further, he shall obtain and submit to the Architect / PMC/ IIBF, a third party insurance policy for maximum Rs.10 lakh for each accident, with IIBF as the first beneficiary. The insurance shall be obtained in joint names of IIBF and the Contractor (who shall be second beneficiary). The Contractor shall, from time to time, provide documentary evidence as regards payment of premia for all the Insurance Policies for keeping them valid till the completion of the work. The Contractor shall ensure that similar Insurance Policies are also taken by his Sub-Contractors / specialized agencies. The Contractor shall however be responsible, to the Employer, for any claim or loss resulting from the failure of his Sub-Contractors / specialized agencies in obtaining such Insurance Policies. Without prejudice to any of its obligations and responsibilities specified above, the Contractor shall within 10 days from the date of Work Order of the tender and thereafter at the end of each quarter submit a report to the Employer giving details of the Insurance Policies along with Certificate of these insurance policies being valid, along with documentary evidences as required by the Architect / PMC/ IIBF representative. No work shall be commenced by the Contractor unless he obtains the Insurance Policies as mentioned above. Also, no payment shall be made to the Contractor on expiry of insurance policies unless renewed by the Contractor. Nothing extra shall be payable on this account. No claim of hindrance (or any other claim) shall be entertained from the contractor on these accounts.

b) WARNING / CAUTION BOARDS

The contractor shall take all precautions to avoid accidents. All temporary warning / caution boards / glow signages display such as "Construction Work in Progress", "Keep Away", "No Parking", Diversions & protective Barricades etc. shall be provided and displayed during day time by the Contractor, wherever required and as directed by the Architect / PMC/ IIBF representative. These glow signages and red lights shall be suitably illuminated during night also. The Contractor shall be solely responsible for damage and accident caused, if any, due to negligence on his part. Also he shall ensure that no hindrance, as far as possible, is caused to general traffic during execution of the work. These signages shall be dismantled & taken away by the Contractor after the completion of work, only after approval of the Architect / PMC/ IIBF. Nothing extra shall be payable on this account.

c) SIGN BOARDS

The Contractor shall provide and erect a display board of size and shape as required and paint over it, in a legible and workman like manner, the details about the salient features of the project, as required by the Architect / PMC/ IIBF. The Contractor shall fabricate and put up a sign board in an approved location and to an approved design indicating name of the project, client / owner, architects, structural consultants, Employer etc. besides providing space for names of other Contractors, Sub-Contractors and specialized agencies. Nothing extra shall be payable on this account

26.02 Safety, Health and Environment

In respect of all workmen directly or indirectly employed in the work for the performance of the contractor's part of this agreement, the contractor shall at his expense arrange for the safety provisions as per Indian Standard Safety codes IS: 7969, 8989, 3696 (Part-I &II), 3764, 4081, 4138, 5121, 5916, 7293, 7969 and shall at his own expense provide for all facilities in connection there with. In case the contractor fails to make arrangement and provide necessary facilities, the Architect / PMC/ IIBF shall be at liberty to make arrangement and provide facilities as aforesaid and recover the cost incurred on that behalf from the contractor, and no claims what so ever shall be entertained.

Details regarding some special provisions to be followed by contractor are as follows:

26.03 **Usage of quality Personal Protection Equipments (PPEs)** through approved vendors. PPEs would include amongst others the following items:

a) Safety Helmets.

b) Hearing Protection.

c) Respiratory Protection.

d) Eye Protection.

e) Protective Gloves.

f) Safety Footwear.

g) High Visibility Clothing (Jacket)

All the items should get approved before issued to the use in the work.

The contractor shall provide all the PPE (Personnel Protective Equipment) and safety appliances required to carry out the job to all the workmen deployed by the contractor and also ensure that his workmen use those PPE and safety appliances while on the job. The contractor shall not pay any cash amount in lieu of PPE to the workers/sub-contractors and expect them to buy and use during work. If the contractor fails to ensure provision of safety appliances and its workmen do not use the PPE and safety appliances as needed for safe working, the employer may ask the contractor to stop the work and comply with safety requirements first. The contractor shall at all time maintain a minimum of 10% spare PPEs and safety appliances and properly record and show to the employer during the inspections. Failing to do so shall invite fulfilling the deficiencies by the Architect / PMC/ IIBF at the risk and cost of the contractor.

26.04 Working at Height

Contractor shall ensure that work at height is properly planned for any emergencies and rescue appropriately supervised, and carried out in a manner, which is reasonably practicable safe. Contractor shall ensure that work at height is carried out only when the weather conditions do not jeopardise the health or safety of persons involved in the work. Guardrail, Toe-board, Barrier or similar collective means of protection shall be of sufficient dimensions, of sufficient strength and rigidity for the purposes for which they are being used, and otherwise suitable.

Working Platform shall be of sufficient dimensions to permit the safe passage of persons and the safe use of any plant or materials required to be used and to provide a safe working area having regard to the work being carried out there. Possess a suitable surface and, in particular, be so constructed that the surface of the working platform has no gap through which a person, material or object could fall and injure a person. A working platform and any supporting structure shall not be loaded so as to give rise to a risk of collapse or to any deformation, which could affect its safe use. Strength and stability calculations for scaffolding shall be carried out by the contractor. The dimensions form and layout of scaffolding decks shall be appropriate to the nature of the work to be performed and suitable for the loads to be carried and permit work and passage in safety.

A personal fall protection system designed for use with an anchor shall be securely attached to at least one anchor, and each anchor and the means of attachment thereto shall be suitable and of sufficient strength and stability for the purpose of supporting any foreseeable loading. Suitable and sufficient steps shall be taken to prevent any person falling or slipping from a personal fall protection system. Any other steps in the opinion of Architect / PMC/ IIBF suggested will also be taken in Protection system

Only metal ladders shall be allowed. Any surface upon which a ladder rests shall be stable, firm, of sufficient strength and of suitable composition safely to support the ladder so that its rungs or steps remain horizontal, and any loading intended to be placed on it. A ladder

shall be so positioned as to ensure its stability during use. A suspended ladder shall be attached in a secure manner and so that, with the exception of a flexible ladder, it cannot be displaced and swinging is prevented. No interlocking or extension ladder shall be used unless its sections are prevented from moving relative to each other while in use.

26.05 Lifting appliances and gears.

The contractor shall maintain a register for record of examinations and test details of all lifting appliances. This register should also contain a system of identification of all tools and tackles, its date of purchase, safe working load etc. Contractors can utilise the services of any competent person as defined in Factories Act, 1948 and approved by Chief Inspector of Factories with the permission of the Employer.

Automatic safe load indicators: Every lifting appliances and gears like cranes, hydras etc, if so constructed that the safe working load may be varied by raising or lowering of the jib or otherwise shall be attached with an automatic indicator of safe working loads approved by Bureau of Indian standards/ International certifying bodies which gives a warning to the operator and arrests further movements of the lifting parts.

Qualification of operator of lifting appliances and of signaller etc: The contractor shall not employ any person to drive or operate a lifting machine like crane, hydra etc whether driven by mechanical power or otherwise or to give signals to work as a operator of a rigger or derricks unless he is above twenty-one years of age and possesses a valid heavy transport vehicle driving license as per Motor Vehicle Act and Rules, is absolutely competent and reliable, possesses the knowledge of the inherent risks involved in the operation of lifting appliances by undergoing a formal training at any institution of national importance, is medically examined periodically.

26.06 Site Electrician / Other Electrical Personnel: The contractor shall engage qualified and competent electricians and other electrical personnel while working on electrical lines (which may be High Tension, Medium Tension and Low Tension electrical lines) for safe execution of contract. The electricians and other electrical personnel must possess requisite certificate issued from competent authority. Using exposed naked loose joints, inserting of bare wire into socket, improper grounding for appliances, exposed circuits on work place etc. shall not be permitted.

Rating of fuses and circuit breakers used for the protection of circuits should be coordinated. Flexible cords with a conductor cross sectional area smaller than 1.5 mm2 should not be used. Socket outlets, Plugs and Cable coupler should be of the water splash proof type, so minimum IP 44 panel boards are required in construction sites. Overhead cabling should provide for a minimum ground clearance of at least 5.2 meters.

The contractor shall employ qualified, full time Electricians / Electrical Supervisors to maintain his temporary electrical installation. Use approved perimeter markings to isolate restricted areas from designated work areas and entryways. Erect them before work begins and maintain them for the duration of work. Approved perimeter marking must be Install red barrier tape printed with the words "DANGER—HIGH VOLTAGE" approximately 1 to 1.5 meter above the floor or work surface or Install a barrier of yellow or orange synthetic rope 1 to 1.5 meter from the floor with standard danger signs. Any steps suggested by Architect / PMC/ IIBF shall be complied with by the contractor.

26.07 Welding and Cutting

Gas cylinders in use should be kept upright on a custom-built stand or trolley fitted with a bracket to accommodate the hoses and equipment or otherwise secured. The metal cap should be kept in place to protect the valve when the cylinder is not connected for use. Non-return valve and Flashback arrester shall be fixed at both end of cylinder and torch. Domestic LPG cylinders shall not be used for Gas welding and Cutting purpose. DCP or CO2 type Fire Extinguisher not less than 5 kg shall be fixed at or near to welding process zone in an easily accessible location. Fire Extinguisher should confirm to IS 2190: 1992. Welding grounds and returns should be securely attached to the work by cable lugs, by

clamps in the case of stranded conductors, or by bolts for strip conductors. The ground cable will not be attached to equipment or existing installations or apparatus.

26.08 Waste

The contractor is required to develop Waste Management Programme (WMP) during the construction of the project for his works, which may include: -

Identification of disposal sites, Identification of quantities to be excavated and disposed off, Identification of split between waste and inert material, Identification of amounts intended to be stored temporarily on site location of such storage, Identification of intended transport means and route, Obtaining permission, where required, for disposal.

Such a mechanism is intended to ensure that the designation of areas for the segregation and temporary storage of reusable and recyclable materials are incorporate into the WMP. The WMP should be prepared and submitted to the Architect / PMC/ IIBF for approval.

The Contractor shall remove waste in a timely manner and disposed off at landfill sites after obtaining approval of Conservancy and Sanitation of Municipal Corporation of New Delhi for its disposal. Burning of wastes is prohibited. The Contractor shall not burn debris or vegetation or construction waste on the site. The Contractor shall make arrangement to dispose of metal scrap and other saleable waste to authorized dealer and make available to the Employer on request, records of such sales.

26.09 Prevention of Nuisance and Pollution

The contractor shall take all necessary precautions to prevent any nuisance or inconvenience to the owners, tenants or occupiers of adjacent properties and to the public in general and to prevent any damage to such properties, roads and any pollution of streams, environment and waterways. He shall make good at his own cost and to the satisfaction of the Architect / PMC/ IIBF representative,

Any damage to roads, paths, drainage works or public or private property whatsoever caused by the execution of the work or by traffic brought thereon by the contractor. All waste or superfluous materials shall be cleaned away by the contractor without any reservations entirely to the satisfaction of the Architect / PMC/ IIBF at no extra cost.

The Contractor shall do proper sequencing of the various activities by suitably staggering the activities within various pockets in the plot so as to achieve early completion. The agency may deploy adequate equipments, machinery and labour as required for the completion of the entire work within the stipulated period specified. Also ancillary facilities shall be provided commensurate with requirement to complete the entire work within the stipulated period. Nothing extra shall be payable on this account. Adequate number/sets of equipments in working condition, along with adequate stand-by arrangements, shall be deployed during entire construction period. It shall be ensured by the Contractor that all the equipments, Tools & Plants, machineries etc provided by him are maintained in proper working conditions at all times during the progress of the work and till the completion of the work. Further, all the constructional tools, plants, equipments and machineries provided by the Contractor, on site of work or his work shop for this work, shall be exclusively intended for use in the construction of this work and they shall not be shifted / removed from site without the permission of the Architect / PMC/ IIBF representative.

27.0 DISPLAY PERMISSIONS

The Contractor shall display all permissions, licenses, registration certificates, bar charts, other statements etc under various labour laws and other regulations applicable to the works, at his site office.

28.0 REMOVAL OF 'MULBA' ETC. FROM SITE

The Contractor shall not stack building material / malba / muck on the land or road of the local development authority or on the land owned by the others, as the case may be. So the muck, rubbish etc. shall be removed periodically as directed by the Architect / PMC/

IIBF representative, from the site of work to the approved dumping grounds as per the local byelaws and regulations of the concerned authorities and all necessary permissions in this regard from the local bodies shall be obtained by the Contractor. Nothing extra shall be payable on this account. In case, the Contractor is found stacking the building material / melba as stated above, the Contractor shall be liable to pay the stacking charges / penalty as may be levied by the local body or any other authority and also to face penal action as per the rules, regulations and bye-laws of such body or authority. The Architect / PMC/ IIBF representative shall be at liberty to recover, such sums due but not paid to the concerned authorities on the above counts, from any sums due to the Contractor including amount of the Security Deposit and performance guarantee in respect of this contract agreement.

29.0 COORDINATION WITH OTHER AGENCIES

The Contractor shall conduct his work so as not to interfere with or hinder the progress of the work being performed by other Contractors or by the Architect / PMC/ IIBF representative. As far as possible, he shall arrange his work and place, so as not to interfere with the operations of other Contractors or shall arrange his work with that of the others, in an acceptable and coordinated manner and shall perform it in proper sequence.

30.0 The Contractor shall employ daily workers for cleaning / sweeping the site and building under construction. Site and its surrounding shall be neat and clean. Water shall be sprinkled whenever required to keep the dust level to minimum. Tyres of all vehicles getting out of this site shall be washed.

31.0 SCAFFOLDING

Wherever required for the execution of work, all the scaffolding shall be provided and suitably fixed, by the Contractor. It shall be provided strictly with steel double scaffolding system, suitably braced for stability, with all the accessories, gangways, etc. with adjustable suitable working platforms to access the areas with ease for working and inspection. It shall be designed to take all incidental loads. It should cater to the safety features for workmen. Nothing extra shall be payable on this account. It shall be ensured that no damage is caused to any structure due to the scaffolding.

32.0 Any consequent damage, whatsoever, no claim financially or otherwise shall be entertained not withstanding any other provisions elsewhere in the contract agreement. Also, the Contractor shall make good, at his own cost, the damages caused, if any.

33.0 The Contractor shall render all help and assistance in documenting the total sequences of this project by way of photography, slides, audio / video recording etc. Nothing extra shall be payable to Contractor on this account. However, cost of photographs, slides, audio / video-graphy etc shall be borne by the Employer. The original films shall be the property of the Employer. No copy shall be prepared without the prior approval of the Architect / PMC/ IIBF representative.

34.0 The Contractor shall make all necessary arrangements for protecting from rains, the work already executed and for carrying out the further work, during monsoon including providing and fixing temporary shelters, protections etc. Nothing extra shall be payable on this account. Also, no claims for hindrance shall be entertained on this account.

35. INCIDENTAL CHARGES

For all items of work, the entire incidental charges of any kind including cartage, storage, wastage and safe custody of material etc. shall be borne by the Contractor and no claim of any kind, whatsoever, shall be entertained on this account.

36.0 STORAGE OF MATERIAL AT SITE

No inflammable materials including P.O.L shall be allowed to be stored in huge quantity at site. Only limited quantity of P.O.L may be allowed to be stored at site subject to the compliance of all rules / instructions issued by the relevant authorities and as per the

direction of Architect / PMC/ IIBF representative in this regard. Also all precautions and safety measures shall be taken by the Contractor for safe handling of the P.O.L products stored at site. All consequences on account of unsafe handling of P.O.L shall be borne by the Contractor.

37.0 NO WAIVING OF LEGAL RIGHTS AND POWERS

The Architect / PMC/ IIBF representative shall not be precluded or stopped from taking any measurements, and framing of estimates or detaining any certificates made either before or after the completion and acceptance of the work and payment, from showing the true amount and character of the works performed and materials furnished by the Contractor and from showing that any such measurements, estimates or certificates untrue or incorrectly made and that Architect / PMC/ IIBF representative shall not be precluded or stopped from recovering from the Contractor such damages as it may be sustained by reasons of his failure to comply with the terms and conditions of the contract.

38.0 FINAL TESTING OF THE INSTALLATION

The Contractor shall demonstrate trouble free functioning of all the Civil and E & M installations and services. The Architect / PMC/ IIBF representative or his authorized representatives shall carry out final inspection of the various Civil and E & M services and installations. Any defect(s) noticed during demonstration shall be rectified by the Contractor at his own cost to the entire satisfaction of the Architect / PMC/ IIBF. Nothing extra shall be payable on this account.

39.0 Existing Services

Existing drains, pipes, electricity cables, overhead wires and telephone cables, sewer lines, water lines and similar services encountered in the course of the execution of the work shall be protected / maintained against the damage by the contractor. The contractor shall not store materials or otherwise occupy any part of the site in a manner likely to hinder the operation of such services. In case temporary shifting / supporting of such services is required to facilitate the work, the same shall be done by the contractor at no extra cost. The decision of the Architect / PMC/ IIBF representative in this regard shall be final and binding.

All works pertaining to services including rerouting / diversion of services, routine testing, installation etc., completed in one or more than one process shall be subject to examination and approval to each stage thereof by the Architect / PMC/ IIBF or concerned employer as would be notified by the Architect / PMC/ IIBF or his authorized representative when such stage is ready. In default of such notice the Architect / PMC/ IIBF representative shall be entitled to appraise the quantity and extent thereof and the decision of Architect / PMC/ IIBF representative or his authorized representative in this regard shall be final and binding.

For utilities which are required to be removed or permanently shifted to new position, in the opinion of the Architect / PMC/ IIBF representative, shall be removed/ shifted by the contractor in consultation with the service provider agency. Payment for this shall be made as per terms and conditions of the contract. No claim for delay or otherwise due to above reasons shall be entertained on this account

40.0 The architectural, services and other drawings for the work shall at all times be properly correlated before executing any work and no claim whatsoever shall be entertained in this respect.

41.0 The contractor shall be responsible for the true and proper setting out of building components of the work in coordination with the Architect / PMC/ IIBF or his authorized representative. The contractor shall be responsible for the correctness of the position, levels, dimensions, and alignments of all the parts of the structure and for arrangement of all necessary instruments, appliances and labour in connection there with. If at any time, during the progress of the works, any error appears or arises in the position levels,

dimensions or alignment of any part of the works, the contractor, on being required to do so by the Architect / PMC/ IIBF representative shall at his own expense rectify such error to the entire satisfaction of Architect / PMC/ IIBF representative. The checking of any setting out of any line or level by the Architect / PMC/ IIBF or his authorized representatives shall not relieve in anyway, the contractor of his responsibility for the correctness there of and the contractor shall carefully protect and preserve all bench marks, site details pegs and other things used in the setting out and construction of works. All duties concerning establishment of a set of bench marks , permanent theodolite stations, centre line pillars etc including all materials tool, plants, equipment, labour etc. for performing all the functions necessary and ancillary there to at the commencement and during the progress of the work, till physical completion of all the types of the work in question shall be carried out by the contractor at his own cost.

42.0 The contractor shall have to deploy adequate well experienced technical staff for the work. A list of staff along with their designation, experience and duties shall be displayed at site of work.

43.0 The contractor shall submit to the Architect / PMC/ IIBF the following reports.

a) Monthly report of receipt & consumption of material arranged by the contractor.

b) Programme of works, material & labour required for the forthcoming month.

c) List of plants & equipment proposed to be deployed.

44.0 Reference made to any Indian standard specification in these documents, shall imply reference to the latest version of that standard including such revision / amendments as issued by the Bureau of Indian Standards at the time of opening of tenders. The contractor shall have to keep all relevant publications / specification at the site.

45.0 Services drawings are diagrammatic but shall be followed as closely as actual construction permits. Any deviations made shall be in conformity with the architectural and other services drawings.

46.0 The contractor shall verify all dimensions at site and bring to the notice of the Architect / PMC/ IIBF all discrepancies or deviations noticed. Decisions of the Architect / PMC/ IIBF shall be final in this regard.

47.0 The contractor shall give performance tests of the entire installation(s) as per specifications before the work is finally accepted and nothing extra whatsoever shall be payable to the contractor for these performance tests.

48.0 The contractor shall be responsible for the watch and ward of the building safety of all fittings and fixtures including sanitary and water supply fittings and fixtures provided by him against pilferage and breakage during the period of installation and till completion is recorded by competent authority

49.0 The contractor shall be bound to follow the instructions and restrictions imposed by the Administration / Police authorities on the working and /or movement of labour, materials etc. and nothing extra shall be payable on this account or due to less/ restricted working hours or any detours in movement of vehicles

50.0 Displaying the Name of the Work

The contractor shall put up a name board of suitable size as directed by the Architect / Consultant indicating there in the name of the project and other details as given by the Architect / Consultant at his own cost remove the same on completion of work.

51.0 As Built Drawings

i) <u>For the drawing issued to the contractor by the Architect / Consultant:-</u> The Architect / will issue two sets of drawings to the contractor. For the item for which some changes have been made from the approved drawings as instructed by the IIBF / Architect / Consultant, the Contractor will make the changes made on these copies and return these copies to the architect / consultant for their approval. In case any revision is required or

the corrections are not properly marked the Architect / Consultant will point out the discrepancies to the contractor. The contractor will have to incorporate these corrections and /or attend to discrepancies either on the copies as directed by the Architect / Consultant and resubmit to him for approval. The Architect / Consultant will return one copy duly approved by him.

ii) For the drawings prepared by the Contractor: The Contractor will modify the drawing prepared by him wherever the changes are made by the IIBF / Architect / Consultant. And submit two copies of such modified drawings to the Architect / Consultant for approval. The Architect / Consultant will return one copy of the approved drawing to the Contractor.

52.0 Acceptance of Tender

The Employer shall have the right to reject any or all tenders without assigning any reason. They are not to bound to accept the lowest or any tender and the tenderer shall have no right to question the acts of the Employer. However, the adequate transparency would be maintained by the Employer.

APPENDIX / MEMORANDUM TO CONDITIONS OF CONTRACT

Estimated cost	Rs. 3.0 Crore (Rupees Three Crore Only)
EMD	EMD shall be Rs 3,00,000.00 (Rs. Three Lakh Only) payable in form of Demand Draft / Pay Order favouring Indian Institute of Banking & Finance , payable at New Delhi .
Initial security deposit	The amount of ISD shall be 2% of the accepted value of the tender including EMD.
Date of commencement	Within 7th Calendar day from the date of Issue of work order
Time for completion of work	As per time schedule given in tender document i.e. 4 months.
Retention money to be deducted from the bills.	8% of the certified gross value of each running bill, till accumulating total security deposit including ISD.
Total Security Deposit /Retention Money	5% of Contract amount.
Defect Liability Period	365 days (Twelve months) from the virtual completion. The defects liability period will be reckoned from the date of virtual completion of the work.
Period of Final	2 months.

Measurement	
Liquidated damages	Shall be 0.5% of contact amount per week of delay subject to ceiling of 5% of the accepted contract amount.
Value of works for Interim Certificates	Value not less than Rs.50 Lakh (Fifty Lakh only) or as decided by the IIBF.
Payment after virtual completion	50% of total security deposit will be returned after (i) issue of virtual completion certificate by the project architect. (ii) contractor's removal of his material, equipments, cleaning of site and against Bank Guarantee. Balance 50% of retention money shall be released 14 days after satisfactory completion of defect liability period.
Period for honouring interim certificate.	An adhoc payment of 75% of the value of work done as assessed by the Architect / PMC/ IIBF shall be released within 20 working days by the Employer, after certification by the Architect / PMC/ IIBF who will certify within 7 working days of submission of Bill including furnishing of all relevant documents. Balance amount shall be certified by the Architect / PMC/ IIBF within 10 working days of submission of bill and payment shall be released by the Employer within 20 working days of certificate receipt.
Recovery towards taxes.	As per rules applicable from time to time.
Taxes	Present & future all taxes inclusive.
Rates	Rates shall be fixed during the contract & extension period and no price variation is entertained.

