



**TENDER DOCUMENT
(e-Procurement)**

Tender No: IISc/IAP/01/2023

For

SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF 1x320KVA DG SET AND ASSOCIATED ELECTRICAL WORKS AT IAP BUILDING AT IISc, BANGALORE.

Chair, Department of IAP

Department of Instrumentation and Applied Physics

Indian Institute of Science Bangalore – 560012

080-2293-2269

Website : <https://iisc.ac.in/all-tenders/>

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1. Tender Notification
Tender No: IISc/IAP/01/2023

Name of work	SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF 1x320KVA DG SET AND ASSOCIATED ELECTRICAL WORKS AT IAP BUILDING AT IISc, BANGALORE.
Estimated Value of work	Rs. 76,89,625.00
Period of Work Completion	3 Months
Name of the Client	Indian Institute of Science, Bangalore
Address of the Client	The Registrar Indian Institute of Science Bangalore – 560 012 e-mail: office.iap@iisc.ac.in , (IAP Office: 080-2293-2269)
Submission of Tender Document	e-procurement portal- https://eprocure.gov.in/eprocure/app Helpline no: 0120-4001005
Earnest Money to be deposited with the Tender	Rs: 1,53,792.50 (2% of the Estimated Cost)
Last date and Time for online submission (uploading) of tender	28 November 2023 at 15:30 Hrs
Date and Time of opening of Tender (Technical Bid)	29 November 2023 at 15:30 Hrs
Date and Time of opening of Tender (Financial Bid)	Shall be intimated to technically qualified bidders thro' CPP portal.
Pre-bid meeting Date, Time & Venue	13 November 2023 at 14:00 Hrs Pre bid meeting will be held via Teams App. The web link will be forwarded to the intending bidders. They are requested to send the request to the email id: office.iap@iisc.ac.in Queries can be mailed in prior to the same mail.

Notice Inviting Tender

The Registrar, Indian Institute of Science invites tenders in two bids (Technical and Financial) system from eligible Bidders, for **“SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF 1x320KVA DG SET AND ASSOCIATED ELECTRICAL WORKS AT IAP BUILDING AT IISc, BANGALORE.**

Bidders shall not be under a declaration of ineligibility for corrupt and fraudulent practices issued by the Government of India or any State Government of Union of India. (Authorized signatory should provide an undertaking). Tenders from Joint ventures are not acceptable.

- 2.1 All Bidders shall provide the required information accurately and enough as per details in Section 4: Eligibility Criteria
- 2.2 The Tenderer shall upload the valid copies of the documents as mentioned in the Chapter-4 (Eligibility criteria) in technical bid, **failing which the tender will be rejected.** If necessary, bidder shall produce all the original documents for verification.
- 2.3 The work shall be carried out as per the directions of the Chair, Department of IAP.
- 2.4 Blacklisted contractors in State / Central Govt. Departments / BBMP / PSU/ Central PSUs/ Autonomous bodies / Institutions are not eligible to quote, if found such tenders will be rejected.
- 2.5 The successful Bidder shall execute an Agreement within 10 days from the date of Receipt of intimation from this office, The Tender Document will form the part and parcel of the agreement, failing which the tender will deem to be get cancelled.
- 2.6 The material shall be got approved by the Chair, Department of IAP , IISc before execution of the work.
- 2.7 Further details of the work can be obtained from this office.
- 2.8 The rates quoted should reflect all taxes. The bid evaluation will be done inclusive of all Taxes / Cess. / Royalty etc. The statutory levies as per Govt. guidelines will be deducted. The IISc reserves the right to accept / reject any or all the tenders without assigning any reasons.
- 2.9 The work shall be commenced with all manpower, material, machinery & requisite resources within 10 days from the date of work order, failing which it would be presumed that the successful tenderer is not interested in the work and action will be taken to get the work executed through alternate agency at the risk and cost of the former Tenderer.
- 2.10 Conditional tenders will not be accepted and is liable for rejection.
- 2.11 Bidders who meet the specified minimum qualifying criteria, shall be eligible.
- 2.12 Even though the Bidders meet the eligibility criteria mentioned in Section-4 they are subject to be disqualified if they have:
 - Made misleading or false representations in the forms, statements and attachments submitted in proof of the qualification requirements; and/or
 - Record of poor performance such as abandoning the works, not properly completed the contract, inordinate delays in completion, litigation history, or financial failures etc.

2.15 Site visit:

The Bidder at his own responsibility is encouraged to visit and examine the Site of Works and its surroundings and obtain all information that may be necessary for preparing the Tender and entering into a contract for the Works. The cost of visiting the Site shall be at the Bidder's own expense.

- 2.16 The Tender document can be downloaded from e-procurement website: <https://eprocure.gov.in/eprocure/app>. It may be noted that all subsequent notifications, changes and amendments on the project/document would be posted only on the same

website. The bidders are advised to visit e-procurement portal and get familiarized with the procedure for submission of the tenders.

2.17 Content of Tender documents

The bidders should go through the Tender Document and submit online response through e-procurement portal only