ANNEXURE-1

(On non- judicial, stamp paper of Rs 100/ -)

PERFORMA OF BANK GUARANTEE IN LIEU OF SECURITY DEPOSIT

B.G. No… Value Rs……

..

To,

The Indian Institute of Banking & Finance

Professional development center NZ, New Delhi .

Sub:- Bank Guarantee of Rs…….towards Security Deposit for the work of Indian Institute of Banking & Finance .

Dear Sir,

WHEREAS ----------(Name and address of contractor / Vendor) (hereinafter called the Contractor) have entered into contract for **Furnishing / Renovation / Fit out work of Institute's office premises at C-5/30, Safdarjung Development Area, New Delhi-110016.** with Indian Institute of Banking & Finance as mentioned in the letter of IIBF, vide their letter No……dated……and the correspondence and tender relating thereto which is hereinafter referred to as " the said contract" and that the contractor has agreed to produce of Bank Guarantee amounting to 5% of the contract value less Initial Security deposit of contract obligations.

AND WHEREAS in terms of the said contract, the contractor is required to furnish to Indian Institute of Banking & Finance a guarantee of a scheduled bank for a value of Rs……to be valid upto ----------(date)

AND WHEREAS ----------(Name of Bank and its branch) having their office at--------(address) the guarantor, at the request of the contractor hereby furnishes a guarantee in favour of Indian Institute of Banking & Finance and guarantees in the manner hereinafter appearing.

In consideration of the premises, we ----------(Name of bank and its branch) having our office at ----------(address) hereafter called the " Guarantor" (which expression shall include its successors and assigns) hereby expressly irrevocably and unreservedly undertake and guarantee that if the contractor fails to execute the work according to his obligations under the said contract, then not withstanding any dispute between Indian Institute of Banking & Finance and the contractor the guarantee shall, without demur and without reference to the contractor, pay to Indian Institute of Banking & Finance immediately any sum claimed by Indian Institute of Banking & Finance under the said contract upto a maximum amount of Rs…….(Rupees only)

In case the amount demanded by Indian Institute of Banking & Finance is not paid within 48 hours of receipt of demand, the guarantor agrees to pay the aforesaid amount of Rs. ----------.

Such payment shall be notwithstanding any right the contractor may have directly against Indian Institute of Banking & Finance or any disputes raised by the Contractor with Indian Institute of Banking & Finance or any suits or proceedings pending in any competent court or before any arbitrator. Indian Institute of Banking & Finance written demand shall be conclusive evidence to the guarantor that such payment is payable under the terms of the contract and shall be binding in all respect on the guarantor.

The Guarantor shall not be discharged or released from this undertaking and guarantee, by any

arrangement, variations made between Indian Institute of Banking & Finance and the contractor and or indulgence shown to the contractor by Indian Institute of Banking & Finance , with or without the consent and knowledge of the guarantor or by alterations in the obligations of the contractor by any forbearance, whether as to payment, time performance or otherwise.

This guarantee shall remain valid upto --------- or as may be caused to be extended by the contractor or until discharged by, Indian Institute of Banking & Finance in writing whichever is earlier.

This guarantee shall be a continuing guarantee and shall not be revocable during its Currency except with the pervious written consent of Indian Institute of Banking & Finance.

This guarantee shall not be affected by any change in the constitution of the contractor by absorption with any other body or corporation or dissolution or otherwise and this guarantee will be available to or enforceable against such body or corporation.

In order to give effect to this guarantee Indian Institute of Banking & Finance will be entitled to act as if the guarantor were the principal debtor and the guarantor hereby waives all and any of its rights or suretyship.

This guarantee shall continue to be in force notwithstanding the discharge of the contractor by operation of law and shall cease only on payment of the amount by the guarantor to Indian Institute of Banking & Finance of the amount hereby secured.

This guarantee shall be in addition to and not in substitution for any other guarantee or security for the contractor given or to be given to Indian Institute of Banking & Finance in respect of the said contract.

Any notice by way of request and demand or otherwise here under may be sent by post or any other mode or communication to the guarantor addressed as aforesaid and if sent by post it shall be deemed to have been given at the time when it would be delivered in due course of post and in providing such notice when given by post it shall be sufficient to prove that the envelope containing the notice was posed and a certificate signed by an officer of Indian Institute of Banking & Finance that the envelope was so posted shall be conclusive.

These presents shall be governed by and constructed in accordance with Indian Law.

Notwithstanding anything contained here in before the liability of the guarantor under this guarantee is restricted to a sum of Rs……

This guarantee will remain valid upto…… unless a demand or claim under this guarantee is made in writing on or before……the guarantor shall be discharged from all liability under the guarantee thereafter.

Dated the……

For (Name of Bank)

(Signature/s with designations/s of signatory / ies)

(Name and Stamp of Bank)

ANNEXURE –2

Proforma for Daily / Weekly / Monthly Progress Report

Name of work :

Progress report for the (Period) :

Report No:

Sr. No.

Description

Details of location where work is done

Approximate quantity executed

ANNEXURE-3

PROFORMA FOR MATERIALS AT SITE ACCOUNT.

Sr. No.

Description

Opening balance

Receipt during month

Consumption during month

Closing balance

Total quantity received till date.

Total quantity consumed till date.

ANNEXURE-4

PROFORMA OF SITE ORDER BOOK

Name of the work……

Date of Commencement……

Sr. No.

Remarks / Instructions of the Site Engineer / Architect

Dated initials of Site Engineer / Architect

Initials of the Contractor for having received the instructions

Action taken with date

Dated initials of the Site Engineer

Remarks of the Architects

PROFORMA FOR APPLICATION FOR EXTENSION OF TIME PERIOD

1.	Name of Contractor	:	
2.	Name of the work as given in the Agreement	:	
3.	Agreement No.	:	
4.	Estimated tender amount	:	
5.	Date of Commencement of work as per Agreement	:	
6.	Period allowed for completion of work as per Agreement.	:	
7.	Date of Completion stipulated in Agreement.	:	
8.	Period for which extension of time has been give previously	:	
a)	Ist extension vide Architect's /IIBF's letter	:	
	No. Dated Month Days		
b)	2nd extension vide Architect's /IIBF's letter	:	
	No. Dated Month Days		
	Total extension previously given	:	
9.	Reason's for which extensions have been previously given (Copies of the previous applications should be attached)	:	
10.	Period for which extension is applied for	:	
11.	Hindrances on account of which extension is applied for with dates on which hindrances occurred and the period for which these are likely to last.	:	
a)	Serial No.		
b)	Nature of Hindrance		
c)	Date of occurrence		
d)	Period for which it is likely to last.		
e)	Period for which extension required for this particular hindrance		

f)	Over lapping period if any, with reference to item (e) above		
g)	Net extension applied for		
h)	Remarks, if any		
12.	Extension of time required for extra work	:	
13.	Details of extra work and the amount involved	:	
a)	Total value of extra work		
b)	Proportionate period of extension of time on estimated amount put to tender.		
14.	Total extension of time required for 11 & 12	:	

Submitted to the Architect/IIBF …….

Date: Signature of Contractor

ANNEXURE-6

PROFORMA OF HINDRANCE

Name of work:

Name of contractor:

Agreement No.

Date of state of work:

Period of completion:

Date of completion:

Sr. No.

Nature of hindrance

Date of occurrence of hindrance

Date of which hindrance was removed

Period of hindrance

Signature of site engineer

Remark's

1

2

ANNEXURE-7

PROFORMA OF LETTER GRANTING EXTENSION OF TIME

To,

Dear Sir,

Sub: Request for Extension of time for Furnishing / Renovation / Fit out work of Institute's office premises at C-5/30, Safdarjung Development Area, New Delhi,

Ref: your letter No…… dated……

This is in connection with the grant to extension of time for completion of the captioned work. The date of completion of the above-mentioned work is…….as stipulated in the contract. Extension of time for completion of the work upto…..is, hereby granted by the IIBF without prejudice to the right of the IIBF to recover liquidated damages in accordance with the provisions of the contract.

Notwithstanding the extension hereby granted, time is and shall continue to be the essence of the said contract.

Your faithfully

Indian Institute of Banking & Finance

ANNEXURE-8

ACCOUNT OF SECURED ADVANCE, IF ADMISIBLE ON THE MATERIALS HELD AT SITE BY THE CONTRACTOR.

No.	Item	Quantity	Unit	Amount	Remarks
1	2	3	4	5	6

Total Value of Materials at Site

Secured Advance @……% of above Value B

CERTIFIED (I) That the materials mentioned above have actually been brought by the contractor to the site of the work and no advance on any quantity of any of this item is outstanding on their security, (ii) that the materials are of imperishable nature and are all required by the contractor for use in the work in connection with the items for which rates of finished work have been agreed upon.

Dated signature of

Site Engineer preparing the bill

Dated Signature of

Institute's representative / Architects

(Name of the Architects

Dated Signature of Contractor

CERTIFICATE

The measurements on the basis of which the above entries for the Running Bill No. ……,were made have been taken jointly on……

and are recorded at pages……

to…of measurement book. The work recorded in the above-mentioned measurements has been done at the site satisfactorily as per tender drawings, conditions and specifications.

No……

..

Signature and date Of contractor

Signature and date of Architect's representative (Seal)

Signature and date of Site Engineer

ANNEXURE-9

MEMORANDUM FOR PAYMENT OF R A BILL No.___

Total amount due since previous Bill Rs_____

DEDUCATION :

a) Secured advance paid in the
Previous R.A. bill Rs_____

c) Retention money on value of
works as per accepted tenders:
Upto date amount Rs_____
Less: Already recovered Rs._____
Balance to be recovered Rs_____

d) Any other departmental
Material cost to be recovered
as per contract, if any Rs_____

e) Any other departmental service
Charges to be recovered if any,
Enclose statement Rs_____

Total deduction as per contract **Rs_____**
(-) Rs_____

Net amount payable as per contract Rs_____

(Rupees----------) in words

RUNNING A/C BILL

Name of Contractor/Agency: _____
Name of Work: _____
Sr. No. of this Bill: _____
No. and Date of Previous Bill. _____
Reference to Agreement No. _____
Date of Written Order to Commence. _____
Date of Completion as per Agreement. _____

Sr. No.	Item description	Unit	Rate (Rs.)	As per Tender		Up to Previous R/A Bill		Up to Date (Gross)		Present Bill		Remarks
				Qty.	Amt. (Rs.)	Qty.	Amt. (Rs.)	Qty.	Amt. (Rs.)	Qty.	Amt. (Rs.)	
1.	2.	3.	4.	5.		6.		7.		8.		9.

Note: 1. If Part Rate is allowed for any Item, it should be Indicated with reasons for allowing such a Rate. Net value since Previous Bill.
2. If Adhoc Payment is made, it should be mentioned specifically.

Date & Signature of Contractor.

TIMBER

As per IS 1708-1969

Test Required & Procedure	Frequency	Acceptance Criteria
1	2	3
1. Moisture Content and Specific Gravity Test preparation and procedure:		
a) **Measurement and weight:** Prior to each test, the dimensions of each test specimen shall be measured correct to 0.01 cm and the specimen shall be weighed correct to 0.001 gm.	For every Ten cum or part thereof.	The loss in weight expressed as a percentage of the oven dry weight shall be taken as the moisture content of the specimen. The formula for calculation shall be as given below: Percentage moisture content = $\frac{WI - WO}{WO} \times 100$ WI = Weight of sample at test in gms. WO = Oven dry wt. of sample in gms. Moisture content shall not exceed following values i) Timber for frames = 14% ii) Timber for planking shutters etc. = 12%
b) **Control of moisture content:** Before the preparation of the test specimens for testing in the seasoned condition, the material shall be brought practically to constant weight by storage under controlled conditions at 27° C ± 2° C temperature and 65 ± 5% relative humidity. This is expected to bring the moisture content at 12% but if it is not exactly 12% it is permitted to test in the neighbourhood of 12% and results shall be adjusted to 12% moisture content. The test shall be made under such conditions that large changes in moisture content do not occur.		
c) **Control of temperature:** To avoid significant changes in strength properties all test specimen shall be tested within the temperature range of 27° ± 2° C. The temperature at the time of test shall be recorded.		

Test Required & Procedure	Frequency	Acceptance Criteria
1	2	3
d) Rate of loading: The rate of loading of the rest machine used shall not vary by more than + 20% from the specified speed for a given test. The load shall be applied continuously without interruption at the required speed throughout the test. The approximate percentage of sapwood if any, by volume, is estimated for all the test specimens and recorded. The number of the growth rings for 3 cm length shall be counted in the radial direction on each of the cross-section of such piece and the average shall be recorded as number of rings/cms for each specimen tested. Immediately after each mechanical test, disc approx. 2.5 cm in length and of full section as the test piece, shall be taken normally at the place of failure, failing which, at the central portion of the test specimen. In the case of shear test, the detached portion of the section approximately 5x5 cm shall be taken for determination of moisture content. The sample shall be weighed and then dried in an oven at a temperature of 103 + 20 °C. The weight shall be recorded at regular intervals.	The drying shall be considered to be complete when the variation between last two weighing shall	

WOODEN PANEL DOOR SHUTTERS

Conforming to IS 2202 (Part I) 1983

Test Required & Procedure	Frequency	Acceptance Criteria
1	2	3
1. Physical Test **Physical Verification-** i) Name of the manufacturer or trade mark. ii) Thickness of door shutter. iii) Whether ISI Certification Mark exists.	faces and the stile and rail shall be examined for de-lamination.	
2. Glue Adhesion Test - **Procedure-** Two square sections, 150 mm X 150 mm shall be cut from the corners of the door. These corner sections as out from the door, shall be immersed in boiling water at 100° C for four hours, then dried at a temperature of 270° + 20° C and relative humidity of 65 $\pm$ 5% for 24 hours. At the end of the drying period the samples shall be examined for de-lamination. Glue lines in all the four exposed edges of the plywood on both faces of a specimen and the glue lines between the plywood	One from each lot.	A specimen shall be considered to have passed the test if no de-lamination has occurred in the glue lines in the plywood and if no single de-lamination. More then 50 mm in length and more than 3 mm in depth has occurred in the assembly glue lines between the plywood faces and the stile and rail.

READY MIXED PAINTS

Test Required & Procedure	Frequency	Acceptance Criteria
1	2	3
1. Drive Time **Procedure:** The material shall be brushed or sprayed as required on a 150 x 150 mm mild steel panel prepared and allowed to air dry or stored under specified drying conditions. The material shall be examined after specified intervals, for the following conditions: i) Surface dry ii) Hard dry iii) **Tack free:** The procedure of test on the dried film of the panel after specified period as follows: Place the panel in one pan of a suitable balance and counterpoise it with weights. Place a further weight of 2.25 kg and press on the dried film surface of the panel with the thumb till the two pans are balanced. Hold for one minute and then slowly release. No sign of stickiness to the thumb shall be apparent and the thumb impression, if produced, shall be such as can be wiped away with dry cotton wool.	On test each lot, (All containers of same size and same batch of manufacture constitute a lot)	No sign of stickiness to the thumb shall be apparent.

Test Required & Procedure	Frequency	Acceptance Criteria
1	2	3
2. Consistency- **Procedure:** Insert a clean metal rod or palette knife into the original container and examine the nature of the setting.	using either 20 ml of petroleum hydrocarbon solvent 145/205 (100 aromatic).	
3. Finish- **Procedure:** The material, when applied on an mild steel panel by brushing or spraying, which ever is specified to give a dry film weight commensurate with the weight per 10 litres of the material and allowed to dry in a vertical position under specified conditions, shall dry to hard, firmly adherent, flexible and smooth film, free from sagging and wrinkling with a matt, semi-glossy or glossy surface in accordance with the requirement of the material specification.		The material shall not be cake hard inside the container and shall be in such a condition that stirring easily produces a smooth uniform paint suitable for application. The film produced shall be of normal capacity and in no way inferior to a film prepared in the same manner and at the same time from the approved sample, when examined not earlier than 48 hours and not later than 100 hours after application. In case of failure, the test shall be repeated by keeping the painted panel under standard atmospheric condition.
4. Residue on Sieve- **Outline:** The material is mixed with a suitable solvent and passed through a 63 micron IS sieve. Not less than 20 gms. of the material taken from under the top skin shall be tested. **Procedure:** Accurately weigh the required quantity of the material and transfer to a 250 ml beaker		

Test Required & Procedure	Frequency	Acceptance Criteria
1	2	3
(Conforming to IS: 1745-1961) or 20 ml of a mixture containing equal parts by volume of petroleum hydrocarbon solvent and benzene. Wet a 63 micron IS sieve on both sides with the solvent. Mix the material and the solvent in the beaker thoroughly, breaking up all lumps without grinding action, with the flattened end of a stirring rod. Transfer the contents of the beaker to the sieve using awash bottle containing the solvent. Remove with the camel-hair brush any small particles of pigment that may be retained on the stirring rod or the walls of the beaker. Wash the residue left on the sieve with the solvent and gently brush with a camel-hair brush unit the solvent passing through the sieve is clear and free from solid particles. When the washing is complete, dry the sieve for one hour at 100 + 2° C. Cool and transfer the residue with the help of the camel-hair brush to a weighed watch glass and determine the weight of residue.		
5. Water Content		
Outline of the method: The material is heated under reflex with an organic solvent which is immiscible with water. The carrier liquid distils into a graduated receiver carrying with it water which then separates to from the lower layer,		

Test Required & Procedure	Frequency	Acceptance Criteria
1	2	3
the excess carrier liquid overflowing from the trap and returning to the still. **Procedure:** Weigh 100 g. of the material in the flask, add 100 ml of dry petroleum hydrocarbon solvent (boiling point 75 to 85° C) and IMI of dry ethyacetate (conforming to IS:229-1964) or acetate (conforming to IS:231-1957) and thoroughly mix the contents of the flask. Pour petroleum hydrocarbon solvent into the receiver upto the level of the side tube. Attach the flask to Dean and stark condensing and collecting system and heat the flask at such a rate that the condensate falls from the end of the condenser at a rate of two to five drops per second. Continue the distillation unit condensed water is no longer visible in any part of the apparatus except at the bottom of the graduated tube and until the volume of water collected remains constant. Remove the persistent ring of condensed water in the rate of distillation by a few drops per second. **6. Weight per Litre** **Outline of the method:** The calibrated cylinder or CNP is filled with the material and weighed.		

Test Required & Procedure	Frequency	Acceptance Criteria
1	2	3
Procedure: Weight the cylinder or cup when empty and then fill to the brim with the material Assuming that the volume of the contents is 50 ml or 100 ml, calculate and express as kg per 10 litres.		
7. Lead Restriction		
Outline of the method: Determination of lead in lead restricted paints is carried out by precipitating the lead as sulphide from the separated pigment, which is finally oxidized to lead monoxide.		
Procedure: Shake about one gram of the ground pigment obtained, accurately weighed, continuously for one hour at room temperature with 1000 times its weight of an aqueous solution of hydrochloric acid containing 0.25 percent by weight of hydrogen chloride.		
Allow the mixture to stand for one hour and then filter. Precipitate the lead salt contained in the clear filtrate as lead sulphide, filter, that the lead sulphide in air to convert it into lead sulphate, weigh calculate as lead monoxide (PbO) and express the result as percentage on the dry weight of the material taken for test.		

PARTICLE BOARDS

Test Required & Procedure	Frequency	Acceptance Criteria
1	2	3
Identification (Physical Verification) Each particle board shall be legibly marked near any of its edge with the following. 1. Name of the manufacturer or trade mark. 2. Designation of particle board. 3. Thickness and date of manufacture. 4. Whether I.S.I. Certification marks exists. 5. Dimensional Tolerace a) Length ± 8 mm b) Width ± 8 mm c) Thickness i) Boards upto and including 25mm thick ± 5.0%] ii) Boards above 25mm thick ± 2.5%. Edges of the board shall be straight with a tolerance of 3 mm. the persistent ring of condensed water in the rate of distillation by a few drops per second.	One from each lot **Density –** The density of each sample shall not vary from the mean density by more than + 10%.	**Moisture content** : The average value of the moisture content shall be between 7 to 16%. **Water absorption :** The value of water absorption shall not exceed 25% for two hrs, soaking and 50% for 20 hrs. soaking. **Exterior grade (I)** : These particle boards shall not delaminate after 3 hrs. boiling in water at 100'C. **Interior Grade (Gr.II)** : These particle boards shall not disintegrate and / or shall not detaminate after 24 hrs. immersion in water at 27% ± 2'C. **Swelling water :** Swelling in thickness in % of original thickness for 2 hrs. immersion shall be determined and the same shall not be more than 5%. The Swelling in thickness due to surface absorption in two hours shall not be more than 5%.

SECTION 5

TECHNICAL SPECIFICATIONS

SPECIFICATIONS OF INTERIOR & FURNISHING WORKS

1. GENERAL :

1. Without forgoing the requirements of the Conditions of Tender and the Conditions of Contract the works in general shall confirm to the "Latest Specifications" published by CPWD, New Delhi and the "Specifications for Works" stated in this tender. In case of items not covered by the General Specifications referred above, reference shall be made to the appropriate I.S. Code. If there is any difference in the particular specifications of individual item of work and the description of item as given in the Schedule of Quantity, the latter shall prevail. In case of any work for which there is no specification in I.S. Specifications or in the specifications forming part of tender documents or in case there is any variation, such work shall be carried out in all respects in accordance with the instructions to be issued by the Architects. The term Department shall mean the Employer. Any reference to ISI shall also mean reference to its successor Bureau of Indian Standards. All corrections to "Latest Specifications" or revisions of I. S. shall be deemed to apply to this contract.
2. Materials bearing ISI certification mark shall be given highest preference for use in the works.
3. Where the Contractor is required to do, perform, execute (etc.) any work or service or the like, it shall be deemed to be at his own cost. Absence of terms providing supplying, installing, fixing, etc. shall not even remotely entitle the Contractor to any additional payment thereof.
4. The rates accepted in the Schedule of Quantities apply to all floors, heights, depths, leads, lifts, spans, sizes, shapes, locations, etc. unless a distinction has been included in the very Schedule.
5. The Specifications and the Schedules may have been divided into various sub-heads for convenience only. This does not limit applicability of one to the other nor it absolves the Contractor of his responsibility to complete any trade/item of work as reasonably inferred from one or more of such sub-heads.
6. The Schedule of Quantities is not necessarily based on "Schedule of Rates – Delhi 2013 or any of its later/earlier versions. Hence the Schedule of Quantities shall be read and construed according to explanations given herein and intentions gathered therefrom. A mere parallel drawn from the said Schedule of Rates shall therefore not form a basis for a variation and, or additional payment.
7. All work under this contract is deemed to be performed above subsoil water level. However, removal of water collected from rains and the like shall be treated as part of contractual risk/obligation.
8. Screws, bolts, nuts, washers, hold fasts, lugs, anchors, clamps, plugs, suspenders, brackets, straps and fasteners of the like are deemed to be included in the rates of various items unless the Schedule of Quantities expressed a different intention.
9. Resetting any displacements, making good holes/chases and such other incidental jobs are included in rates of respective items for which these are required.
10. The specifications given in the BOQ are for work to be done, item to be supplied and materials to be used in the works as shown and defined on the drawings and described herein, to the satisfaction of the IIBF/architects.
11. 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 by the IIBF / architects. Use must be made of special tradesman in all aspects of the work and allowance must be made in the rates for the same.

12. The materials to be provided by the contractor shall be in accordance with the samples already got approved from the s/architects by the contractor and in conformity with specifications and approved list called upon to do so by the IIBF / architects.

13. Samples of all materials are to be submitted to the IIBF / architects for their approval before the contractor orders of deliver 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 contractor's expense. All samples will be required to submit specimen finishes of colors, fabrics etc. for the approval of the IIBFs / architects before proceeding with the work.

14. The contractor shall be responsible for providing and maintaining temporary overages 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 coverings or infillings are constructed.

15. The contractor shall maintain uniform quality and consistency in workmanship throughout the execution of the work.

2. Wood Work:

1. The areas of doors & windows shutters shall be measured to the nearest cm in closed position covering the rebates of the frame but excluding the gap between the shutter and the frame. Over lap of two shutters shall not be measured. All work shall be measured for finished dimensions. No allowance shall be made for dimensions supplied beyond those specified. Length of each piece shall be measured overall nearest to 1 cm, so as to include projections for tenons, scraves or mitres, width and thickness shall be measured to the nearest mm.
2. Where painting, polishing has been included in the item the same shall be executed as per Architect's directions. Painting shall be two or more coats of approved synthetic enamel plus a coat of fire resistant primer to wood work as approved by Architect and shall conform to BS-476 part 7 for class I surface spread of flame. Preparations of surfaces, fillars, etc. are included. This primer shall also be applied before polishing (i.e. French Spirit Polish).
3. All flush door shutters shall have teak lipping on all edges as directed with extra thickness of lipping of meeting edges of double shutter doors.
   Glasses 5.5mm thick or 4mm thick shall respectively weigh not less than 13.75 Kg/sqm. Or 10 Kg/sqm.
   Bends, stepping and circular shapes in railings are integral part of the rate.
   The widths of various rails & styles shall be as described in the items or shown in the drawing. All aluminum section & fittings used shall be ISI marked. All screws for fixing of fittings/fixtures shall be of matching finish.
   In case of composite units (M.S. frame + teak wood shutter) the hold fasts shall be added or fixed with counter sunk machine screws. Also the M.S. frames shall have necessary holes and other arrangement for receiving/fixing of fittings

2.1 Joinery in woodwork

1. The contract surfaces between internal frame and the cover material shall be glued with approved adhesive in addition to fixing with necessary screws etc.
2. After preparing proper surface of the cover material by sand-papering etc. the laminates or veneers shall be fixed on it with the help of approved adhesive
3. Framework for full height partition shall be rigidly fixed to the floor, walls and ceiling soffit. The partition height shall be measured up to bottom of false ceiling and framing members / ply going above shall not be measured, except hwre specifically mentioned.

4. Any portions that are warped or found with other defects are to be placed. The whole of the work is to be framed and finished in a workman like manner in accordance with the detailed drawings and the direction of IIBF/architects and

5. Whenever required, fitted with all necessary metal ties, straps, screws, adhesives, etc. joinery work generally to be finished with fine sand / glass paper.

6. All joints shall be standard mortise and tenon, dowel, dovetail, or cross halved. Screws, nails etc. will be of standard iron or wire. Tenon should fit the mortises exactly.

7. Nailed or glued butt joined will not be permitted.

8. Where screw heads are on a finished surface, those will be sunk and hole plugged with a wood plug of the same wood and grain to match the color.

3. TIMBER

1. All wood for internal framework shall be strictly as specified in the tender document under approved list of material. The wood shall be of natural growth and free from worm holes, loose or dead knots or other defects, sawn square and shall not suffer warping, splitting or other defects.

   All other exposed wood shall be properly seasoned of natural growth and shall be free from worm holes, loose or dead knots or other defects, sawn square and shall not suffer warping, splitting or other defects.

2. The moisture content shall not exceed 12%

3. All Internal frameworks shall be treated with approved wood preservatives.

4. All wood brought to site shall be clean; it shall not have any preservative or other coating / covering.

5. All rejected, decayed, bad quality wood shall be immediately removed from site, as may be directed.

6. All the dimensions mentioned for T.W. members are finished size.

4. PLYWOOD

All plywood shall be strictly as per approved list of material and approved by IIBF / Architect. The plywood shall have ISI mark and relevant registration No. on the product.

5. **Hardware and Metals:**

1. All the screws / bolts with nuts to be used shall have oxidized finish (unless required otherwise). Of approved shape, size and quality.

2. Fittings shall be brass oxidized unless specified otherwise.

3. Samples of all hardware are required to be got approved in advance.

4. The agency should cover up and protect the brass surface by suitable material as necessary and subsequently clean it away at the time of handling over.

5. All hardware shall be fitted with good workmanship without the surrounding edges being damaged.

6. Laminate :

1. **All laminates on table tops shall be as specified in tender of approved shade and make.**

2. The contractor shall get the sample showing the surface texture, pattern and color approved by IIBF/Architects.

3. All edges, beadings, etc. shall also be finished in laminate.

7. Fabrication in Metal

1. All brazing and welds are to be executed in a clean and smooth manner, rubbed down and finished in flat and tidiest way, particularly where exposed.

8. Glazier

1. All glass is to be of approved manufacture, and as per approved quality and sample to be of the qualities specified and free from bubbles, air holes, waviness and other defects.
2. In cutting glass, proper allowance shall be made for expansion.
3. Glass for mirror shall be approved manufacture and quality.
4. On completion, all glasses surfaces shall be cleaned inside and all cracked, scratched glass/mirror shall be replaced.
5. Sun control film shall be non-reflective type of approved make and shade. The fixing shall be without any defects such as air bubbles/creases/adhesive marks etc.

9. <u>Plaster of Paris Punning (P. O. P.)</u>

If the plaster surface is to be finished with plaster of paris punning, the surface shall be combed slightly with the wire brushes or nails before it is completely set to form key for plaster of Paris punning. The surface shall be thoroughly cleaned of dust then only damped but not soaked before the application of plaster of paris punning. The Gypsum for preparing punning shall be approved quality. It shall be dry and free from lumps and shall be suitably packed in watertight bags or containers. Paste shall be prepared by adding required quantum of water and it shall be used before it sets. No dropping paste shall be used in the work. Punning shall be applied to the prepared surface with steel trowel to a thickness required to make the surface produce perfectly smooth and even surface working from top to bottom. It shall then be sand papered to give a smooth and even surface. Any unevenness shall be made good by applying putty, made of plaster of paris mixed with water, then sand papering the same after it is dry. Pilling in plaster shall be made good with plaster of paris mixed with colour to be used. The surface shall then be rubbed down again with a fine grade sand paper and made smooth. The surface shall be allowed to dry thoroughly before the regular coat of paint is applied. The measurement shall be in square metre.

10. <u>Plastic Emulsion Paint:</u>

Plastic emulsion paint shall be of approved manufacturer and shall generally confirm to IS-5411 (Part-I)-1969.

The colour and shade of the emulsion shall be got approved by the Architect. Double scaffolding shall be used, ladden if used shall be tied with old gunny bags at top to prevent damage or scratches to the walls. The instructions of the manufacturer shall be followed, in application of priming and finishing coats. Turpentine or any other solvent shall not be used for thinning the paint.

Minimum 3 coats of paint shall be applied inclusive of primer coat. If a proper and even surface is not obtained to the satisfaction of the Architects in 3 coats, Contract shall carry out additional coats of painting to approval at his expenses. Care shall be taken that dust or other foreign material does not settle or disfigure the various coats. The measurement shall be in square metre.

11. Polishes

1. All material required for the work shall be of approved manufacture, delivered to the site in the manufacturer's containers with the seals etc. unbroken and after use empty containers shall be stored till finally cleared by the IIBF.
2. All iron or steel/metal surfaces shall be thoroughly scraped and rubbed down with wire brushes and shall be entirely free from rust, mill scale etc. Before applying the primary cost.

3. Melamine polish/French polish/polyurethane finishes shall be properly finished without any flaw marks, spots, roughness etc.

12. Metal frame suspended gyp board ceiling:

1. Unless otherwise specified the suspended false ceiling shall have following specifications i.e. providing and fixing G.I. perimeter channels of size 0.55 mm size thick having one flange of 20 mm and another flange of 30 mm and a web of 27 mm along with perimeter of ceiling, screw fixed to brick wall/partition with the help of nylon sleeves and screws, at 610 mm centers. Then suspending G.I. intermediate channels of size 45 mm, 0.9 mm, thick with two flanges of 15 mm each from the soffit at 1220 mm centers with ceiling angle of width 25mmx10mmx0.55mm thick fixed to soffit with G.I. cleat and steel fasteners. Ceiling section of 0.55 mm thickness having knurled web of 51.5 mm and two flanges of 26mm each with lips of 10.5mm are then fixed to the intermediate channel at 457mm centers. 12.5mm tapered edge Gyp board (conforming to IS-2095-1982) is then screw fixed to ceiling section with 25mm drywall screws at 230mm centers. Screw fixing is done mechanically either with screw-driver and drilling machine with suitable attachment. Finally the boards are to be joined and finished so as to have a flush lock which includes filling and finishing the tapered and square edges of the boards with joining compound, paper tape and two coats of primer suitable for Gyp board (as per recommended practices of India Gypsum or equivalent)
2. For light fittings, grids diffusers and cutouts etc. have to be made with the frame of perimeter channels of size 20mmx27mmx30mmx0.55mm thick, supported and shall not be considered for extra changes.

13. Metal frame suspended aluminium perforated plank's ceiling:

1. Suspended false ceiling, which includes planks in width dimension 254mm and length 1264mm manufactured out of 0.7mm aluminium alloy. The planks should have square edges, short sides of each plank should be raised and piped. Perforated planks shall be with a standard perforation 2.5mm dia, holes at 5.5mm centers giving 16% open area.
2. Planks would be suspended by means of suspension system comprising 0.5mm galvanized steel clip-in-profiles installed at correct spacing to support the planks. Suspension profiles would be suspended from roof structure by G.I. ceiling bracket G.I. suspension angle and aluminium hold on clamp at maximum 1200mm center along clip-in-profiles.
3. Planks to be trimmed along the wall perimeter by means of 25mmx25mmx1.6mm extruded aluminium perimeter angle powder coated.
4. Aluminium planks would be finished with 50 microns epoxy polyester powder paint in approved shade on exposed surface. Aluminium wall trim would also be finished with 50 microns epoxy polyester powder paint in broken white space.
5. The ceiling shall be erected in a continuous sequence. Spans would not exceed those recommended.

MODE OF MEASUREMENTS FOR INTERIOR FURNISHING WORKS :

DOORS, WINDOWS AND GRILLS.

1. Clear area over one face inclusive of frame shall be measured. Hold fasts and portion embedded in masonary or flooing shall not be measured.
2. PARTITIONS IN WOOD WORK

   The partition height shall be measured up to bottom of false ceiling and framing members / ply going above shall not be measured
3. DECORATIVE PANELLING OVERWALL OR OVER PARTITIONS

   The actual area of cladding shall be measured in square meter.
4. CARPETS

   The actual area covered by the carpet shall be measured. No extra shall be allowed for wastage. No deduction shall made for columns up to 0.5 sq. meter.

5. PAVING AND TILE WORK

The work mentioned in this section shall be measured in square meter and shall be priced per unit of square meter. In all paving work, the slabs shall be touching the walls and go well under the plaster, but the measurements shall be the clear measurements of the rooms or areas finished. No allowance shall be made for portions going under the plaster.

6. ALUMINUM SLIDING WINDOWS

The measurement of aluminum sliding windows shall be taken only after the frame work with shutter is fixed in its final finished position in line level and plumb. Width and height shall be measured net between the out to out portion of the aluminum window frames.

7. FALSE CEILING

For false ceiling work, the measurement shall be for the actual area covered. No deductions shall be made for the cutouts, for light fittings, speakers, AC grills and column up to 0.5 sq. meter.

8. WOODWORK

For conversion of centimeters to meter the resultant figure shall be taken up to two digits after decimal point. Third digit shall not be taken into account.

SPECIFICATIONS FOR SERVICES

1.0 General

1.1 The drawings for services are diagrammatic but shall be followed as closely as actual construction permits. Any deviations from the drawings shall be in conformity with architectural and structural drawings. The dimensions designated by the manufacturers shall take precedence over the drawings.

1.1 At completion of work the Contractor shall submit one set of tracings and two sets of prints of "As-Built-Drawings". These drawings shall, among others, include invert levels, pipe runs, diameters, location of valves, access panels, layout of equipment, piping connections and such other information for maintenance & future extensions. Guarantees given by manufacturers shall be assigned to the Employer along with names & addresses of manufacturers, suppliers and information about spare parts.

1.2 All site test shall be carried out with prior intimation to the IIBF representative / Architect. All defects shall be rectified and tests conducted again to the satisfaction of the IIBF representative / Architect. In addition to the test required by the specifications, the Contractor shall also conduct tests required by the Architect and by the Municipal or other Authorities.

1.3 All work shall be executed by competent and licensed persons. The contractor shall maintain liaison with Municipal and other controlling Authorities. He shall obtain their approvals and certificates as required by the bye – laws at appropriate stages.

1.4 No cutting / chasing shall be done in load bearing structural members without prior approval of the Architect. Sleeves and openings shall be provided during the progress of construction in preference to cutting at later date.

1.5 The Architect may require typical mock up(s) to be installed in advance for approval. Undamaged materials from the mock up shall be allowed to be reused in the work.

1.6 Unless otherwise described in the item CI / SCI pipes and fittings shall be a spigot and socket type.

1.7 G.I. pipe spouts shall be paid as per item of G.I. pipes (internal work). Cutting and making good is included. The free ends may be skew-cut.

1.8 Wherever use of G.I. pipes is called for the same shall be medium class (class – B)

2.0 Materials :

2.1 The materials shall conform to the specifications and in absence thereof to Indian Standards. The products should bear the ISI Mark.

2.2 The makes of materials for use in this work are broadly approved as per list given below. The Contractor shall, however, get particular makes and samples approved before ordering:

2.3 Notwithstanding any interim or final approval the Contractor remains responsible for satisfactory performance of all fittings & fixtures. The liability of the Contractor is not limited by any approval of the make of materials.

2.4 The item rate of mirror includes extra packing piece of AC plain sheet, where required due to off set between plaster & glazed tiles surface.

3.0 Testing

3.1 The sand cast iron soil, waste and vent pipes and fittings including joints shall be tested by pumping smoke into the pipe at the lowest end.

3.2 All G.I pipes and fittings including joints shall be tested to hydraulic pressure of 6 kg / cm2 (60 meters) avoiding water hammer. The test pump having been stopped the test pressure should maintain without loss for at least half an hour. The pipes and fittings shall be tested in sections as the work of laying proceeds keeping the joints exposed for inspection during the testing.

3.3 All stone ware pipes shall be tested with water pressure of 1.5m head of water at the highest point of the section under test.

TECHNICAL SPECIFICATION FOR SANITARY & PLUMBING WORKS

2.1 Sanitary Ware & Allied Fittings:

2.1.1 General:

All sanitary fixtures and their allied fittings should be of best quality, manufactured by reputed manufacturer . These should be approved by the consultant / IIBF representative before use.

2.1.2 Squatting pattern W.C. pan (Orissa Pattern Closets)

The water closets shall be of vitreous china of specified size and pattern, integral flushing rim. It shall have the flushing inlet at the back. The Orissa closets should be I.S.I marked of approved quality conforming to IS –2556.

The squatting type Indian water closets (Orissa Closet) shall be sunk in floor sloped towards the pan in a workmanship like manner. The closet shall be fixed on a proper cement concrete base of 1:3:6 proportion, taking care that the cushion is uniform and even without closet, to receive the specified thickness of the floor finishing. The joint between the closet and the PVC. Trap shall be made with W.C. ring and rubbed lubricant and shall be of leak proof.

2.1.3 Flushing Cistern:

The flushing of the Indian water closet (Orissa closet) shall be done polystyrene high level valve less symphonic flushing cistern (PVC low level cistern) of approved brand and quality I.S.I. marked and capacity as specified. The connection between the cistern and water closet shall be made by 32 mm dia G.I. flush pipe, made from G.I. pipe (Light quality) or 32 mm dia. PVC pipe as specified in the tender schedule. The flush pipe with an off set should be fixed to wall using C.I. holder bat clamps. The capacity of the cistern should be 10 ltrs. As per I.S.S. the cistern shall be fixed on cast iron or rolled steel /PVC cantilever brackets (built in type) which shall be firmly embedded screwed in the wall, with C.C. M20. the cistern shall be provided with 20mm dia PVC. Overflow pipe with fittings which shall terminate into mosquito proof coupling secured in a manner that will permit it to be readily cleaned or renewed.

2.1.4 Wash Hand Basin:

The wash hand basin shall be of the white vitreous china of approved quality, make and brand I.S.I. marked. It shall be one piece construction with an integral combined overflow. The size of the basin shall be as specified. Each basin shall be provided with one 15 mm dia C.P. Brass pillar Tap, 32 mm dia C.P. waste C.P. chain and rubber plug, unions, joints, C.P. Bottle trap casted PVC waste pipe complete in all respects of approved quality.

The basin shall be supported on a pair of R.S. or C.I. cantilever brackets (built in type) and embedded and fixed in wall with cement concrete, M20. these brackets shall be painted to the required shade with two coats of synthetic enamel paint over coat of priming. The waste of the basin shall discharge into a floor trap of channel through bottle traps PVC waste pipe as specified. One 32 mm dia C.P. bottle trap is to be fixed to the waste of the basin, & the outlet of the bottle trap is to be connected to the waste pipe to discharge the waste to the aforesaid floor trap. The inlet connection to the basin shall be made with 450 mm long 15mm dia heavy type P.V.C. connection pipe.

2.1.5 Standing Urinals:

The urinals shall be flat pattern lipped front basin of required dimension of the white vitreous china and one piece construction with internal flushing box, rim of an approved make and brand as specified. It shall be fixed in the position by using wood unplug embedded in the wall with screws of proper size. Each urinal shall be connected to a 40 mm dia PVC waste pipe which shall discharge into a channel or floor trap. The lip of

urinal shall be kept at 525 mm from floor level, while fixing the urinal on the wall.

Where no of urinals are fixed in a line, the distance between the center to center of each urinal shall be kept 750mm and each urinal should be separated from one to other by a partition plate. The center to center partition plates shall be kept 750 mm.

The partition plates shall be of one piece kota stone plates, cut to size or partition wall and front corners rounded. The partition parttion plates are embedded in wall with cement concrete and finished smooth. The bottom of the partition plates should be kept 500 mm above floor level and top should be kept at 1250 mm above floor level. The plates should project 600mm from wall surface. The width of the plates should be embedded inside the wall and should not be less than 100 mm. The thickness of the plates shall be minimum of 25 mm to 32 mm. Thickness of partition wall should be limited to 150 mm including smooth surface finishing.

For flushing the urinals each urinal shall be, connected with one 20 mm dia G.I. Pipe (Midium class). One end of each of this pipe 15 mm PVC connection pipe shall be inserted into the inlet of the Urinal and jointed with jute and putty where as the other end is connected either with a tee or bend with water pipe line fixed on the wall horizontal above the urinals. In each 20 mm dia flush pipe one 20 mm dia –gun-metal gate valve angle stopcock to the fixed. By opening this valve, the water will flow to the rims of urinal through the inlet pipe and flush the urinal. After flush, the valve can be closed to avoid wastage of water. One 40 mm dia P.V.C. waste pipe shall be connected to the waste of each urinal, to discharge the waste into the channel or trap. One end of this waste pipe shall be made a cup size to fit into the projected waste and tightened with screws and waste clamp.

2.1.6 Squatting Urinal Plates:

The urinal plates shall be of white glazed vitreous china with integral flusuing rim of size 450 mm x 350 mm of approved make and brand as specified. There shall be white vitreous channel with stop and outlet pieces in the front. These plates shall be fixed on C.C. at 75 mm to 100 mm above floor level.

For flushing arrangement, one 25 mm dia G.I. common water pipeline(minimum s9ze) shall be fixed on the wall parallel to floor. For each urinal one 20mm dia. G.I. Branch pipe shall be taken down upto 12mm from floor level just at the center of each plate, in which one 20 mm dia gate valves is fixed at 1500 mm above floor level. At 1200m height, the 20mm dia flash pipe shall be divided into two branches with a tee and fixed horizontal. 300mm on either side and then with the help of elbows, both the branches shall be taken downward and connected to the inlets of the urinal plates at floor level. By operating the valve as above, the water will rush into the rims of the urinal plate and flush it.

Where there are number of urinals fixed in a line, each urinal should be separated by a partition plate fixed in the centre of two urinal plates. The centre to centre distance of the partition places shall be kept 750mm minimum.

The partition plates shall be of one piece kota stone plate, 25 mm to 52 mm thick, cut to sizes and front corners rounded. The plates are embedded in wall with cement concrete and finished smooth. The bottom of the partition plates wall shall be kept flushed to urinal top level, the top level shall be kept at 1200 mm from the urinal plate top and the projection from the wall shall be 600 mm. the width of the plate to be embedded inside the wall should not be less than 100mm.

2.2 P.V.C. (S.W.R.) AND P.V.C. (Rigid) Pipes and Fittings:

2.2.1 General

The PVC (SWR) and PVC(Rigid), soil waste and vent pipes (spigot and socket, and couples joints), shall be of make and brand as specified (under specification of materials) confirming to I.S.S., B.S.S. and DIN are to be used.

The main specification of PVC, soil and waste pipes and fittings are as below.

a) Materials – unplaticised Poly vinyl Chloride (UPVC)

b) Color –Grey.

c) Dimensions –

i) diameter – fittings – 75mm. 110mm /63 mm and 634mm.

ii) Pipes –75mm, 110mm, in lengths of 3 or 6 mtr.

d) Wall thickness - fittings – minimum 3.2 mm at any point

Pipes – as per application.

For rain water – 75mm – 1.8 to 2.2 mm

110mm – 2.5 to 3 mm

Waste and soil :- 75mm – 1.8 to 2.2 mm

110mm – 2.5 to 3 mm

Underground drainage with

Light / Nil traffics – 110 mm – 2.5 to 3 mm

Under ground Drainage with

Heavy traffic – 110mm –3.7 to 4.3 mm.

e) Standards confirming to attributes

Attributes	Confirms to standard No.
i. fittings and wall thickness -	B.S. 4514. DIN 10531 DIN 10532, I.S. 7834 – PVC(Rigid)
ii. Pipe wall thickness	I.S. 4985
iii. Rubber ring	IS 5382.
iv. Fittings Dimensions	DIN 19531 I.P.V.C. DIN19534 I (SWR) IS –7834 PVC (Rigid)
v. Pipe dimensions	IS –4985

2.2.2 Leaving instructions and joint procedure

i. Jointing a PVC (SWR) pipes and fittings.

Clean the outside of the pipes spigot and the inside of the sealing groove of the flitting. Apply the rubber lubricant, to the spigot end, sealing ring and pass the spigot and into the socket, containing sealing ring, until fully home. Mark the position of the socket edge with the pencil on the pipe and then withdraw the pipe from the socket by approx 10 mm towards thermal expansion gap.

ii.Fixing of the pipes and fittings on wall surface :

PVC pipes both (SWR) and (Rigid), fixed on wall surface, are to be supported by PVC pipe clips specially made for these pipes. With horizontal runs. The pipe clips should be spaced at intervals of more then 10 times the outside diameter of the pipes. In verticals of one meter to a maximum of two meters according to pipe diameter or wherever specified.

iii. Jointing of P.V.C. (Rigid) pipe fittings.

Clean the outside of the pipes and inside of the socket of a fitting or the inside of the couplers (where 2 plain ended pipes are jointed) of. Apply solvent cement solution, evenly and smoothly on the outer surface of the pipe end and inside surface of either the coupler or the socket and pass the pipe end into the socket of the fittings, up to the half depth on the end of one pipe and the outer half of the coupler should be pushed to the end other pipe and thus, both pipes are jointed.

iv. Fixing of P.V.C. pipes & fittings through holes of walls or chaja or roofs etc.

The wall / concrete slots should allow for a stress free installation, pipes and fittings to be inserted into the slots, without a cement base, have to be applied first with a thin coat of P.V.C. solvent cement, followed by sprinkling of dry sand (medium size). Allow it to dry. This process gives a sound base for cement concrete fixation, around the pipes / fittings while mending the damages.

v. Antisyphonage Pipes

All the antisyphonage pipes and fittings to be used are of 63 mm. If these are not available under the items of P.V.C. (SWR) materials, 63mm pipes and fittings, manufactured under P.V.C.(Rigid) material can be used, since the raw materials for both is same.

vi. Installation of Traps

All traps should have a minimum water seal of 60mm as per I.S. 5329 AND i.s. 2552(Part – XIII). Where anti-syphonage connection is required, the traps to be supplied and used should have a 50 mm antisyphonage vent horn on the outlet side. All the traps used with the closets, should be of the size 125mm x 110mm i.e. inlet (socket end) of 125mm and outlet (spigot end) of 110mm only.

vii. Installation of water closet

Determine the correct location of the P/S trap and set it on a firm base, relative to the floor finish by pouring concrete around on a slab. Bedding can be endured that the raps outlet is left clear of concrete. Place the W.C. connector ring to the locketed pipe of 125/110 mm R/S trap. Apply rubber lubricants on W.C. connector ring as well as outer side of water closet (connection point) and now complete the joint by pushing the W.C. to home of 125mm socket of the trap.

viii. P.V.C.(Rigid) pipes and Fittings

63mm (O.D.) P.V.C. Pipes to be used for these works either in antisyphonage system or elsewhere, should be of "Quick Fit" pipes Class 2 (4kg F/cm^2), quick Fit. Pipes have one end socketted.

The P.V.C.(rigid) fittings, such as 63 mm elbow, 63 mm equal tee 110 x 63 mm reducer etc. used in the work, should be of injection moulded fittings.

ix. One jointing rubber ring will be available, with each P.V.C.(SWR) pipe and fitting and hence, the cost of the ring will not be added in the joint.

All pipes shall be measured net / length as laid or fixed and shall be measured over all fittings such as bends junctions traps etc. the length shall be taken along the centerline of the pipes and fittings. Fittings will be counted extra over.

x. For fixing and painting, the pipe shall be tested hydraulically to a pressure 0.4Kg/cm^2 for pipes under I.S. 1729 and at a pressure 0.7 Kg. Cm^2 for pipes under I.S. 3989 without showing any sign of leakage, sweating of or other defect of any kind. The pressure should be applied internally and shall be maintained for not less than 15 seconds.

2.3 WATER SUPPLY PIPES AND FITTINGS

2.3.1 Materials

P.V.C pipes of approved quality conforming to IS 1239& bearing ISI Marks, manufactured by reputed firms and approved brands as specified.

2.3.2 Laying of Pipes.

The layout of the mains and service pipe set etc. will be done in accordance with the drawings. The contractor is to mark out the exact position of the pipes and fittings at site and take approval of the consultant / Engineer in –charge, before taking up the work.

Where the pipes are laid, underground these must not be laid less than 450 mm below ground level and coated with one coat of approved black bituminous paint. For laying the G.I. Pipes and Fittings below ground level, the width and the depth of the trenches

for different dimensions of the pipes shall be given as below :

Dia of pipe	Width of Trench	Depth of Trench
15mm to 50 mm	300 mm	600mm
65mm to 100 mm	450mm	750mm

The pipes shall be laid on a layer of 75 mm thick sand and filled up with sand and filled up with sand up to 75 mm above pipes and the remaining portion of the trench shall then be filled up with excavated earth with proper ramming as described in "Excavation and refilling ". The surplus earth shall be disposed of as directed.

Thrust or anchor blocks of cement concrete !:2:4 in hard granite chips shall be constructed on all `bends or branches to transmit the hydraulic pressure without impairing the ground and spreading it over a sufficient area. Pipes shall not be laid to pass through manholes, catch pit, drain. Where it is unavoidable the pipes shall be carried in sleeve pipes of M.S. / G.I. as approved by the consultant / IIBF. The rates should include such a situation.

4. Where pipes run along walls, the same are to be fixed to the wall with holder bat clamps /M.S. Hooks as below:

Dia of pipe in mm	15	20	25	32	40	50
Horizontal Line	2m	2.5m	2.50m	2.503m	3m	3m
Vertical Line	2.5m	3m	3m	3m	3.5m	3.5m

Where the pipes are passing through the R.C.C. /Masonry wall / Column / beam of Pillars, these must pass through the appropriate higher sizes of C.I. / G.I. Sleeve Pipes and are to be included in the rates.

In case the Pipes are embedded in walls and floors it should be painted with one coat of anticorrosive paint of approved quality.

All pipes should be fixed horizontal and vertical. For taking the pipes through the walls and floors and roof slabs etc. the holes shall be made by filling with Chisel or jumper and not by dismantling the brick work of concrete. After fixing, the holes shall be made god with cement concrete 1:2:4 and properly finished with C. Plaster 1:4 to match the adjacent surface.

Union Nuts are to be provided in each of the Vertical riser or drop on and from G.I. Tank and near the Valve and as and where necessary.

The long screw fittings of 3 Mtrs. For long horizontal lines and inside the lavatory / kitchen etc.,

After laying and jointing the Pipes and fittings shall be inspected under working condition of pressure and flow. Any joint found leaking pipes should be removed and replaced without extra cost. The pipes and fittings after they are laid shall be tested to hydraulic pressure of 6 Kg. Cm^2. the test pressure should maintain without loss of for atleast half an hour.

2.3.3 Painting

On completion of the test, the exposed pipes and fittings are to be painted with two coats of synthetic enamel paint of approved colour and brand over a coat of priming.

Measurement

The length shall be measured in running meter correct to centimeter for the finished work, which shall include the pipes and fittings such as Bends, Tees, Elbows etc., but excludes Brass of Gun-metal fixture like Tap, Cocks, Valves, PVC connection Pipes etc.

2.3.4 Ball Valve

The ball valve shall be high class and shall confirm to I:S 1703. The nominal size of ball valve shall be that corresponding to the size of pipe for which it is used. The ball valve shall be of brass of gun-metal and the float for low pressure in Polyethylene and for high pressure in copper.

Each and every ball valve while in closed position shall withstand an internally applied hydraulic pressure of 20 kg /Cm^2 for a minimum period of two minutes without leakage or sweating.

Every high pressure ball valve when assemble in working condition, with the float immersed to not more than half its volume shall remain closed against a test pressure of 10.5 Kg. /Cm^2.

Polyethylene floats shall be watertight and non-absorbent and shall not contaminate water and with no jointing adhesive jointing parts.

The minimum thickness of the copper sheet used for making copper floats shall be of 0.45 mm. The thickness of materials of the float shall be uniform throughout.

2.3.5 Ferule:

The ferrules for connection with C.I. Main shall generally confirm to I.S 2692 and shall be of nominal bore as specified. The ferrule shall be fitted with 3 screw and plug or value capable or complete cutting off the supply to the connected pipe as and when required. For fixing the ferrule the C.I. main shall be drilled and tapped during non-supply hour at 45^o to the connected pipe as and when required. The ferrule must be so fitted that no portion of the sunk shall be left projecting with in the main on which it is fitted. After the ferrule is connected, one C.I. bell mouth cover or with bricks (as specified) shall be kept over the ferrule to cover the ferrule to protect it and the cost thereof is to be included in the item, even if there is not mention.

2.3.6 Non – return Valve (Check Valves)

The Non-return valve shall be of Brass or Gun-Metal and shall be of horizontal or vertical flow type and of the size as specified and confirm to I:S 7810 and I:S 778. The approximate weight of the valves are given below:

Dia in mm	Horizontal type in Kg.	Vertical type in Kg.
15	0.30	0.25
20	0.55	0.25
25	0.90	0.75
32	1.25	0.90
40	1.70	1.20
50	2.90	1.45
65	5.25	2.15
80	7.70	4.10
	Tolerance 5%	

2.3.7 Foot Valve

Foot valve is generally placed at the lower and of the suction pipe of the centrifugal pump to prevent the suction pipe from empting. Vertical non-return valve may also be fixed in place of foot valve.

The foot valve shall confirm to IS: 038.

2.3.8 Water meters (Domestic Type)

Water meter up to 50mmm nominal size shall confirm to I:S 779. The meter body shall be bronze / Gun-Metal and marked to read in liters complete with registration box and lid. The water meters shall be provided with Strainers. Strainers shall be of material which is not

susceptible to electrolyte, clean and shall be fitted on the inlet side of water meter. It shall be possible to remove and clean the strainer and not permit disturbing the registration box. The offer should include the same. The water meters shall bear ISI Mark.

2.3.9 Bibcock and Stop Cock

These shall conform to I:S 781 bear ISI Mark. The Bib cock is a draw off tap with a horizontal inlet and free outlet and stopcock is a valve with a suitable means of connection for insertion in a pipeline for controlling or stopping the flow. This shall be of screw down type. The cocks shall open in anti-clockwise direction. The stopcocks should be C.P. concealed stopcocks and C.P. angle valves type as specified in tender schedule. Bib cocks should be also C.P. Brass hid cocks.

2.3.10 Full way Valve (Brass)

Full way valve is a valve with suitable means of connection for insertion in a pipeline for controlling or stepping the flow. The valve shall be of brass fitted with a cast-iron wheel and shall be of gate valve type confirming to I:S 780 brass rod latest one, opening full way and of the size as specified.

The approximate weight of the valves are indicated below for guidance.

Dia in mm	Flanged End valves in Kg.	Screwed End valve in Kg.
15	1.021	0.567
20	1.503	0.680
25	2.498	1.077
32	5.232	1.559
40	6.082	2.268
50	6.691	3.232
65	10.149	6.840
80	13.381	8.845

2.3.11 Gun-Metal Full way Valve

This shall be of the Gun-Metal fitted with wheel and shall be of Gate-Valve type opening full way. This shall confirm to I:S 778. Class I. The valves should bear I.S.I. Mark.

2.4 TECHNICAL SPECIFICATION FOR STONE WARE PIPE ETC.

2.4.1 Stone ware pipes (Materials)

The S.W. Pipes and Fittings should be of Grade 'A' confirming to I :S 651/1965. The pipes shall be sound free from visible defects such as fire crack or hair crack and flaw or blister. The pipes shall give a sharp clear line when struck with a light hammer and should be perfectly salt glazed.

Pipe in mm.	Thickness of the Barrel in mm.	Weight of Each Pipe in Kg.
100	12	14
150	16	22
200	17	33
230	19	44
250	20	52
300	25	79
350	30	100
400	35	125
450	38	147

The length of pipes are 600 mm exclusive of the internal depth of Socket.

2.4.2 Excavation of Trench for Laying Sewer Pipes:

The trenches for the pipes shall be excavated to the lines and level as directed. The bed of the trench shall have to be evenly dressed throughout from one change of grade to the next. The gradient is to stout by means of sight rails and booing rods and the required depth the excavated at any point. The depth of the trench shall not be less than one meter, measured from top of the pipe to the surface of the ground under roads and not less than 0.75 mtr. elsewhere. The width of the trench shall be the nominal diameter of the pipe plus 400 mm. The bed of the trench if in soft or made up earth, shall be well watered and rammed before laying the pipes and the depressions if any shall be properly filled with sand and consolidated in 200 mm layer. Depending on soil condition piling way even be necessary if so desired by the Architect / IIBF. If rock is met with, it shall be removed 150 mm below the level of the pipe and the trench will be refilled with sand and consolidated.

The excavated materials shall not be placed within one mtr. Or half of the depth of the trench which ever is greater, from the edge of the trench.

The trench shall be kept from water, shoring and shuttering shall be provided wherever required. Excavation below water table shall be done after dewatering the trenches.

After the excavation of the trench is completed foundation of cement concrete M20 in hard granite metal (size 25 to 40 mm) shall be laid with proper level all along under the length of the pipe with hunching or all around concrete as per drawing.

Laying, jointing, hunching of the pipes and fittings. Drain Pipes(S.W. Pipes and other pipes used for drain and sewer) shall be laid in straight lines and to the even gradients as shown in the layout drawings.

The socket end of the pipes shall face upstream. Adequate care shall be exercised in setting out and determining the level of the pipes and the Contractor shall provide suitable instruments, templates, sight rails, boning rods and other equipments necessary for the purpose. In the case of pipes with joints to be made with loose collars. The collars shall be slipped on before the next pipe is laid. In those joints a tight ring of twisted jute tarred soaked in cement slurry filling to ensure proper alignment and prevent. Cement entering the pipes. Cement compound joints is to be finished with proportion 1:1 with 45^0 beveling. The joints are to be kept wet with wet bag until the same are properly set with beveling. The cement mortar joints shall be cured at least for 7 (seven) days.

In the case of S.W. Pipe joints (socket and Spigot), they should be caulked first with tarred jute (spun) of required diameter, almost quarter depth of the socket, after which cement mortar 1:3 is pushed in with wooden chisel and finishing beveled at outside at 45^0. Instead of jute of hemp rubber gasket of proper size may also be used. The whole joint must be cured for not less than three days. In case of pipes less than 250 mm dia, joints should be made at ground level with three pipes at a time and for larger ones two pipes at a time and after curing they should be soled in foundation with the help of the ropes. All pipes should be properly hunched with cement concrete 1:3:6 with hard granite metal of size 25 mm to 40 mm or otherwise specified as shown in the drawing. Where the pipes are crossing the drain or road, all –round concrete 1:3:6 with H.G. Metal of size 25 mm to 40 mm is to be done to 150 mm thick over the barrel of the pipe.

The whole of the drain work shall be tested when laid, and at the completion of the contract, to the satisfaction of the Architect / IIBF and shall be retested if necessary, until found satisfactory. The test shall be made by means of water under pressure at the highest point of the section under test and providing an air pipe at the lower end of the line. Maximum head of 5)five) feet (1.5 Mtr) must be maintained.

2.4.3 Excavation and refilling

Excavation for drain and pipe trenches shall be straight and to the correct depth and gradient. The trench bottom shall be of sufficient width to allow working space for pipe jointing.

Excavated materials shall be damped away from the side as directed by IIBF. Suitable precautions are to be taken to prevent inflow of water into the excavated area, during construction.

The Contractor at his own expense shall pump out or otherwise remove any or all water, which during the continuance of contract, may be found in the excavated trenches to keep the trench clear of water during the work under progress.

No excavation for pipe line shall be filled and line covered, until the line therein has been passed and tested.

2.4.4 Burried Services

All pipes, cable mains and other services exposed by the excavations shall be effectively supported by timbering or other means for which no extra payment will be allowed. The Contractor shall be responsible for any damage occurring to buried services and make good the same at his own cost to the satisfaction of the Consultant / IIBF.

2.4.5 Trench condition

Where a trench is excavated and refilled after laying the pipe, settlement of the earth in the refilled trench take place. The filling above the top of pipe, settles relatively, more than the sides of the trench, thereby developing frictional resistance. The contractor is required to take special precaution against this while refilling the trenches, procedure for back filling as stipulated earlier should be strictly followed.

2.4.6 Inspection chambers / Manholes

At every change of alignment, gradient or diameter of a drain, there shall be a manhole or inspection chamber. The maximum distance between Manhole Chamber shall be 30 Mtrs. For the lines laid straight.

All Manholes and inspection chambers shall have internal dimensions as shown on drawing and B.O.S. the depth of invert shall be according to the gradient.

The foundation for Manhole shall be 150 mm thick and with cement concrete M20 in hard granite well graded metal of 25 mm to 40 mm size. The concrete shall project 75 mm beyond the external faces of the brick work.

The brick masonry shall be done in cement mortar in the proportion of 1:4 and thickness of the brick wall should be 250 mm thick upto 1200 mm depth from Ground Level and beyond that the wall thickness shall be maintained 375 mm. Both the inside and outside surface of the walls of the chamber, shall be finished with cement plaster 1:4 – In addition to this, the inside surface should also be provided with cement punning.

On the top of base slab channeling on C.C. M20 with granite chips is to be done keeping the diameter equal to the dia of drain pipe and depth equal to ¼th of the dia of the pipe. The channel, should be done longitudinally at the center, connecting both the ends of the pipe. The channel is to be hunched up with concrete M20 with hard granite chips of size 20 mm and below) sloping upwards from the edge of channel to meet the side of chamber at gradient of 1:6. The channel and benching are to be finished smooth and cement mortar 1:4 and punning.

Sewers of un-equal sectional area and branch sewers shall not be jointed at the same invert in a Manhole inspection chamber unless it is unavoidable. The branch sewers should deliver sewage in the Manhole in the direction of main flow and the junction must be made with case so that the flow in the main is not impeded. Channels for drains coming from the side of the Manhole chamber, shall be curved to meet the main drainage channels.

The Manhole and Inspection Chambers shall be covered with R.C.C. cover slab or thickness 100 mm to 150 mm according to the requirement at site. One C.I. Manhole cover of diameter and weight as stipulated in the tender schedule shall be fixed, on the cover slab. Unless otherwise mentioned the C.I. cover and Frames and shall confirm to I:S 1726. Heavy duty covers etc., under heavy vehicular traffic condition and capable of bearing wheel loads up to 11.25 Tor are to be used and medium duty under light type wheel traffic loads and light duty for domestic premises are to be used. Covers and Frames shall be clearly cast, double water seal type and they shall be free from air and sand holes. The cover shall be gas

tight and water tight with proper water-seal. The C.I. Cover and Frame shall be coated with two coats of black bituminous paint. The frame of Manhole cover shall be fixed on the slab while the slab is casted.

2.4.7 Gully Trap chamber

The size of Chamber for 1500 x 100 mm S.W. Yard gully shall be 300 x 300 mm (inside). Foundation 100 mm thick in cement concrete m20 in hard granite metal of size 25 mm to 40 mm. The foundation should project 75 mm, from outer surface of wall. Brick work in cement mortar 1 :4 /125 mm thick, depth upto 600 mm maximum. The finishing of masonry walls both inside and outside should be done in cement mortar 1:4 Cement punning should be provided on the inner surface. One C.I. frame and cover of (Clear Opening 300 x 300 mm wt. 7 kg.) shall be fixed on the top of Chamber, duly embedded in C.C. 1:2:4 with granite chips and finished with Cement Plaster 1:4. The trap should be buried in cement concrete M20 in H.G. Chips upto the mouth and one C.I. Grating of size 225 mm X 225 mm are to be fixed on the top of mouth of Gully Trap to arrest rubbishes.

SPECIFICATIONS FOR ELECTRICAL WORKS

SPECIAL CONDITIONS OF CONTRACT

1. COMPLETENESS OF TENDER :-

All sundry fittings, assemblies, accessories, hardware items, foundation bolts, termination lugs for electrical connections as required, and all other sundry items which are useful and necessary for proper assembly and efficient working of the various components of the work shall be deemed to have been included in the tender, whether such items are specifically mentioned in the tender documents or not.

2. RATES: -

The rates tendered shall be for complete items of work inclusive of Cost of material, erection, connection, testing, labour, supervision, tool & plants, storage, contingencies, breakage, wastage, execution at any level & height, all taxes (including works contract tax, if any), duties, and levies etc. and all charges for items contingent to the work, such as, packing, forwarding, insurance, freight and delivery at site for the materials to be supplied by the contractor.

3. WORKS TO BE DONE BY THE CONTRACTOR :-

The scope of internal and external electrification under this contract shall include the design, engineering, manufacture, assembly, testing, delivery, erection and commissioning of electrical system including supply of all material, labour, T&P etc for followings –

- Main Switches, Main L T Panels, meter board and external cable connection.
- 11 KV HT Panel.
- 11 KV / 0.433 KV Transformers.
- D. G. Sets with fuel tank, piping, fuel pump, exhaust piping with lagging and supports, cooling system complete.
- Sub and branch distribution boards, MCB's and RCCB's etc.
- Mains and Sub mains between various panels, meter boards and distribution boards.
- Point wiring with Conduits for all type of wiring including circuits, sub mains, light, fans, power and AC etc.
- Switches and socket outlets for light, fans, plug, power, Tel, TV, computer network etc with suitable MS/GI boxes with accessories complete.
- Earthing and Lightning Protection with earth leads/strips.
- Conduits and wiring for Telephone, EPABX, TV system, PA system, Music system and Computer networking, fire alarm, broad band etc.
- Cables and other allied works.
- Provision of emergency electrical supply and distribution for complete light, fans and other specified points are also included in the scope of work. For the purpose of emergency distribution separate DB's shall be installed for Light/fans **and fax machines & staircase** lighting at every place, so that these can be separated.
- Lighting Fixtures fans and exhaust fans. (If these are supplied by the client, then the contractor will erect the fixture as required without any extra payment beyond the contract)
- External lighting including underground cables and connection with the external cables and earthing.
- Feeder pillars with circuit breakers.

- Underground cables.

All the above work shall be complete in all respects up to the satisfaction of architect, consultant, Client and Engineer in charge as per the details mentioned in BOQ and drawings supplied time to time.

Unless and otherwise mentioned in the tender documents the following scope of works shall be done by the contractor, and therefore their cost shall be deemed to be included in their tendered cost:

a. Furnishing of all labour, skilled and unskilled, supervisory and administrative personnel, erection tools and tackles, testing equipment, implements, supplies, consumables like welding rods and gas, oil and grease, cleaning fluids, insulating tape, anti corrosive paints, jute cotton waste etc., and hardware for timely and efficient execution of the erection work.

b. Transport vehicles necessary for efficient transportation of equipment from Owner's stores to site of erection and excess materials back to owner's stores.

c. Complete assembly, erection and connection, testing and commissioning, putting into successful and satisfactory commercial operations of above equipment.

d. The items of work to be performed on all equipment and materials shall include but not limited to the following:

i. Receiving, unloading and transportation at site. (To Owner or Contractor's stores and from their upto actual place of erection).

ii. Opening, inspecting and reporting all damages and short supply items.

iii. Arranging to repair and/or re-order all damaged and short supply items.

iv. Storing at site with suitable all weather protection.

v. Assemblies, erection and complete Installation.

vi. Necessary coordination between work done by other Contractors.

vii. Final check-up, testing and commissioning in presence of Owner's representative.

viii. Obtaining Owner's written acceptance of satisfactory performance.

4. <u>INFORMATIONS REQUIRED FROM CONTRACTOR</u>

i. Typical GA drawing of all equipment to be supplied and disposition of various fittings and loading.

ii. All Annexures of this specification duly filled in and signed by the contractor.

iii. Catalogue of all equipment and components explaining construction features.

iv. Transportation/shipping dimensions and weights, space required for handling parts for maintenance.

v. Type test certificates for all equipment on similar type of equipment.

vi. Final Single line diagram complete with cable sizes etc.

vii. Bill of Materials, Control & schematic line diagram for meter & relay panel, terminal connection/Master Terminal box diagram, wiring diagram with physical location of components for all equipment.

viii. Detailed cabling layout showing cable trench / tray layout, earthing layout.

ix. Detailed lighting layout showing position of fixtures / type of fixtures, circuiting and route of wires / cables / fixing details, DB details.

x. Protection relay settings.

xi. Cable schedule & interconnection chart.

xii. Foundation details and plan, loading details for all equipment.

xiii. Test certificates.

xiv. Instruction manuals of all major equipment.

xv. Test Procedures at sites.

xvi. Test reports of all tests carried out at site.

xvii. 'AS BUILT' drawings (2 sets of soft copies on CD and six sets of hard copies duly wound).

xviii. All layout drawings shall be made in scale of 1:50 or 1:100 unless until agreed by the Owner/ Consultant.

5. PRICES

a. The price quoted for supply items shall include all packing, crating, excise duty, sale tax / Works Contract tax, insurance, freight, loading/ unloading, handling & all other charges.

b. The price quoted for erection & commissioning shall include cost of all consumables, taxes & duties. (if any). No additional taxes/duties shall be payable by Owner.

c. Prices quoted shall be firm and no variation shall be allowed during contract period.

d. Contractor shall furnish prices separately for spare parts for two (2) year's trouble free operation of the equipment and shall furnish the list of the same.

6. ELECTRIC POWER SUPPLY AND WATER SUPPLY :-

Unless and otherwise specified, power supply and water supply as may be required shall be arranged by the contractor for installation and testing of the equipment's at the site of work.

7. PROVISIONS AGAINST ACCIDENTS AND SAFETY MEASURES

a. All safety rules and codes as applicable to work including rules applicable as per factory inspector shall be followed during execution of above work.

b. All safety appliances and protective devices including hand gloves, aprons, helmets, shields, goggles, safety belts etc. shall be provided by Contractor for his personnel.

c. The Contractor shall arrange to provide guards and prominent display caution notices if access to any equipment / area is considered unsafe and hazardous.

8. SPECIFICATIONS

In the absence of specifications for any work or materials, relevant Indian Standard Specifications shall be applicable. If such codes for a particular subject have not been framed, the decision of the Employer / Consultant will be final and binding.

9. VARIATION IN QUANTITY

a. The Employer shall have right to delete or increase / decrease quantity specified in this specification as specified in preamble to Bill Of Materials.

b. Quantities indicated in Bill of Materials are based on engineering status of the project as on date. It is necessary that proper engineering is carried out by the contractor before procurement of material.

c. For procurement of any material & sequential delivery at site from point of view of erection etc. Contractor shall take prior approval from the employer.

d. All left over material for which payment has been made by the employer, has to be taken back by the contractor. The employer shall make necessary deduction from the bills of contractor.

10. SITE VISIT

It is recommended that contractor shall visit site before submission of his offer. Time and date shall be fixed with employer.

11. TOOLS FOR HANDLING AND ERECTION :-

All tools and tackles required for handling of equipment and materials at site of work as well as for their assembly and erection and also necessary test instruments shall be the responsibility of the contractor.

12. CO-ORDINATION WITH OTHER AGENCY: -

The contractor shall co-ordinate with all other agencies involved in the building work so that the building work is not hampered due to delay in his work. Recessed conduit and other works, which directly affect the progress of building work, should be given priority.

13. CARE OF BUILDINGS :-

Care shall be taken by the contractor to avoid damage to the building during execution of his part of the work. He shall be responsible for repairing all damages and restoring the same to their original finish at his cost. He shall also remove at his cost all unwanted and waste materials arising out of his work from the site, from time to time as designed by the IIBF.

14. STRUCTURAL ALTERATIONS TO BUILDINGS :-

i. No structural member in the building shall be damaged/altered, without prior approval from the competent authority through the IIBF.

ii. Structural provisions like openings, cutouts if any, provided by the department for the work, shall be used. Where these require modifications, or where fresh provisions are required to be made, such contingent works shall be carried out by the contractor at his cost.

iii. All such openings in floors provided by the department shall be closed by the contractor after installing the cables/conduits/rising mains etc. as the case may be, by any suitable means as approved by the IIBF without any extra payment.

iv. All chase required in connection with the electrical works shall be provided and filled by the contractor at his own cost to the original architectural finish of the buildings.

15. WORK IN OCCUPIED BUILDINGS: -

i. When work is executed in occupied buildings, there should be minimum of inconvenience to the occupants. The work shall be programmed in consultation with the architect/ consultant and the occupying department. If so required, the work may have to be done even before and after working hours.

ii. The contractor shall be responsible to abide by the regulations or restrictions set in regard to entry into, and movement within the premises.

iii. The contractor shall not tamper with any of the existing installations including their switching operations or connections there to without specific approval from the IIBF.

1. **STATUTORY REGULATION AND APPROVALS :-**

All electrical works shall be carried out only by those Contractors who are licensed by the concerned local authorities to execute this type of work. Only "A" Class government approved electrical contractor shall execute the job.

It shall be the responsibility of the Contractor to comply with the regulations laid down by the Indian Electricity Rules and local authorities. The Contractor shall also be responsible for obtaining all the statutory approvals/certificates for the work from the concerned Departments and these certificates shall be handed over to the Architects/Clients at the completion. All coordination with the local electric supply authorities, submitted of application, getting the desired load sanctioned shall be in the scope of contractor. The fees required to obtain the desired load sanctioned and other legal and miscellaneous charges by local electric supply authority / undertaking shall be given by the client but all follow-ups etc. shall be the contractor's responsibility.

On completion of the work, the contractor shall obtain the certificates of final inspection and approval by the local electric supply authority and deliver these certificates to the Owner/Architects in original. The contractor shall bear all expenses and fees required to obtain these certificates without which the work shall not be taken over and shall not be considered complete.

17. STANDARDS AND CODE OF PRACTICE :-

The work shall be carried out as per the enclosed Specifications of work and the construction drawings to be issued from time to time. These specifications shall be read in conjunction with National Building Code, National Electrical Code 1985, Relevant Codes of Practices and Standards as issued by ISI and Indian Electricity Rules, CPWD specifications for electrical works (all with the latest amendments). The installation shall confirm in all respects to Indian Standard code of Practices. Following BIS codes shall be referred -

a. National Electrical Code
b. IS: 694 – 1977: PVC insulated cables for working voltage up to and including 1100 volts
c. IS: 732 -1989: Electrical wiring installation
d. IS: 1225 -1938: Installation and Maintenance of power Cables up to and including 33 KV Rating
e. IS: 1554: PVC insulated heavy-duty electrical cables.
f. IS: 1860: Installation operation and maintenance of passenger and goods elevator.
g. IS: 2309 -1989: Protection of building and allied structures against lightning.
h. IS: 3043 -1987: Earthing
i. IS: 3646 (Part-1) -1992: Interior Illumination
j. IS: 3661 (Part-2) -1967: Current rating for cable
k. IS: 3661 (Part-5) -1968: Current rating for cable
l. IS: 5216 (Part-1) -1982: Recommendations on safety procedures and practices in electrical work.
m. IS: 7098 (1 & 2): XLPE insulated cables
n. IS: 10028 (Part-1) -1985: selection, Installation and Maintenance of Transformers
o. IS: 10118 (Part-1) -1982: Selection, Installation and Maintenance of switchgear and Control gear

18. MATERIAL SAMPLES AND SHOP DRAWINGS :-

It shall also be the responsibility of the Contractor to submit without any extra charge the samples of the materials/equipment as and when asked by the Architect/Consultant. If the Contractor wishes to use an alternative make due to non-availability of the approved one, he should take the prior approval of the Architect/Consultant. Under such situations the Contractor shall show such promptness as not to hamper the progress of the work.

The Contractor shall submit for Architect/Consultant's approval the shop drawings at approved scale indicating the custom built equipment, L.T. Panels, run of cables and conduits he proposes to install.

19. ELECTRICAL DRAWINGS: -

i) The electrical drawings issued from time to time to the contractor are diagrammatic but shall be following as closely as actual construction and work will permit. The Contractor at his own expenses shall make any deviation from the drawings required to conform to the building construction. The architectural drawings shall take

precedence over the electrical drawings as for as the civil and other trades works are concerned.

ii) If there is any discrepancy due to in-complete description, ambiguity or omission in the drawings and other documents relating to this Contract found by the Contractor either before starting the work or during execution or after completion, the same shall be immediately brought to the attention of the Architect/Consultant and his decision would be final and binding on the Contractor.

20. TESTING AND COMMISSIONING: -

The Contractor shall be responsible for testing and commissioning the entire electrical installation described in these specifications and relevant IS specifications and will demonstrate the operation of the systems to the entire satisfaction of the Architect/Consultant and to the Client approval.

21. GUARANTEE

At the close of work and before issue of final certificate of virtual completion by Owner / Consultant, the contractor shall furnish a written guarantee indemnifying the owner against defective materials and workmanship for a period of one year after commissioning. The contractor shall hold himself fully responsible for reinstallation or replacement of defective material free of cost to the owner.

22. COMPLETION DRAWINGS

The contractor shall submit, after the completion of the work, one set of originals and two sets of prints of the As-Fitted drawings/Completion drawings, giving the following information:

a. Run and size of conduits, inspection, junction and pull boxes.

b. Size of conductor in each circuit.

c. Location and ratings of sockets and switches controlling the light/fan and power outlets.

d. Location and details of distribution boards, mains, switches, switchgears and other particulars.

e. A complete wiring diagram as installed and schematic drawings showing all connections in the complete electrical system.

f. Location of telephone outlets, junction boxes and sizes of various conduits.

g. Location of all earthing stations, route and size of all earthing conductors etc.

h. Layout and particulars of all cables.

i. Location of all equipments with dimensions and connections.

23. INSPECTION

All equipment / material covered under this specification Is liable for inspection by the Owner/ his representative. The vendor shall inform two weeks in advance for inspection to be carried out at the manufacturer's works.

The contractor shall furnish data Sheets & other details. Additional information, if desired by the bidder can also be furnished separately.

SYSTEM DESCRIPTION

1.0 GENERAL INFORMATION

1.1 Ambient air temperature shall be taken as 50 deg. C for the purpose of designing of electrical equipment.

1.2 This specification shall be read and constructed in conjunction with the drawings and annexure to determine the scope of work.

1.3 All equipment shall be capable of continuous operation satisfactorily under the following conditions:

a. voltage variation : ± 10%

b. frequency variation : ± 5%

c. combined voltage & frequency variation : ± 10%

1.4 Nominal system supply available shall be as follows:

a. Incoming : 11 kV, 3 Ph., 50 Hz,

b. Utilization : 415V, 3 Ph., 4 wire, 50 Hz

2.0 CODES AND STANDARDS

2.1 All equipment and materials specified herein or not, shall be designed, manufactured and tested with the latest applicable standards & bureau of Indian standards.

2.2 All electrical equipment shall also conform to the latest electricity rules as regards safety and other essential provisions.

2.3 All electrical installation work shall comply with the requirements of the following Act / rules / codes as amended upto date:

a. Indian electricity act.

b. Indian electricity rules.

c. National electric code published by 818.

d. All relevant IS codes of practice.

e. Regulations published by tariff advisory committee.

3.0 SYSTEM DESCRIPTION

3.1 GENERAL

a. One independent radial feeder is envisaged from State Electricity Board for receiving incoming supply on 11 kV.

b. Two poles structure consisting of LAs, Isolator, drop out fuses etc. or 11 KV incoming supply shall be connected to Metering Panel through 11 kV XLPE cable. On two Pole structure 11 kV XLPE cable shall be terminated through outdoor termination.

c. 11 kV XLPE cable from two pole structure to metering Panel to shall be buried in ground

d. 11 KV Panel shall have one incomer cum outgoing (unit panel), which will feed power to the Transformer.

e. 415V L T panel shall receive power from Transformer *I* DG sets and shall feed power to various Blocks & Common Services as per enclosed single line diagram. The panel will be PLC controlled for automatic operation in case of power failure for DG synchronization and auto load sharing arrangements.

f. Further routing of cables and Power Distribution shall be as per Single Line Diagram.

TECHNICAL SPECIFICATIONS
WIRING AND CONDUITING

1 GENERAL

Technical Specifications in this section cover the Internal Wiring Installations comprising of:

- Wiring for lights and convenience socket outlets etc. in concealed/surface conduit/raceways.
- Wiring for telephone outlets.
- Submain wiring.

2 STANDARDS AND CODES

The following Indian Standard Specifications and Codes of Practice will apply to the equipment and the work covered by the scope of this contract. In addition the relevant clauses of the Indian Electricity Act 1910 and Indian Electricity Rules 1956 as amended upto date shall also apply. Wherever appropriate Indian Standards are not available, relevant British and/or IEC Standards shall be applicable.

BIS certified equipment shall be used as a part of the Contract in line with Government regulations. Necessary test certificates in support of the certification shall be submitted prior to supply of the equipment.

It is to be noted that updated and current Standards shall be applicable irrespective of those listed below.

660/1100 V grade PVC insulated wires.	IS 694 : 1990
Rigid steel conduits for electrical wiring.	IS 9537 : Part I 1980 IS 9537 : Part II 1981
PVC conduits for electrical wiring.	IS 9537 : Part III 1980
Accessories for rigid steel conduits	IS 3837 : 1990
Flexible steel conduits for electrical wiring	IS 3480 : 1990
Switch socket outlets	IS 4615 : 1990
Switches for domestic and similar purposes	IS 3854 : 1997
Boxes for the enclosure of electrical accessories	IS 5133 : Parts I &II 1969
Code of practice for personal hazard fire safety of buildings	IS 1644: 1998
Code of practice for electrical installation fire safety of buildings	IS 1646 : 1997
Code of practice for electrical wiring installations	IS 732 : 1989

3 CONDUITS

3.1 Steel Conduits

These shall be of mild steel 16 gauge upto 32mm and 14 gauge for sizes above 32mm, electric resistance welded (ERW), electric threaded type having perfectly circular tubing. Conduits shall be precession welded ERW and shall be fabricated from tested steel strips of thickness as per ISS by high frequency induction weld process. Weld shall be smooth and of consistent of high quality to ensure crack proof bending. The conduits shall be black enamel painted inside and outside in its manufactured form. Wherever so specified, the conduit shall be galvanized. All conduits used in this work shall be ISI embossed.

3.2 PVC Conduits

Wiring shall be carried out in recessed /surface PVC conduits. The PVC conduits conform to IS 9537 Part-III and shall be ISI embossed. The conduits shall be heavy gauge (minimum 2 mm wall thickness) and the interiors of the conduits shall be free from all obstructions. All joints in conduits shall be sealed/cemented with approved solvent cement. Damage conduits/fittings shall not be used. Cut ends of conduits shall not have sharp edges.

3.3 Bends

Large right angle bends (more than 75 mm radius) or non right angle bends in conduit runs shall be made by means of conduits bending machines carefully so as not to cause any crack in the conduit. Small right angle bends in conduits runs can be made by standard conduit accessories (solid/inspection bends/elbows) no run of conduits shall have more than four right angle bends from outlet to outlet. Bends in multi runs of conduits shall be parallel

to each other and neat in appearance, maintaining the same distance as between straight runs of conduits.

3.4 Conduit Accessories.

3.4.1 Standard accessories

Heavy duty black enamel painted standard conduit fittings and accessories like standard/extra-deep circular boxes, looping in boxes, junction boxes, PVC bends, PVC solid elbows, solid/inspection tees, couplers, nipples, saddles, check nuts, earth clips, ball socket joints etc. shall be of superior quality and of approved makes. Heavy duty covers screwed with approved quality screws shall be used. Superior quality screwed PVC bushes shall be used Samples of all conduits fittings and accessories shall be got approved by Project Manager before use.

3.4.2 Fabricated accessories

Wherever required, outlet/junction boxes of required sizes shall be fabricated from 1.6 mm thick MS sheets excepting ceiling fan outlet boxes which shall be fabricated from minimum 3 mm thick sheets. The outlet boxes shall be of approved quality, finish and manufacture. Suitable means of fixing connectors etc., if required, shall be provided in the boxes. The boxes shall be protected from rust by zinc phosphate primer process. Boxes shall be finished with minimum 2 coats of enamel paint of approved colour. A screwed brass stud shall be provided in all boxes as earthing terminal.

3.4.2.1 Outlet Boxes For Light Fittings.

These shall be minimum 75mm x 75mm x 50mm deep and provided with required number of threaded collars for conduit entry. For ceiling mounted florescent fittings, the boxes shall be provided 300 mm off centre for a 1200 mm fitting and 150 mm off centre for a 600 mm fitting so that the wiring is taken directly to the down rod. 3 mm thick perspex/hylam sheet cover of matching colour shall be provided.

3.3.2.2 Outlet Boxes For Ceiling

Outlet boxes for ceiling fans shall be fabricated from minimum 3 mm thick MS sheet steel. The boxes shall be hexagonal in shape of minimum 100 mm depth and 60 mm sides. Each box shall be provided with a recessed fan hook in the form of one 'U' shaped 15 mm dia rod welded to the box and securely tied to the top reinforcement of the concrete slab for a length of minimum 150 mm on either side. 3 mm thick Perspex/ hylam sheet cover of matching colour shall be provided.

3.4.3 Boxes For Modular Wiring Accessories

3.4.3.1 Switch Boxes - Modular Type

Switch boxes suitable to house modular type switches of required ratings, and fan regulators as required shall be provided. In case the number of switches in one box is not tallying with that available in standard manufacture, the box accommodating the next higher number of switches shall be provided without any extra cost. In case fan regulator/regulators is /are to be provided at a later dated, suitable provision for accommodating such regulators shall be made in the switch boxes and blank off covers shall be provided without any extra cost.

Switch boxes shall be so designed that accessories are mounted on a grid plate with tapped holes for brass machine screws leaving ample space at the back and on the sides for accommodating conductors, check-nuts and screwed bushes at conduit entries etc. The grid plates and M.S. boxes shall be fitted with a brass earth terminal. Boxes shall be attached to conduits by means of inserting the conduits in the outlet boxes. Extra length of conduit shall be cut-off inside the box with the help of cutting blade. Moulded front covers made from high impact resistant, flame retardant and ultra violet stabilized engineering plastics shall be fixed by means of counter sunk chromium plated brass machine screws. No timber shall be used for any supports. Switch boxes shall be located with bottom at 1200 mm above floor level unless otherwise indicated.

3.4.3.2 Modular Type Boxes For Socket/ Telephone/Call Bell Outlets

Outlet boxes shall be suitable for housing modular type switched socket outlets/ telephone outlets/ buzzers and any other outlet as required. These shall be so designed that accessories are mounted on a grid plate with tapped holes for brass machine screws leaving ample space at the back and on the sides for

accommodating conductors. The grid plates and M.S. boxes shall be fitted with a brass earth terminal. Boxes shall be attached to conduits by means of inserting the conduits in the outlet boxes. Extra length of conduit shall be cut-off inside the box with the help of cutting blade. Moulded front covers made from high impact resistant, flame retardant and ultra violet stabilized engineering plastics shall be used to mount the outlets and shall be fixed to the outlet M.S. boxes by means of counter sunk chromium plated brass machine screws. No timber supports shall be used. Boxes shall be located at skirting level or bottom at 1200 mm from floor or inside raceways on laboratory work tables., as indicated in drawings and/or as directed.

3.5 Cross Section

The conduits shall be of ample sectional area to facilitate simultaneous drawing of wires and permit future provision also. Total cross section of wires measured overall shall not normally be more than half the area of the conduit. Maximum number of PVC insulated 660/1100 Voltage grade copper conductor cable conforming to IS - 694 - 1990 as per table give below.

Maximum no of PVC insulated 660/1100 V grade aluminium/copper Conductor cable conforming to IS : 694 – 1990

Nominal cross Sectional Area - Sq mm	20 mm dia	25 mm dia	32 mm dia	40 mm dia	50 mm dia
1.0	7	13	20	-	-
2.5	6	10	14	-	-
4.0	5	10	14	14	-
6.0	3	6	10	11	-
10.0	2	5	9	9	12
16.0	-	4	7	5	6
25.0	-	2	4	2	5
35.0	-	-	2	2	5
50.0	-	-	-	2	3

4. WIRES

Wiring shall be carried out with PVC insulated 660/1100 volt grade unsheathed single core wires with electrolytic annealed stranded copper (unless otherwise stated) conductors and conforming to IS 694/1990. All wire rolls shall be ISI marked. All wires shall bear manufacturer's label and shall be brought to site in new and original packages. Manufacturer's certificate, certifying that wires brought to site are of their manufacture shall be furnished as required.

5 LAYING OF CONDUITS

☐ Conduits shall be laid either recessed in walls and ceilings or on surface on walls and ceilings or partly recessed and partly on surface, as required.
☐ Same rate shall apply for recessed and surface conduiting in this contract.
☐ Stranded copper conductor insulated wire of size as per schedule of quantities shall be provided in entire conduiting for loop earthing.
☐ GI wire of suitable size to serve as a fish wire shall be left in all conduit runs to facilitate drawing of wires after completion of conduiting.

5.1 Recessed Conduiting

Conduits recessed in concrete members shall be laid before casting, in the upper portion of slabs orotherwise as may be instructed, so as to embed the entire run of conduits and ceiling outlet boxes with a cover of minimum 12 mm concrete. Conduits shall be adequately tied to the reinforcement to prevent displacement during casting at intervals of maximum 1 meter. No reinforcement bars shall be cut to fix the

conduits. Suitable flexible joints shall be provided at all locations where conduits cross expansion joints in the building.
Conduits recessed in brick work shall be laid in chases to be cut by electrical Contractor in brick work before plastering. The chases shall be cut by a chase cutting electric machine. The chases shall be of sufficient width to accommodate the required number of conduits and of sufficient depth to rmit full thickness of plaster over conduits. The conduits shall be secured in the chase by means of heavy duty pressed steel clamps screwed to MS flat strip saddles at intervals of maximum 1 meter. The chases shall then be filled with cement and coarse sand mortar (1:3) and properly cured by watering.

Entire recessed conduit work in concrete members and in brick work shall be carried out in close coordination with progress of civil works. Conduits in concrete members shall be laid before casting and conduits in brick work shall be laid before plastering. Should it become necessary to embed conduits in already cast concrete members, suitable chase shall be cut in concrete for the purpose. For minimizing this cutting, conduits of lesser diameter than 25 mm and outlet boxes of lesser depth than 50 mm could be used by the Contractor for such extensions only after obtaining specific approval from Project Manager . For embedding conduits in finished and plastered brick work, the chase would have to be made in the finished brick work. After fixing conduit in chases, chases shall be made good in most workmanlike manner to match with the original finish.

Cutting chases in finished concrete or finished plastered brick work for recessing conduits and outlet boxes etc shall be done by the Contractors without any extra cost.

5.2 Surface Conduiting
Wherever so desired, conduit shall be laid in surface over finished concrete and/or plastered brickwork. Suitable spacer saddles of approved make and finish shall be fixed to the finished structural surface along the conduit route at intervals not exceeding 600 mm. Holes in concrete or brick work for fixing the saddles shall be made neatly by electric drills using masonry drill bits. Conduits shall be fixed on the saddles by means of good quality heavy duty MS clamps screwed to the saddles by counter sunk screws. Neat appearance and good workmanship of surface conduiting work is of particular importance. The entire conduit work shall be in absolute line and plumb.
5.3 Fixing of conduit fittings and accessories
For concealed conduiting work, the fittings and accessories shall be completely embedded in walls/ceilings leaving top surface flush with finished wall/ceiling surface in a workman like manner.
Loop earthing wire shall be connected to a screwed earthstead inside outlet boxes to make an effective contact with the metal body.
5.4 Painting and Colour coding of conduits
Before laying, conduits shall be painted specially at such places where paint has been damaged due to vice or wrench grip or any other reason.

If so specified, surface conduits shall be provided with 20 mm wide and 100 mm long colour coding strips as below

Use	Code colour
Low voltage	Grey
Telephone	Black
Earthing system	Green
Control system lighting	Purple

5.5 Protection of Conduits
To safeguard against filling up with mortar/plaster etc. all the outlet and switch boxes shall be provided with temporary covers and plugs which shall be replaced by sheet/plate covers as required. All screwed and socketed joints shall be made fully water tight with white lead paste.
5.6 Cleaning of Conduit Runs

The entire conduit system including outlets and boxes shall be thoroughly cleaned after completion of erection and before drawing in of cables.

5.7 Protection Against Dampness

All outlets in conduit system shall be properly drain and ventilated to minimise chances of condensation/sweating.

5.8 Expansion Joints

When crossing through expansion joints in buildings, the conduit sections across the joint shall be through approved quality heavy duty metal flexible conduits of the same size as the rigid conduit.

5.9 Loop Earthing

Loop earthing shall be provided by means of insulated stranded copper conductor wires of sizes as per Schedule of Quantity laid alongwith wiring inside conduits for all wiring outlets and sub-mains. Earthing terminals shall be provided inside all switch boxes, outlet boxes and draw boxes etc.

6 LAYING AND DRAWING OF WIRES

6.1 Bunching of Wires

Wires carrying current shall be so bunched in conduits that the outgoing and return wires are drawn into the same conduit. Wires originating from two different phases shall not be run in the same conduit.

6.2 Drawing of Wires

The drawing of wires shall be done with due regard to the following precautions:-

 No wire shall be drawn into any conduit, until all work of any nature, that may cause injury to wire is completed. Burrs in cut conduits shall be smoothen before erection of conduits. Care shall be taken in pulling the wires so that no damage occurs to the insulation of the wire. Approved type bushes shall be provided at conduit terminations.

 Before the wires are drawn into the conduits, conduits shall be thoroughly cleaned of moisture, dust, dirt or any other obstruction by forcing compressed air through the conduits if necessary..

 While drawing insulated wires into the conduits, care shall be taken to avoid scratches and kinks which
cause breakage of conductors.

 There shall be no sharp bends.

 The Contractor shall, after wiring is completed, provide a blank metal/sunmica plate on all switch / outlet / junction boxes for security and to ensure that wires are not stolen till switches / outlets etc.. are fixed at no extra cost the contractor shall be responsible to ensure that wires and loop earthing conductors are not broken and stolen. In the event of the wire been partly / fully stolen , the contractor shall replace the entire wiring alongwith loop earthing at no extra cost. No joint of any nature whatsoever shall be permitted in wiring and loop earthing .

6.3 Termination /Jointing of Wires

 Sub-circuit wiring shall be carried out in looping system. Joints shall be made only at distribution board terminals, switches/buzzers and at ceiling roses/connectors/lamp holders terminals for lights/fans/socket outlets. No joints shall be made inside conduits or junction/draw/inspection boxes.

 Switches controlling lights, fans or socket outlets shall be connected in the phase wire of the final sub circuit only. Switches shall never be connected in the neutral wire.

Wiring conductors shall be continuous from outlet to outlet. Joints where unavoidable, due to any special reason shall be made by approved connectors. Specific prior permission from Project Manager in writing shall be obtained before making such

joint.

□ Insulation shall be shaved off for a length of 15 mm at the end of wire like sharpening of a pencil and it shall not be removed by cutting it square or wringing.

□ Strands of wires shall not be cut for connecting terminals. All strands of wires shall be twisted round at the end before connection.
□ Conductors having nominal cross sectional area exceeding 1.5 sq. mm shall always be provided with crimping sockets. Tinning of the strands shall be done wherever crimping sockets are not available as per instructions of the Project Manager

□ All wiring shall be labelled with appropriate plastic ferrules for identification.

At all bolted terminals, brass flat washer of large area and approved steel spring washers shall be used.

□ Brass nuts and bolts shall be used for all connections.

□ The pressure applied to tighten terminal screws shall be just adequate, neither too much nor too less.

□ Switches controlling lights, fans, socket outlets etc. shall be connected to the phase wire of circuits only.

□ Only certified valid license holder wiremen shall be employed to do wiring / jointing work.

6.4 Load Balancing

The Contractor shall planed the load balancing of circuits in 3 phase insulation and get the same approved by the Project Manager before commencement of the work.

6.5 Colour Code of Conductors
Colour code shall be maintained for the entire wiring installation - red, yellow, blue for three phases, black for neutral and green for earth.

7. SWITCHES AND FIXTURES
7.1 SWITCHES

All 6 and 16 amps switches shall be of the modular enclosed type flush mounted 220 Volt AC of the best quality and standard. The switch moving and fixed contacts shall be of silver nickel and silver graphite alloy and contact tips coated with silver. The housing of switches shall be made from high impact resistant, flame retarding and ultra violet stabilized engineering plastic material.
The switch controlling the light point shall be connected on to the phase wire of the circuit.

7.2 FLUSH PLATES
Switches, receptacles and telephone system outlets in wall shall be provided with molded cover plates of shape, size and colour approved by the Project Manager made from high impact resistant, flame retarding and ultra violet stabilized engineering plastic material, and secured to the box with counter sunk round head chromium plated brass screws. Where two or more switches are installed together, they shall be provided with one common switch cover plate as described above with notches to accommodate all switches either in one, two or three rows.
One and two gang switch cover plate, telephone outlet cover plate, 6 and 16 amps switched/unswitched plates, shall have the same shape and size. Three and four gang switch cover plates shall have the same shape and size. Six and eight gang switch cover plates shall have the same shape and size. Nine and twelve switch cover plates shall have the same shape and size. Wherever five switches, seven

switches, ten switches and eleven switches are to be fixed the next higher size of gang switch cover plate to be used and extra openings shall be provided with blank-off.

7.3 EXTERNALLY OPERATED SWITCHES

Externally operated switches, shall be of general purpose type, 250 volts of the proper size and rating and shall be provided in weather proof enclosures, complete with weather proof gasketed covers. The MCB's for all externally operated switches shall be separate and of proper rating.

7.4 WALL SOCKET OUTLETS

All 6/16 amps wall socket outlets unless otherwise mentioned on the drawings shall be switched, five/six round pin and fitted with automatic linear safety shutters to ensure safety from prying fingers. Unswitched 6/16 amp wall socket outlets where called for in the drawings shall be of five/six round pin type. The socket outlets shall be made from high impact resistant, flame retarding and ultra violet stabilized engineering plastic material.

The switch and sockets shall be located in the same plate. The plates for 6 amp switched/unswitched plugs and telephone outlets shall be of the same size and shape.
All the switched and unswitched outlets shall be of the best standard.
The switch controlling the socket outlet shall be on the phase wire of the circuit.

An earth wire shall be provided along the cables feeding socket outlets for electrical appliances. The earth wire shall be connected to the earthing terminal screw inside the box. The earth terminal of the socket shall be connected to the earth terminal provided inside the box.

7.5 LIGHTING FIXTURES

The light fixtures and fittings shall be assembled and installed complete and ready for service, in accordance with details, drawings, manufacturer's instructions and to the satisfaction of the Project Manager.

Wires brought out from junction boxes shall be encased in GI flexible pipes for connecting to fixtures concealed in suspended ceiling. The flexible pipes shall be provided with a checknut at the fixture end.

Pendant fixtures specified with overall lengths are subject to change and shall be checked with conditions of the job and installed as directed.
All suspended fixtures shall be mounted rigid and fixed in position in accordance with drawings, instructions and to the approval of the Project Manager.
Fixtures shall be suspended true to alignment, plumb, level and capable of resisting all lateral and vertical forces and shall be fixed as required.
All suspended light fixtures etc. shall be provided with concealed suspension arrangement in the concrete slab/roof members. It is the duty of the Contractor to make these provisions at the appropriate stage of construction.
All switch and outlet boxes shall be bonded to earth with insulated stranded copper wire as specified. Wires shall be connected to all fixtures through connector blocks.
Flexible pipes, wherever used, shall be of make and quality approved by the Project Manager.

8. MEASUREMENT AND PAYMENT OF WIRING

Wiring for lights, fans, convenience socket outlets and telephone outlets etc. shall be measured and paid for on POINT BASIS as itemized schedule of quantities and as elaborated as below unless otherwise stated.

8.1 Primary and Secondary light point wiring

In respect of group control of lights (more than one light controlled by one switch or MCB), wiring upto the first light in the group shall be measured and paid for as a primary light point. Wiring for other lights looped in one group for switch controlled as also MCB controlled lights shall be measured and paid for as secondary light points. Primary light points for switch controlled lights shall include the cost of control

switch whereas primary light points controlled by MCBs shall not include the switch cost. The cost of MCB controlling such lights shall not be included in the primary light point rate since the MCB shall be paid for in the item of DB.
The point wiring basis shall assume average wiring length and average conduiting length per point based on parameters stipulated in para 9.2 below. The average wiring length and average conducting length forming the basis of point wiring payment, shall take the electrical layouts of the entire project into consideration. Tenderers are advised to seek clarifications, if they so desire, on this aspect before submitting their tenders. No claim for extra payment on account of electrical layouts in part or whole of the project requiring larger average wiring and conduiting length per point, whether specifically shown in tender drawings or not, shall be entertained after the award of contract.
8.2 Parameters: Wiring shall be carried out as per following parameters in recessed/ surface conduit system.

☐ Only looping system of wiring shall be adopted throughout. No joints excepting at wiring terminals shall
be permitted.
☐ All accessories shall be flush type unless otherwise stated.
☐ For estimation of load, following loads per point shall be assumed.

Light points	100 Watts.
6 amps socket outlet points	100 Watts.
Fan points	60 Watts.
Exhaust fan points	300 Watts or as specified.
16 amp socket outlet points	1000 Watts.

☐ Lights, fans and 6 amp socket outlets may be wired on a common final such circuit. Such circuit shall not normally have more than a total of ten lights, fans or socket outlets or a load of 800 watts whichever is lesser.
☐ Power circuits shall normally have maximum one 16 amps socket outlet unless otherwise stated. Separate circuit shall be run for each geyser, kitchen equipment, window air conditioners and similar appliances.
☐ Wiring rates shall include painting of conduits and other accessories as required.
☐ Wiring rates shall include cleaning of dust, splashes of colour wash or paint from all fixtures, fans, fittings etc. at the time of taking over of the installation.
☐ Wiring rates shall include blanking of outlet boxes to prevent damage/pilferage of wires
8.3 Definitions
8.3.1 Wiring for Lights

Primary Light Points : Wiring for primary light points, as defined in para 9.1 above, shall commence at the Distribution Board terminals and shall terminate at the ceiling rose/connector in ceiling box/lamp holder via the control switch (for switch controlled lights). Rates for primary light point wiring shall be deemed to be inclusive of the cost of entire material and labour require for completion of primary light point thus defined including : .

☐ Recessed / surface conduting system with all accessories, junction/draw/inspection boxes, bushes, check nuts etc. complete as required,

☐ Wiring with stranded copper conductor PVC insulated 660/1000 volt grade wires including terminations etc. complete as required.
☐ Control switch with switch box and cover plate of specified type including fixing screws, earth terminal etc. complete as required. Cost of this switch is applicable only for switch controlled points. This cost shall not be applicable for DB controlled points.
☐ Loop earthing with insulated copper wires.
Secondary Light points :
Secondary light points, as defined in para 9.1 above, shall cover the cost of interconnection wiring between group controlled light fittings and shall be deemed to be inclusive of the cost of entire materials and labour required for completion of the

secondary light point thus defined including

☐ Recessed / surface conduting system with all accessories, junction/draw/inspection boxes, bushes, check nuts etc. complete as required,
☐ Wiring with stranded copper conductor PVC insulated 660/1000 volt grade wires including terminations etc. complete as required.
☐ Loop earthing with insulated copper wires.

8.3.2 Wiring for Ceiling Fans
Wiring for ceiling fan points shall be same as for primary light points and shall, in addition, include ceiling outlet box with recessed fan hooks.

8.3.3 Wiring for Exhaust Fans
Wiring for exhaust fan points shall be same as for primary light points and shall in addition include the cost of providing a 3/5 pin 6 amp socket outlet near the fan alongwith plug top and a 6 amp control switch at convenient location near the room entry.
8.3.4 Wiring for Call Bell Points
Wiring for call bell points shall be the same as for primary light points and shall in addition include the cost of a call bell/buzzer of approved type and make in the required location and a call bell in lieu of the control switch at a convenient location as required.
8.3.5 Wiring for Telephone Outlets
Wiring for telephone outlets points shall include the entire wiring and conduiting from the telephone tag block to the telephone outlet including the telephone outlet complete as required and as itemized in the Schedule of Quantities
8.3.6 Wiring for Convenience Socket Outlets
3/5 pin 6 amps and 3/6 pin 16 amps single phase switched convenience socket outlets shall be provided in the building as indicated in the layout drawings. In addition, combined 3 pin 6 / 16 amps socket outlets at modular intervals in special PVC raceway over the work tables in laboratories shall be provided. Wherever required, 20/32/50 amps single phase and 32/50 amps 3 phase outlets shall also be provided.
Wiring for 3/5 pin 6 amps convenience socket outlets
Point wiring for 3/5 pin 6 amps socket outlets (in locations other than over the laboratory work tables) on point wiring basis shall be the same as primary light point defined in para 8.3.1 and shall in addition include 3/5 pin 6 amp socket outlet with 6 amp control switch in MS box with cover.including loop earthing of the third pin complete as required as as itemised in scheduled of quantities.
Wiring for 3/6 pin 16 amps convenience socket outlets
Point wiring for 3/6 pin 16 amps socket outlets (in locations other than over the laboratory work tables) on point wiring basis shall be the same as primary light point defined in para 8.3.1 and shall in addition include 3/6 pin 16 amp socket outlet with 16 amp control switch in MS box with cover.including loop earthing of the third pin complete as required as as itemised in scheduled of quantities.
Wiring for geyser outlets
The wiring shall be as for point wiring above and including provision for 16 amp shuttered socket outlet located adjacent to the Geyser and the controlling 16 amp moulded switch located at the Switch plate position in the room.
Wiring for special socket outlets
In addition to the above, special convenience outlets of 20/32/50 amps single phase and 32/50 amps three phase, required in few locations as indicated in the layout drawings, shall be paid for on linear basis as itemised in schedule of quantities. Outlets only shall be paid separately in numbers as per actuals. Wiring alongwith loop earthing shall be paid separately on running meter basis and conduiting /PVC raceway shall be paid separately on running meter basis.

8.3.7 Submains wiring
Submains wiring shall be measured from outer end of the boxes. Extra Loop length shall be left at each end as required.

9. ROUTINE AND COMPLETION TESTS

9.1 Installation Completion Tests

At the completion of the work, the entire installation shall be subject to the following tests:

Wiring continuity test

Insulation resistance test

Earth continuity test

Earth resistivity test

Besides the above, any other test specified by the local authority shall also be carried out. All tested and calibrated instruments for testing, labour, materials and incidentals necessary to conduct the above tests shall be provided by the contractor at his own cost.

9.2 Wiring Continuity Test

All wiring systems shall be tested for continuity of circuits, short circuits, and earthing after wiring is completed and before installation is energised.

9.3 Insulation Resistance Test

The insulation resistance shall be measured between earth and the whole system conductors, or any section thereof with all protection in place and all switches closed and except in concentric wiring all lamps in position of both poles of the installation otherwise electrically connected together, a direct current pressure of not less than twice the working pressure provided that it does not exceed 1100 volts for medium voltage circuits. Where the supply is derived from AC three phase system, the neutral pole of which is connected to earth, either direct or through added resistance, pressure shall be deemed to be that which is maintained between the phase conductor and the neutral. The insulation resistance measured as above shall not be less than 50 megohms divided by the number of points provided on the circuit thewhole installation shall not have an insulation resistance lower than one megohm.

The insulation resistance shall also be measured between all conductors connected to one phase conductor of the supply and shall be carried out after removing all metallic connections between he two poles of the installation and in those circumstances the insulation shall not be less than that specified above.

The insulation resistance between the frame work of housing of power appliances and all live parts of each appliance shall not be less than that specified in the relevant Standard specification or where there is nosuch specification, shall not be less than half a megohm or when PVC insulated cables are used for wiring 12.5 megohms divided by the number of outlets. Where a whole installation is being tested a lower value than that given by the above formula subject to a minimum of 1 Megohms is acceptable.

9.4 Testing Of Earth Continuity Path

The earth continuity conductor including metal conduits and metallic envelopes of cable in all cases shall be tested for electric continuity and the electrical resistance of the same alongwith the earthing lead but excluding any added resistance of earth leakage circuit breaker measured from the connection with the earth electrode to any point in the earth continuity conductor in the completed installation shall not exceed one ohm.

9.5 Testing Of Polarity Of Non-Linked Single Pole Switches

In a two wire installation a test shall be made to verify that all non-linked single pole switches have been connected to the same conductor throughout, and such conductor shall be labeled or marked for connection to an outer or phase conductor or to the non-earthed conductor of the supply. In the three of four wire installation, a test shall be made to verify that every non-linked single pole switch is fitted to one of the outer or phase conductor of the supply. The entire electrical installation shall be subject to the final acceptance of the Project Manager as well as

the local authorities.

9.6 Earth Resistivity Test
Earth resistivity test shall be carried out in accordance with IS Code of Practice for earthing IS 3043.

9.7 Performance
Should the above tests not comply with the limits and requirements as above the contractor shall rectify the faults until the required results are obtained. The contractor shall be responsible for providing the necessary instruments and subsidiary earths for carrying out the tests. The above tests are to be carried out by the contractor without any extra charge.
9.8 Tests And Test Reports
The Contractor shall furnish test reports and preliminary drawings for the equipment to the Project Manager for approval before commencing supply of the equipment. The Contractor should intimate with the tender the equipment intended to be supplied with its technical particulars. Any test certificates etc., required by the local Inspectors or any other Authorities would be supplied by the Contractor without any extra charge. All test reports shall be approved by the Project Manager prior to energizing of installation.

TECHNICAL SPECIFICATIONS
MEDIUM VOLTAGE CABLING

1. GENERAL
Technical specifications in this section covers supplying and laying of : ☐ Medium voltage cables.
2. STANDARDS AND CODES

All equipments, components, materials and entire work shall be carried out in conformity with applicable and relevant Bureau of Indian Standards and Codes of Practice, as amended upto date and as below. In addition, relevant clauses of the Indian Electricity Act 1910 and Indian Electricity Rules 1956 as amended upto date shall also apply. Wherever appropriate Indian Standards are not available, relevant British and /or IEC Standards shall be applicable.
Equipments certified by Bureau of Indian Standards shall be used in this contract in line with government regulations. Test certificates in support of this certification shall be submitted, as required.

It is to be noted that updated and current standards shall be applicable irrespective of dates mentioned along with ISS's in the tender documents.

PVC insulated heavy duty cables	IS 1554 - 1988
Cross link polyethylene insulated PVC (sheathed XLPE cables)	IS 7098 - 1985
Code of practice for installation and maintenance of power cables	IS 1255 - 1983
Conductors for insulated electrical cables	IS 8130 - 1984
Drums for electrical cable	IS 10418 - 1982
Methods of test for cables	IS 10810 - 1988
Recommended current rating	IS 3961 - 1987
Recommended short circuit rating of high voltage PVC cables	IS 5891 - 1970

3. CABLES

3.1. Medium Voltage Cables

Medium voltage cables shall be aluminium conductor PVC insulated, PVC sheathed armoured conforming to IS 1554. Cables shall be rated for a 1100 Volts. The conductor of cables from 16 Sq. mm. to 50 Sq. mm. shall be stranded. Sector shaped stranded conductors shall be used for cables of 50 sq. mm and above. Conductors shall be made of electrical purity aluminium 3/4 H or H temper. Conductors shall be insulated with high quality PVC base compound. A common covering (bedding) shall be applied over the laid up cores by extruded sheath of unvulcanised compound. Armouring shall be applied over outer sheath of PVC sheathing. The outer sheath shall bear the manufacturer's name and trade mark at every meter length. Cores shall be provided with following colour scheme of PVC insulation.

1 Core	:	Red/Black/Yellow/Blue
2 Core	:	Red and Black
3 Core	:	Red, Yellow and Blue
3 1/2 /4 Core	:	Red, Yellow, Blue and Black

Current ratings shall be based on the following conditions.

a)	Maximum conductor temperature	70^{O} C
b)	Ambient air temperature	45^{O} C
c)	Ground temperature	30^{O} C
d)	Depth of laying	1000 mm

Short circuit rating of cables shall be as specified in IS 1554 Part-I

Cables have been selected considering conditions of maximum connected loads, ambient temperature, grouping of cables and allowable voltage drop. However, the contractor shall recheck the sizes before cables are fixed and connected to service.

4. DELIVERY, STORAGE AND HANDLING

Cable drum shall be stored on a well drained, hard surface, preferably of concrete, so that the drums do not sink in ground causing rot and damage to the cable drum. The cable drum shall conform to IS 10418. During storage, periodical rolling of drums, in the direction of arrow marked on the drum, shall be done once in 3 month through 90o C Both ends of cables shall be properly sealed to prevent moisture ingress Drums shall be stored in well ventilated area protected from sun and rain. Drums shall always be rested on the flanges and not on flat sides. Damaged battens of drums etc. shall be replaced. Movement of drums shall always be in direction of the arrow marked on the drum. For transportation over long distance, the drums shall either be mounted on drum wheels and pulled by ropes or they shall be mounted on trailers etc. drums shall be unloaded preferably by crane otherwise they shall be rolled down carefully on suitable ramps. While transferring cable form 1 drum to another, the barrel of the new drum shall have diameter not less than the original drum. Cables with kinks or similar visible defects like defective armouring etc. shall be rejected. Cables shall be supplied at site in cut pieces as per actual requirements.

5.LAYING OF CABLES

Cables shall be so laid that the maximum bending radius is 12 times the overall diameter of the cable for medium voltage cables and 15 times the overall diameter for 11 kV cables. Cables shall be laid in masonry trenches, directly on walls/cable trays, directly buried in ground or in pipes/ducts as elaborated below. Cables of different voltages and also power and control cables shall be laid in different trenches with adequate separation. Wherever available space is restricted such that this requirement cannot be met, medium voltage cables shall be laid above HT cables. Where more than one cable is laid side by side, cable marker tags of approved type inscribed with cable identification details shall be permanently attached to cables at entry points to the building, at specified intervals for cables laid direct in grounds and in locations like manholes, pull pits etc.

5.1 In Masonry Trenches

Wherever so specified, cables shall be laid in indoor/outdoor masonry/RCC trenches to be provided by Owners. Cables shall be laid on painted MS supports fabricated from minimum 38mm x 38mmx6mm painted / galvanized angle iron supports grouted in trench walls at intervals not exceeding 600 mm. If required, cables shall be arranged in tier formation

inside the trench. Suitable clamps, hooks and saddles shall be used for securing the cables in position and dressing properly so that the clear spacing between the cables shall not be less then the diameter of the cable. Trenches shall be provided with chequered plate/RCC covers. After laying and dressing of cables, trenches shall be filled with fine sand as directed.

5.2 On Trays/Walls

5.2.1 Wherever so specified, cables shall be laid along walls/ceiling or on cable trays. Cable shall be secured in position and dressed properly by means of suitable clamps, hooks, saddles etc. such that the minimum clear spacing between cables is diameter of the cable. Clamping of cables shall be at minimum intervals asbelow.

Type of cables	Size	Clamping by Fixing intervals
MV	Upto and including 25 sq mm	Saddles 1 mm thick 45 cm
MV & HV	35 sq mm to 120 sq mm	Clamps 3 mm thick 25 mm wide 60 cm
MV & HV	150 sq mm and above	Clamps 3 mm thick 40 mm wide 60 cm

Note : The fixing intervals specified apply to straight runs. In the case of bends, additional clamping shall be provided at 30 cm from the center of the bend on both sides.

5.2.2 Cable trays

Cable trays, of sizes as per schedule of quantities and drawings shall be of perforated doubled bend channel or of ladder design as specified in BOQ. Cable trays shall be fabricated from sheet steel of thickness as per BOQ and shall be complete with tees, elbows, risers, and all necessary hardware.

Trays shall have suitable strength and rigidity to provide proper support for all the contained cables. Trays shall not have sharp edges, burrs or projections injurious to cable insulation. Trays shall include fittings for changes in direction and elevation. Cable trays and accessories shall be painted with two coats of red oxide zinc chromate primer after proper surface preparation and two finishing coats of synthetic enamel paint of approved make or as specified in BOQ. Cable trays shall have side rails or equivalent structural members.

Cable trays shall be mounted on support structure as specified by means of specified size of threaded rods and suitable fasteners. Spacing of the support structure shall be such that the cable trays shall remain perfectly horizontal without buckling when fully loaded with cable runs. The support structure shall be suspended from ceiling slab or grouted to walls in an approved manner. Width of the horizontal arms of the support structure shall be same as the tray width plus length required for threading /bolting /welding to the vertical supports. The length of vertical supporting members for horizontal tray runs shall be to suit the number of tray tiers required. Cable trays shall be bolted/welded to the support structure. Minimum clearance between the top most tray tier and the ceiling shall be 300 mm. Trays shall be erected properly to present a neat and clean appearance. Trays shall be installed as a complete system. The entire cable tray system shall be rigid. Each run of cable tray shall be completed before laying of cables. Cable trays shall be erected so as to be exposed and accessible. Cables shall be fixed to the tray by clamps fabricated from minimum 3 mm thick GI sheets. The cables shall be dressed properly so as to provide minimum one cable diameter clearance between adjacent cables and from tray ends. Cable trays shall be earthed by 2 runs of 25 mm x 3 mm GI strips through out their lengths.

5.3 Buried Directly In Ground

5.3.1 General

Cables shall be so laid that they will not interfere with under ground structures. All water pipes, sewage lines or other structures which become exposed by excavation

shall be properly supported and protected from injury until the filling has been rammed solidly in places under and around them. Any telephone or other cables coming in the way are to be properly shielded as directed by Project Manager . Surface of the ground shall be made good so as to conform in all respects to the surrounding ground to the satisfaction of Project Manager.

5.3.2 Routing of cables

Before cable laying work is undertaken, the route of the cables shall be decided with the Project Manager. While shortest practicable route shall be preferred, cable runs shall follow fixed development such as roads, footpaths etc with proper off-sets so that future maintenance and identification are rendered easy. Whenever cables are laid along well demarcated or established roads, the LV/MV cables shall be laid further from the kerb line than HV cables. Cables of different voltages and also power and control cables shall be kept in different trenches with adequate separation. Where available space is restricted, LV/MV cables shall be laid above HV cables. Where cables cross one another, the cables of higher voltage shall be laid at a lower level than the cables of lower voltage. Power and communication cables shall as far as possible cross at right angles. Where power cables are laid in proximity to communications cables the horizontal and vertical clearances shall not normally be less than 60 cm.

5.3.3 Width Of Trench

The width of trench shall be determined on the following basis. The minimum width of trench for laying single cables shall be 350 mm. Where more than one cable is to be laid in the same trench in horizontal formation, the width of trench shall be increased such that the inter-axial spacing between the cables except where otherwise specified shall be at least 200 mm. There shall be a clearance of at least 150 mm between axis of the end cables and the sides of the trench.

5.3.4 Depth Of Trench

The depth of trench shall be determined on the following basis:

□ Where cables are laid in single tier formation, the total depth of the trench shall not be less than 750 mm for cables upto 1.1 kV and 1250 mm for cables above 1.1 kV.

□ When more than one tier of cables is unavoidable and vertical formation of laying is adopted, the depth of trench shall be increased by 300 mm for each additional tier to be formed.

5.3.5 Excavation Of Trenches

The trenches shall be excavated in reasonably straight lines. Wherever there is a change in direction, suitable curvature of 12 times the overall diameter of the largest cable shall be provided. Where gradients and changes in depths are unavoidable these shall be gradual. Excavation should be done by any suitable manual or mechanical means. Excavated soil shall be stacked firmly by the side of the trench such that it may not fall back into the trench. Adequate precautions shall be taken not to damage any existing cables,pipes or other such installations during excavation. Wherever bricks, tiles or protected covers or bare cables are encountered, further excavation shall not be carried out without the approval of the ProjectManager. Existing property exposed during trenching shall be temporarily supported or propped adequately as directed by the Project Manager. The trenching in such cases shall be done in short lengths, necessary pipes laid for passing cables therein and the trench refilled as required. If there is any danger of atrench collapsing or endangering adjacent structures the sides shall be well shored up with timbering and/or sheathing as the excavation proceeds. Where necessary these may even be left in place when back filling the trench. Excavation through lawns shall be done in consultation with the Project Manager. Bottom of the trench shall be level and free from stone, brick, etc. The trench shall then be provided with a layer of clean dry sand cushion of not less than 80 mm in depth.

5.3.6 Laying Of Cable In Trench

The cable drum shall be properly mounted on jacks or on a cable wheel at a suitable location. It should beensured that the spindle, jack etc are strong enough to carry the

weight of the drum without failure andthat the spindle is horizontal in the bearings so as to prevent the drum creeping to one side while rotating. The cable shall be pulled over rollers in the trench steadily and uniformly without jerks or strains. The entire cable length shall, as far as possible, be laid in one stretch. However when this is not possible the remainder of the cable shall be removed by flaking i.e. making one long loop in the reverse direction. After the cable is uncoiled and laid over the rollers, the cable shall be lifted slightly over the rollers beginning from one end by helpers standing about 10 metres apart and drawn straight. The cable should then be taken off the rollers by additional helpers lifting the cables and then laid in the trench in a reasonably straight line. For short runs and cable sizes upto 50 sq mm 1.1 kV grade the alternative method of direct handling can be adopted with the prior approval of the Project Manager. If two or more cables are laid in the same trench care should be taken to preserve relative position. All the cables following the same routes shall be laid in the same trench. Cables shall not cross each other as far as possible. When the cable has been properly straightened the cores shall be tested for continuity and insulation resistance. The cable shall be measured thereafter. Suitable moisture sealing compound/tape shall be used for sealing of the ends.
Cable laid in trenches in a single tier formation shall have a covering of clean dry sand of not less than 170 mm above the base cushion of sand before the protective cover is laid. In the case of vertical multi-tier formation after the first cable has been laid a sand cushion of 300 mm shall be provided over the initialbed before the second tier is laid. If additional tiers are formed each of the subsequent tiers also shall have a sand cushion of 300 mm. The top most cable shall have a final sand covering not less than 170 mm before the protective cover is laid. A final protection to cables shall be laid to provide warning to future excavators of the presence of the cable and also to protect the cables against accidental mechanical damage. Such protection shall be with second class bricks of not less than 200 mm x 100 mm x 100 mm(normal size) laid breadth wise for the full length of the cable to the satisfaction of the Project Manager. Where more than one cable is to be laid in the same trench this protective covering shall cover all the cables and project at least 50 mm over the sides of the end cables. In addition bricks on edge shall be placed along the entire run on either side of the cable run. The trenches shall then be back filled with excavated earth free from stones or other sharp edged debris and shall be rammed and watered in
successive layers not exceeding 300 mm. Unless otherwise specified a crown of earth not less than 50 mm in the centre and tapering towards the side of the trench shall be left to allow for subsidence. The crown of earth should however not exceed 100 mm so as not to be a hazard to vehicular traffic. Where road berms or lawns have been cut or kerb stones displaced the same shall be repaired and made good to the satisfaction of the Project Manager and all surplus earth and rocks removed to places as specified.

5.3.7 Laying In Pipes/Closed Ducts

In locations such as road crossings, entry to buildings/poles in paved areas etc., cables shall be laid in pipes or closed ducts. Spun reinforced concrete pipes shall be used for such purposes and the pipe shall not be less than 100 mm in diameter for a single cable and not less than 150 mm for more than one cable. These pipes shall be laid directly in ground without any special bed. Sand cushioning and/or brick tiles need not be used in such installations. Unless otherwise specified the top surface of pipes shall be at a minimum depth of 1000 mm from the ground level when laid under roads, pavements etc. The pipes for road crossings shall preferably be on the skew to reduce the angle of bend as the cable enters and leaves the crossing. Pipes shall be continuous and clear of debris or concrete before cable is drawn. Sharp edges at ends shall be smoothened to prevent injury to cable insulation or sheathing. No deduction shall be made for sand and bricks not used for cables passing through RCC Hume pipes or for parts of vertical cables at the lighting poles. Wherever so required, cables shall be laid at the bed of the lake through existing PVC pipe as itemized in bill of quantities.

5.3.8 Route Markers

Route markers made out of 100 mm x 5 mm GI plates bolted to 35 mm x 35 mm x 6 mm and 60 cm long angle shall be provided along the cable route at intervals not exceeding 100 m in straight runs and at every bend.

5.3.9 Laying Of Cables In Floors

Laying of cables directly in floors shall be avoided and GI pipes of adequate size shall be used wherever necessary. However if the cables have to be laid direct in the floor specific written approval of Project Manager shall be obtained and the Contractor shall cut chases, lay the cables and make good the chases to original finish.

5.3.10 Cable Entry Into Buildings

Cable entry into buildings shall be made through RCC pipes recessed in the floor. RCC Hume pipes shall be provided well in advance for service cable entries. The pipe shall be filled with sand and sealed at both ends with bitumen mastic to avoid entry of water. Suitable size manholes shall be provided wherever required to facilitate drawing of cables as per requirements.

5.4 Cable Identification Tags

Wherever more than one cable is laid/run side by side, marker tags as approved by the Project Manager, inscribed with cable identification details shall be permanently attached to all the cables in manholes/pull pits/ joint pits/ entry points in buildings/open ducts/trenches etc. These shall also be attached to cables laid directly in ground at specified intervals, before the trenches are back-filled.

6 TERMINATION/JOINTING OF CABLES

Soldered jointing/termination shall be totally avoided. Solderless terminations by using Dowel crimping tools and suitable legs shall be adopted for all cable terminations. Any terminations may without use of proper crimping tool is shall be liable to be rejected. In the case of aluminium conductors, it is to be ensured that the conductor oxidation is cleaned by means of emery paper and then a thin coat of tin is applied before pinching into any equipment. Heat shrinkable Raychem type or approved equivalent terminations shall be provided for High Voltage cables and Siemens make or approved equivalent make brass double compression glands shall be provided for Medium Voltage cable terminations. Straight through jointing of Medium Voltage or High Voltage cable shall normally be totally avoided. If absolutely unavoidable, such jointing shall be carried out as per procedure to be got specifically approved from Project Manager and without cost.

7 MEASUREMENT OF CABLE RUNS

The cable runs shall be measured upto the outer end of the boxes without any allowances for over lap in
joints. The rate shall include all the above mentioned material, labour etc for laying as required.

8. CABLE LOOPS

At the time of the installation approximately 3 meters of surplus cable shall be left
at each end of the cable
- on each side of underground straight through/tee/termination joints.
- at entries to buildings
- and such other places as may be decided by the Project Manager .

This cable shall be left in the form of a loop.
Wherever long runs of cable length are installed cable loops shall be left at suitable intervals as specified by
the Project Manager.

9. BONDING OF CABLES.

Where a cable enters any piece of apparatus it shall be connected to the casting by means of an approved
type of armoured clamp or gland. The clamps must grip the armouring firmly to the gland or casting, so
that in the event of ground movement no undue stress is placed on to the cable conductors.

10. TESTING

10.1 Tests At Manufacturer's Work

The cables shall be subjected to shop test in accordance with relevant standards to prove the design and general qualities to the cables as below (as per IS 10810) :

- ☐ Routine test on each drum of cables.
- ☐ Acceptance tests on drums chosen at random for acceptance of the lot.
- ☐ Type test on each type of cables, inclusive of measurement of armour DC resistance of power cables.

10.2 Site Testing

- ☐ All cables before laying shall be tested with a 500 V megger for 1.1 kV grade or with a 2,500/5,000 megger for cables of higher voltages. The cables cores shall be tested for continuity, absence of cross phasing, insulation resistance to earth/sheath/armour and insulation resistance between conductors.
- ☐ All cables shall be subject to above mentioned test during laying, before covering the cables by protective covers and back filling and also before the jointing operations.
- ☐ After laying and jointing, the cable shall be subjected to a 15 minutes AC/DC pressure test. In the absence of facilities for pressure testing, it is sufficient to test for one minute with 1000 V megger for cables of 1.1 kV grade and with 2500/5000 V megger for cables of higher voltages.

10.3 Test Witness

Tests shall be performed in presence of representative of Project Manager. The Contractor shall give at least fifteen (15) days advance notice of the date when the tests are to be carried out.

TECHNICAL SPECIFICATIONS

MEDIUM VOLTAGE DISTRIBUTION BOARDS

1 GENERAL

This section covers specification of DBs.

2. STANDARDS AND CODES

The following Indian Standard Specifications and Codes of Practice will apply to the equipment and the work covered by the scope of this contract. In addition the relevant clauses of the Indian Electricity Act 1910 and Indian Electricity Rules 1956 as amended upto date shall also apply. Wherever appropriate Indian Standards are not available, relevant British and/or IEC Standards shall be applicable.

BIS certified equipment shall be used as a part of the Contract in line with Government regulations. Necessary test certificates in support of the certification shall be submitted prior to supply of the equipment.

It is to be noted that updated and current Standards shall be applicable irrespective of those listed below.

Miniature Air Circuit Breakers for AC circuits IS 8828 : 1978

Degrees of Protection provided by enclosures for low voltage switchgear IS 2147 : 1962

Code of Practice for installation and maintenance of switchgear not exceeding 1000 volts IS 10118 : 1982

General requirements for switchgear and controlgear for voltages not exceeding 1000 volts IS 4237 : 1982

3. MINIATURE CIRCUIT BREAKERS

☐ The MCB's shall be of the completely moulded design suitable for operation at 240/415 Volts 50 Hz
system.
☐ The MCB's shall have a rupturing capacity of 10 KA at 0.5 p.f.
☐ The MCB's shall have inverse time delayed thermal overload and instantaneous magnetic short circuit
protection. The MCB time current characteristic shall coordinate with PVC cable characteristic.
☐ Type test certificates from independent authorities shall be submitted with the tender.

4. FINAL DISTRIBUTION BOARDS

☐ Final distribution boards shall be flush mounting, totally enclosed, dust and vermin proof and shall
comprise of miniature circuit breakers, earth leakage circuit breakers, neutral link etc as detailed in the
schedule of quantities.

☐ The distribution equipment forming a part of the Distribution Boards shall comply to the relevant
Standards and Codes of the Bureau of Indian Standards and as per detailed specifications included in this tender document.
 The board shall be fabricated from 16 gauge CRCA sheet steel and shall have a hinged lockable spring
loaded cover. All cutouts and covers shall be provided with synthetic rubber askets. The entire construction shall give a IP 42 degree of protection.

 The bus-bar shall be of electrical grade copper having a maximum current density of 1.6 ampere per
square mm and PVC insulated throughout the length. The minimum spacing between phases shall be 25 mm and between phase and earth 19 mm

☐ Separate neutral link for each phase shall be provided.

☐ All the internal connections shall be with either solid copper PVC insulated or copper conductor PVC
insulated wires of adequate rating.

☐ All the internal connections shall be concealed by providing a hinged protective panel to avoid accidental contact with live points.

☐ All outgoing equipment shall be connected direct to the bus bar on the live side. The equipment shall be
mounted on a frame work for easy removal and maintenance.

☐ The sheet steel work shall undergo a rigorous rust proofing process, two coats of filler oxide primer and
final powder coated paint finish.

☐ All the circuits shall have an independent neutral insulated wire, one per circuit, and shall be numbered and marked as required by the Project Manager.

☐ A sample of the completed board is to be got approved by the Project Manager before commencement of supply and erection.

☐ Before commissioning, the distribution boards shall be megger tested for insulation and earth continuity.

5 SHEET STEEL TREATMENT AND PAINTING

☐ Sheet Steel materials used in the construction of these units should have undergone a rigorous rust

proofing process comprising of alkaline degreasing, descaling in dilute sulphuric acid and a recognized phosphating process. The steel work shall then receive two costs of oxide filler primer before final painting. Castings shall be scrupulously cleaned and fettled before receiving a similar oxide primer coat.

☐ All sheet steel shall after metal treatment be given powder coated finish painted with two coats of shade 692 to IS 5 on the outside and white on the inside. Each coat of paint shall be properly stoved and the paint thickness shall not be less than 50 microns.

6. NAME PLATES AND LABELS

 Suitable engraved white on black name plates and identification labels of metal for all Switch Boards and

Circuits shall be provided. These shall indicate the feeder number and feeder designation.

ROUTINE AND COMPLETION TESTS

1 INSTALLATION COMPLETION TESTS

At the completion of the work, the entire installation shall be subject to the following tests:

1. Wiring continuity test
2. Insulation resistance test
3. Earth continuity test
4. Earth resistivity test

Besides the above, any other test specified by the local authority shall also be carried out. All tested and calibrated instruments for testing, labour, materials and incidentals necessary to conduct the above tests shall be provided by the contractor at his own cost.

2 WIRING CONTINUITY TEST

All wiring systems shall be tested for continuity of circuits, short circuits, and earthing after wiring is completed and before installation is energised.

3 INSULATION RESISTANCE TEST

The insulation resistance shall be measured between earth and the whole system conductors, or any section thereof with all protection in place and all switches closed and except in concentric wiring all lamps in position of both poles of the installation otherwise electrically connected together, a direct current pressure of not less than twice the working pressure provided that it does not exceed 1100 volts for medium voltage circuits. Where the supply is derived from AC three phase system, the neutral pole of which is connected to earth, either direct or through added resistance, pressure shall be deemed to be that which is maintained between the phase conductor and the neutral. The insulation resistance measured as above shall not be less than 50 megohms divided by the number of points provided on the circuit the whole installation shall not have an insulation resistance lower than one megohm.

The insulation resistance shall also be measured between all conductors connected to one phase conductor of the supply and shall be carried out after removing all metallic connections between he two poles of the installation and in those circumstances the insulation shall not be less than that specified above.

The insulation resistance between the frame work of housing of power appliances and all live parts of each appliance shall not be less than that specified in the relevant Standard specification or where there is no such specification, shall not be less than half a megohm or when PVC insulated cables are used for wiring 11.5 megohms divided by the number of outlets. Where a whole installation is being tested a lower value than that given by the above formula subject to a minimum of 1 Megohms is acceptable.

4 TESTING OF EARTH CONTINUITY PATH

The earth continuity conductor including metal conduits and metallic envelopes of cable in all cases shallbe tested for electric continuity and the electrical resistance of the same alongwith the earthing lead but excluding any added resistance of earth leakage circuit breaker measured from the connection with the earth electrode to any point in the earth continuity conductor in the completed installation shall not exceed one ohm.

5 TESTING OF POLARITY OF NON-LINKED SINGLE POLE SWITCHES

In a two wire installation a test shall be made to verify that all non-linked single pole switches have been connected to the same conductor throughout, and such conductor shall be labeled or marked for connection to an outer or phase conductor or to the non-earthed conductor of the supply. In the three of four wire installation, a test shall be made to verify that every non-linked single pole switch is fitted to one of the outer or phase conductor of the supply. The entire electrical installation shall be subject to the final acceptance of the Project Manager as well as the local authorities.

6 EARTH RESISTIVITY TEST

Earth resistivity test shall be carried out in accordance with IS Code of Practice for earthling IS 3043.

7 PERFORMANCE

Should the above tests not comply with the limits and requirements as above the contractor shall rectify the faults until the required results are obtained. The contractor shall be responsible for providing the necessary instruments and subsidiary earths for carrying out the tests. The above tests are to be carried out by the contractor without any extra charge.

8 TESTS AND TEST REPORTS

The Contractor shall furnish test reports and preliminary drawings for the equipment to the Project Manager for approval before commencing supply of the equipment. The Contractor should intimate with the tender the equipment intended to be supplied with its technical particulars. Any test certificates etc., required by the local Inspectors or any other Authorities would be supplied by the Contractor without any extra charge.

9. Equipment: Servo Voltage Stabilizer

A. Specifications

1.1	MAKE	-	
1.2	EQUIPMENT	-	Servo Voltage Stabilizer (Servo)
1.3	TYPE	-	**Unbalanced, Outdoor with indoor panel**
1.4	FREQUENCY	-	50 Hz+/-3 Hz
1.5	NO. OF PHASES	-	3 phase
1.6	COOLING	-	**ONAN**
1.7	DESIGN & TESTING STANDARDS	-	IS 9815 / IS 2026
1.8	TERMINATIONS	-	Porcelain Bushings (IS 3347)
1.9	OVERLOAD CAPACITY	-	Tested to withstand overloading of 110% for 30 minutes at 30 degree C ambient
1.10	DUTY CYCLE	-	Continuous
1.11	FIRST FILL OF TRANSFORMER OIL	-	Apar / Equivalent make oil conforming to IS 335, so as to achieve high insulation level(included)
1.12	CLASS OF INSULATION	-	A
1.13	TEMP. RISE PERMISSIBLE IN OIL	-	55 degree C

1.14	Core Architecture	-	For attaining high efficiency of the stabilizer we use stepped and mitered core architecture

B. In-built Protections and output variations

Overload	Protection given by suitable MCCB capacity
High/Low voltage cutoff	Through MCCB at output Input low adjustable
Output accuracy	High accuracy within +/- 1% variation
Unbalanced conditions	Independent phase control makes it suitable for unbalanced current load and input voltage supply
Input voltage beyond range	Lamp for each phase

NET WORKING SYSTEMS Spacifications for Passive Items Cable & others

All UTP Components should be from the same OEM. The OEM should be ISO 9001:2000 & QS: 9000 Certified. In the changing needs of the global resources if the company has environmental management systems in place like ISO 14001 accreditation the same shall be added advantage.

The cabling should be certified to have application support warranty for next 25 years.
The complete cabling system offered shall be upgradeable to the intelligent system by simply bringing in additional hardware and software. The OEM should have at least 1 site on intelligent system in India. The bidder/OEM should be able to physically demonstrate intelligent system monitors/scanners, intelligent jack panels etc. if so required by the customer
Technical Specifications

UTP CABLING COMPONENTS

(i) Category 6 UTP, 4 Pair with ETL test report for channel and zero bit error

Characteristic	**Min. Required Specification**
Features	Category 6 Unshielded Twisted Pair 100Ω cable shall be compliant with EIA/TIA 568-C.2 transmission performance specifications
	Category 6 UTP cables shall extend between the work area location and its associated telecommunications closet and consist of 4 pair, 23 AWG, UTP Non Plenum cable jacket.
	The 4 pair Unshielded Twisted Pair cable shall be UL® Listed
	All Category 6 cables shall meet or exceed the following characteristics:
Mechanical Characteristics	Construction: 4 twisted pairs separated by internal X shaped, 4 channel, polymer spine / full separator. Half shall not be accepted.
	Conductor: Solid Copper
	Conductor Diameter: 0.57±0.005mm (23 AWG)
	Insulator Polyolefin
	Jacket: PVC, BLUE in color

Characteristic	Min. Required Specification
	Outer Diameter: 6.0±0.4mm
	Insulation Dia. (±0.05mm): 1.04

(ii) FACE PLATE

Characteristic	Min. Required Specification
Features	Single Gang square plate, 86mmx86mm
	Write on labels in transparent plastic window – supplied with plate
	Screw hole covers – to be supplied with plate
	Plug in Icons – Icon tree – to be supplied with plate
	Should be able to support variety of jacks – UTP, STP, Fiber, Coax etc.

(iii) INFORMATION OUTLET with ETL test report

Characteristic	Min. Required Specification
Features	Category 6, EIA/TIA 568-C.2 – 250MHz
	Information outlets should have ETL component compliance (ETL certificate to be enclosed)
	All information outlets for 100 Ω, 22-24 AWG copper cable shall: Use insulation displacement connectors (IDC)
	Allow for a minimum of 200 re-terminations without signal degradation below standards compliance limits.
	Be constructed of high impact, flame-retardant thermoplastic with color and icon options for better visual identification.
	Should have spring loaded integrated shutter
	Should have Terminator cap
	IDC posts should be pointed
Mechanical : Jack Connector	Plastic Housing: Polycarbonate, UL94V-0 rated or equivalent
	Operating Life: Minimum 750 insertion cycles
	Contact Material: Copper alloy
	Contact Plating: 50 µinches gold over 100 µinches nickel
	Plastic Housing: Polycarbonate, UL94V-0 rated or equivalent
	Operating Life: Minimum 200 Re-terminations
	IDC Contact Plating: Tin Plate (tin/lead)

(iv) 24 PORT JACK PANEL

Characteristic	Min. Required Specification

Characteristic	Min. Required Specification
Features	Be made of cold rolled steel, in 24 port configurations. Each jack should have spring loaded shutter inside the jack for 100% dust free environment.
	Allow for a minimum of 750 plug mating cycles
	Have port identification numbers on the front of the panel.
	Should have self adhesive, clear label holders (transparent plastic window type) and white designation labels with the panel, with optional color labels / icons.
	Each port / jack on the panel should be individually removable on field from the panel.
	Should have integrated rear cable management shelf.
	Should comply to the following : TIA/EIA-568-C.2 Component Compliant FCC Subpart F 68.5 Compliant IEC-603-7 Compliant ISO 11801 Class E Compliant UL 1863 CSA C22.2
Mechanical Characteristics **Jack Connector**	Plastic Housing: Polycarbonate, UL94V-0 rated or equivalent
	Operating Life: Minimum 750 insertion cycles
	Contact Material: Copper Alloy
	Contact Plating: 50µ" Gold/100µ" Nickel
	Contact Force: 100g minimum
	Plug Retention Force: 11 lbf.
IDC Connector	Plastic Housing: Polycarbonate, UL94V-0 rated or equivalent
	Operating Life: Minimum 200 re-terminations
	Contact Material: Copper Alloy
	IDC Contact Plating: Tin/Lead Plate
	Contact Force: 100g minimum
	Wire Accommodation: 22-24 AWG solid

(v) MOUNTING CORDS

Characteristic	Min. Required Specification
Features	Category 6 Equipment cords
	The work area equipment cords shall, at a minimum comply with proposed ANSI/TIA/EIA-568-C.2 Commercial Building Cabling Standards Transmission Performance Specifications for 4 pair 100Ω Category 6 Cabling.
	Category 6 modular equipment cords: Shall be round, and consist of eight insulated 24 AWG, stranded copper conductors, arranged in four color-coded twisted-pairs
	Equipped with modular 8-position plugs on both ends, wired straight through with standards compliant wiring.

Characteristic	Min. Required Specification
	Should have 50 micro inches of gold plating over nickel contacts.
	Modular cords should include slim clear anti-snag slip-on boots
	Mounting cords should have ETL component compliance. (ETL certificate to be enclosed)
Mechanical – Cable	Conductor size: 24 AWG stranded bare copper
	Nominal outer diameter: 5.9mm
	Jacket: LSOH
	Temperature range: - 20°C to + 60°C
Mechanical Characteristics – Plug	Operating life: Minimum 750 insertion cycles
	Contact material: Copper alloy
	Contact plating: 50µ" Gold/100µ"Nickel
	Plug dimensions compliant with ISO/IEC 60603-7-4 and FCC 47 Part 68
	Fire Propagation tests: LS0H Sheath: CSA FT1, IEC 60332-1, IEC 61034
Electrical Characteristics – Plug	Max voltage: 150 VAC (max)
	Max current: 1.5A @ 25°C
	Operating temperature: -20°C to +60°C

List of Approved Makes/Brands for Material

The contractor shall quote for the best of the materials specified below with ISI mark wherever applicable. The contractor shall obtain prior approval from the Architect / IIBF before placing order for the specific materials agencies.

INTERIOR & FURNISHING MATERIAL

S. NO.	Materials		Manufacturers
1.	Glass Reinforced Gypsum Board / tiles IS 2095-1982 certified		INDIA GYPSUM / KNAUF DENOLINE/ ARMSTRONG / HUNTER DOUGLAS
2.	Clear Float Glass		SAINT-GOBAIN /ASAHI EMIRATES / OR EQUIVALENT
3	Aluminum Extrusion Sections		JINDAL/ HINDALCO OR EQUIVALENT
4	8, 10, 12& 18 mm thick MDF/ HDF Board		GREEN PANEL / CENTURY
5	Block Boards & Plywood : Boiling water proof		GREEN PANEL / ARCHIDPLY / DURO / CENTURY
6	Veneer		DURO / GREEN PANEL / ARCHIDPLY
7	Laminates		GREENLAM / MERINO / ARCHID / SUNMICA / AMULYA
8	Flush Door Shutters *IS: 2202 Certified Part I*		GREEN PANEL / ARCHIDPLY / DURO/ CENTURY
9	Fire check doors		SAINT-GOBAIN/ SUKRI
10	Door Lock / Handles & Latches		HAFFELE / DORMA OR EQUIVALENT
11	Floor Type Hydraulic door closer (Floor spring)		HAFFELE / DORMA / OZONE / EQUIVALENT
12	Hinges stainless steel		HAFFELE/ DORMA / HETTICH
13	Hardware		HAFFELE/ DORMA / HETTICH
14	Drawer sliding fitting		HAFFELE / EBCL /KAIF / FLYRAIL
15	Ball Catch		MAGNETIC (M-2) / BRASS OR EQUIVALENT
16	Screws		GKM / METTLE FOLD OR EQUIVALENT
17	Vitrified Tiles (GLAZED / ANTI SKID)		KAJARIA / ORIENT BELL / H R JOHNSON / SOMANY
18	Ceramic Tiles (GLAZED / Non-Skid)		KAJARIA / ORIENT BELL / H R JOHNSON / SOMANY
19	WOODEN FLOORING		GREEN PANEL / PERGO/ FIN FLOOR
20	Adhesive		FEVICOL (SH) FOR FURNITURE, LAMINATES, ARALDITE OF HINDUSTAN CIBA GEIGY LTD. FOR STEEL/MIRROR
21	Wood Preservative		ASIAN PAINT / BRITISH PAINT OR EQUIVALENT

22	Plaster Of Paris		SUPERFINE OR EQUIVALENT
23	Plastic Emulsion / Acrylic emulsion Paint (water based)		ASIAN PAINTS / DULUX / BURGER / EQUIVALENT
24	Texture Paint		OIKOS / ASIAN PAINTS/ SPECTRUM / UNITILE
25	Melamine / PU Polish		ASIAN PAINTS / SHALIMAR
26	Waterproof cement paint		SNOCEM INDIA, NEROLAC, NITCOCEM OR EQUIVALENT.
27	Synthetic Enamel Paint		ASIAN/ NEROLAC/ BERGER/ DULUX
28	Roller Blinds / Wooden Blinds		VISTA, MAC, HUNTER DOUGLAS
29	Grey Cement (43 or 53 Grade) White Cement Putty		A.C.C/ L&T/ AMBUJA/ BIRLA WHITE, J.K. BIRLA WHITE PUTTY
30	Steel (Thermo Mechanically Treated Steel) High strength deformed bars or mild steel		TATA, SAIL, RATHI OR EQUIVALENT
31	Bricks		GOOD QUALITY LOCALLY AVAILABLE MATERIAL APPROVED BY ENGINEER / ARCHITECT
32	Water proofing material / compound.		SIKKA / CICO-I / ROFF / STP OR EQUIVALENT
33	Toilet partition		GREENLAM / MARINO OR EQUIVALENT
34	Toilet Accessories		EURONICS OR EQUIVALENT
35	Hardeners		"IRONITE" OR EQUIVALENT.
36	Red Oxide		"ASIAN" OR EQUIVALENT.
37	Toilet fixtures & fittings		JAQUAR / HINDWARE OR EQUIVALENT
38	SOIL, WASTE & RAIN WATER PIPES & FITTINGS		
a	CAST IRON PIPES		RIF/SRIF/KAJEEO (IS: 3989)
b	U.P.V.C		FINOLEX / SUPREME / PRINCE
c	P.V.C. PIPE		PRAKASH / JINDAL
39	GUN METAL VALVES (FULLWAY, CHECK AND GLOBE VALVES)		ZOLOTO/LEADER
40	G.I. PIPE		TATA/ JINDAL / G.S.T.
41	G. I. FITTINGS		UNIK / KS
42	R.C.C PIPE		PRAGATI / USHA / JSP
43	C.I. MANHOLE COVER & FRAME		SRIF / RIF / K 11
44	CLAMPS (GI), DASH FASTNESS, PIPE SUPPORTS, HOLD FAST		CHILLY
45	Polyurethane foam		'U' FOAM OR EQUIVALENT
46	Modular Furniture		BP ERGO / FEATHERLITE
47	SOLID ACRYLIC TOP / CORIAN TOP		LG / MERINO
48	Glass wool Insulation for partition / paneling / Ceiling		KNAUF DENOLINE / UP TWIGA

ELECTRICAL WORK

The following is the list of products and the names of the approved manufacturers against each product. Where more than one manufacturer is listed the Contractor shall quote rates for the various items of work based on the materials, after ascertaining the availability, delivery schedule etc of the same.

A.	**Internal Electrical Works**		
	PVC CONDUIT & ACCESSORIES		BEC, POLYPACK, AKG, SETIA
	COPPER CONDUCTOR PVC INSULATED WIRES		POLYCAB, FINOLEX, HAVELS,RALLISON
	COPPER CONDUCTOR PVC INSULATED WIRES		SCHNEIDER, LEGRAND MK, HAVELS, ANCHOR, PANASONIC
	MODULAR SWITCHES, SOCKET OUTLETS AND WIRING ACCESSORIES WITH MOULDED COVER PLATE		POLYCAB, LEGRAND , SIEMENS, L&T HAGER, ABB, ANCHOR
	HEAVY DUTY METAL CLAD SOCKET OUTLETS WITH MCB IN MS HOUSING		LEGRAND, NEPTUNE, CLIPSAL, ABB, ANCHOR , L&T
	WEATHER PROOF SOCKET OUTLETS WITH MCB		LEGRAND , SIEMENS, HAGER, SCHNEIDER, ABB, ANCHOR, L&T
	MINIATURE CIRCUIT BREAKER		LEGRAND , SIEMENS, HAGER, SCHNEIDER, ABB, ANCHOR, L&T , POLYCAB,
	EARTH LEAKAGE CIRCUIT BREAKER TIMERS & CONTACTORS TO BE MOUNTED IN DB'S MCB DISTRIBUTION BOARDS IN SHEET STEEL HOUSING (DOUBLE DOOR)		LEGRAND , SIEMENS, HAGER, SCHNEIDER, ABB, L&T LEGRAND, SIEMENS, SCHNEIDER, HAGER, ABB, ANCHOR, L&T , POLYCAB,
B.	**Ceiling Fan**		CROMPTON GREAVES, HAVELLS , ORIENT
C.	**Low Tension System** Telephone wires Telephone Tag Blocks		EXCEL CABLE, MOLEX, FINOLEX, DELTON KRONE, POUYET, TVS
D.	**Cables and accessories** 1100 Volts grade cables		POLYCAB, SKYTONE, HAVELLS, RALLISON
	Cable Lugs Cable compression glands		DOWELLS, PEECO, COMET PEECO, COMET,DOWELLS
E.	**Cable trays / Cable ladders** **Raceway**		BEC/ SLATCO / GEMTECH /, RISHA CONTROL/ ERA CONTROL BRIDGE INDUSTRY, SLOTCO, PELCO
G.	**FIXTURES AND FITTINGS**		PHILIPS /POLYCAB / BAJAJ / WIPRO
H	**DISTRIBUTION BOARDS & SUBDISTRIBUTION PANELS**		
	Isolator and Drop Out Fuse		VERSATEK/ KIRAN TEXTILE/ STERLING/ PACTIL/ GR POWER/ ELPRO CROMPTON/ MEHRU/ ALSTOM

	11kV Breaker		L&T /SIEMENS/ ABB / SCHNEIDER
	11kV Cables		CABLE CORPORATION OF INDIA/ RPG / UNIVERSAL/TORRENT 3M
	11kV Termination		RAYCHEM / 3M
	Air Circuit Breaker		MG SCHNEIDER ,L&T, SIEMENS, LEGRAND ,ABB, MITSUBISHI (WS)
	MV Contactors/Timer/Starters Protective Relays (Microprocessor)		L&T, SCHNEIDER, SIEMEN , MITSUBISHI L&T, ALSTOM, SCHNEIDER, SIEMENS,
	Moulded case circuit breaker		SIEMENS (3VL), L & T (D-SINE), SCHNEIDER (COMPACT), ABB(T- MAX), MDS LEGRAND, MITSUBISHI (WS)
	KWH meters (Electronic Digital type) BIS Marked		SECURE, HPL SOCOMAC, L&T, ITRON, CONZERVE, SEIMENS
	Miniature Circuit Breaker ISI Marked. 10KA.		L&T HAGER, LEGRAND, SCHNEIDER, SIEMENS GILBERT MAXWELL
	Cast Resin Current Transformer Meter (Electronic digital/LCD)		KAPPA, AE, ADVANCE L&T RISHAB, SIEMENS, ELTECH,
	Selector Switches Indication Lamp (LED type)		L&T SALZER, KAYCEE ESBEE (L&T), VAISHNO, TEKNIC, SCHNEIDER, SIEMENS
	Energy Monitor/ Trivector Meter		NEPTUNE-DUCATI, SECURE ,SOCOMEC, L&T, CONZERVE
	Voltmeter, Ammeter (Digital Type) MV Contactors/Timer/ Starters		L&T RISHAB, SIEMENS, ELTECH, CONZERVE, AE, SALZER
	MV Switchboards (Powder coated)		TRICOLITE , ADLEC , RISHA CONTRL , GEMTECH POWER CONTROL , ADVANCE, KRYPTON
	PLC		ALLEN BRADLEY , SEIMENS
I.	**Lighting Control Panel**		LUTRON ABB / SCHNEIDER / DAYNALIGHT / LEVITON /
J .	**NET WORKING SYSTEM**		POLYCAB / AMP (TYCO), LEGRAND, COMMSCOPE
K.	**Fire Detection System**		
	Copper conductor PVC FRLS wires		FINOLEX, BONTON, POLYCAB , DELTON , RALLISON
	Heat/Smoke Detectors		NOTIFIER,/JONSONCONTROL(IFC)/XLS3000
	Fire Panel		NOTIFIER,/JONSONCONTROL(IFC)/XLS3000
	Speaker cum Hooter		NOTIFIER,/JONSONCONTROL(IFC)/XLS3000
	Response Indicator		EDWARDS, SYSTEM SENSOR, DEVI, MORLEY, NOTIFIRE
	Manual Call Points		HONEYWELL , SIEMENS, JHONSON CONTROL
	Fire Exit Sign with battery back up		SYSTEMS TEK, GLO-LITE, PROLITE
L.	**PUBLIC ADDRESS/MUSIC SYSTEM**		BOSCH, HONEYWELL, AUDIOTRACK
M.	**CLOSE CIRCUIT TELEVISION SYSTEM**		HONEYWELL IMPULSE, PALCO, AXIS, PANASONIC, QOGNIFY
N.	**ACCESS CONTROL SYSTEM**		HONEYWELL/ALGATEC/ SMART I/ ESSL/ HID, / SPECTRA / BIOMAX

SECTION 6

FORMS OF SECURITIES

Forms of Securities

Acceptable forms of securities are annexed. Bidders should not complete the Performance and Advance Payment Security forms at this time. Only the successful Bidder will be required to provide Performance and Advance Payment Securities in accordance with one of the forms, or in a similar form acceptable to the Employer.

Annex A: Bid Security (Bank Guarantee)

Annex B: Performance Bank Guarantee

Annex C: Performance Bank Guarantee for Unbalanced Items

Annex D: Bank Guarantee for Advance Payment

Annex A

BID SECURITY (BANK GUARANTEE)

WHEREAS, _____ *[name of Bidder]* (hereinafter called "the Bidder") has submitted his Bid dated _____ *[date]* for the construction of _____ *[name of Contract]* (hereinafter called "the Bid").

KNOW ALL PEOPLE by these presents that We _____ *[name of bank]* of _____ *[name of country]* having our registered office at _____ (hereinafter called "the Bank") are bound unto _____*[name of Employer]* (hereinafter called "the Employer") in the sum of _____[1] for which payment well and truly to be made to the said Employer the Bank binds itself, his successors and assigns by these presents.

SEALED with the Common Seal of the said Bank this _____ day of _____ 20____.

THE CONDITIONS of this obligation are:

(1) If after Bid opening the Bidder withdraws his bid during the period of Bid validity specified in the Form of Bid;

or

(2) If the Bidder having been notified of the acceptance of his bid by the Employer during the period of Bid validity:

(a) fails or refuses to execute the Form of Agreement in accordance with the Instructions to Bidders, if required; or

(b) fails or refuses to furnish the Performance Security, in accordance with the Instruction to Bidders; or

(c) does not accept the correction of the Bid Price pursuant to Clause 12;

we undertake to pay to the Employer up to the above amount upon receipt of his first written demand, without the Employer having to substantiate his demand, provided that in his demand the Employer will note that the amount claimed by him is due to him owing to the occurrence of one or any of the three conditions, specifying the occurred condition or conditions.

This Guarantee will remain in force up to and including the date _____[2] days after the deadline for submission of Bids as such deadline is stated in the Instructions to Bidders or as it may be extended by the Employer, notice of which extension(s) to the Bank is hereby waived. Any demand in respect of this guarantee should reach the Bank not later than the above date.

DATE _____ SIGNATURE OF THE BANK _____

WITNESS _____ SEAL _____

_____

[signature, name, and address]

_____

1 The Bidder should insert the amount of the guarantee in words and figures denominated in Indian Rupees. This figure should be the same as shown in Clause 15.1 of the Instructions to Bidders.

2 45 days after the end of the validity period of the Bid.

Annex B

PERFORMANCE BANK GUARANTEE

To: _____ *[name of Employer]*

_____ *[address of Employer]*

WHEREAS _____ *[name and address of Contractor]* (hereinafter called "the Contractor") has undertaken, in pursuance of Contract No. _____ dated _____ to execute _____ *[name of Contract and brief description of Works]* (hereinafter called "the Contract");

AND WHEREAS it has been stipulated by you in the said Contract that the Contractor shall furnish you with a Bank Guarantee by a recognized bank for the sum specified therein as security for compliance with his obligations in accordance with the Contract;

AND WHEREAS we have agreed to give the Contractor such a Bank Guarantee;

NOW THEREFORE we hereby affirm that we are the Guarantor and responsible to you, on behalf of the Contractor, up to a total of _____ *[amount of guarantee]*[1]_____ *[in words]*, such sum being payable in the types and proportions of currencies in which the Contract Price is payable, and we undertake to pay you, upon your first written demand and without cavil or argument, any sum or sums within the limits of _____ *[amount of guarantee]*[1] as aforesaid without your needing to prove or to show grounds or reasons for your demand for the sum specified therein.

We hereby waive the necessity of your demanding the said debt from the Contractor before presenting us with the demand.

We further agree that no change or addition to or other modification of the terms of the Contract or of the Works to be performed thereunder or of any of the Contract documents which may be made between you and the Contractor shall in any way release us from any liability under this guarantee, and we hereby waive notice of any such change, addition or modification.

This guarantee shall be valid until …… (i.e.) 28 days from the date of expiry of the Defects Liability Period.

Signature and seal of the guarantor

Name of Bank

Address

Date

1 An amount shall be inserted by the Guarantor, representing the percentage of the Contract Price specified in the Contract and denominated in Indian Rupees.

Annex C

PERFORMANCE BANK GUARANTEE (for unbalanced items)

To: _____ *[name of Employer]*

_____ *[address of Employer]*

WHEREAS _____ *[name and address of Contractor]* (hereinafter called "the Contractor") has undertaken, in pursuance of Contract No. _____ dated _____ to execute _____ *[name of Contract and brief description of Works]* (hereinafter called "the Contract");

AND WHEREAS it has been stipulated by you in the said Contract that the Contractor shall furnish you with a Bank Guarantee by a recognized bank for the sum specified therein as security for compliance with his obligations in accordance with the Contract;

AND WHEREAS we have agreed to give the Contractor such a Bank Guarantee;

NOW THEREFORE we hereby affirm that we are the Guarantor and responsible to you, on behalf of the Contractor, up to a total of _____ *[amount of guarantee]*[1]_____ *[in words]*, such sum being payable in the types and proportions of currencies in which the Contract Price is payable, and we undertake to pay you, upon your first written demand and without cavil or argument, any sum or sums within the limits of _____ *[amount of guarantee]*[1] as aforesaid without your needing to prove or to show grounds or reasons for your demand for the sum specified therein.

We hereby waive the necessity of your demanding the said debt from the Contractor before presenting us with the demand.

We further agree that no change or addition to or other modification of the terms of the Contract or of the Works to be performed there under or of any of the Contract documents which may be made between you and the Contractor shall in any way release us from any liability under this guarantee, and we hereby waive notice of any such change, addition or modification.

This guarantee shall be valid until …….. (i.e.) 28 days from the date of issue of the certificate of completion of works.

Signature and seal of the guarantor

Name of Bank

Address

Date

1 An amount shall be inserted by the Guarantor, representing additional security for unbalanced Bids, if any and denominated in Indian Rupees.

Annex D

BANK GUARANTEE FOR ADVANCE PAYMENT

To: _____ *[name of Employer]*

_____ *[address of Employer]*

_____*[name of Contract]*

Gentlemen:

In accordance with the provisions of the Conditions of Contract, subclause 49.1 ("Advance Payment") of the above-mentioned Contract, _____ *[name and address of Contractor]* (hereinafter called "the Contractor") shall deposit with _____ *[name of Employer]* a bank guarantee to guarantee his proper and faithful performance under the said Clause of the Contract in an amount of _____ *[amount of guarantee]*[1]_____ *[in words]*.

We, the _____ *[bank or financial institution]*, as instructed by the Contractor, agree unconditionally and irrevocably to guarantee as primary obligator and not as Surety merely, the payment to _____ *[name of Employer]* on his first demand without whatsoever right of objection on our part and without his first claim to the Contractor, in the amount not exceeding _____ [amount of guarantee][1] _____ *[in words]*.

We further agree that no change or addition to or other modification of the terms of the Contract or of Works to be performed there under or of any of the Contract documents which may be made between _____ *[name of Employer]* and the Contractor, shall in any way release us from any liability under this guarantee, and we hereby waive notice of any such change, addition or modification.

This guarantee shall remain valid and in full effect from the date of the advance payment under the Contract until _____ *[name of Employer]* receives full repayment of the same amount from the Contractor.

Yours truly,

Signature and seal:

Name of Bank/Financial Institution:

Address:

Date: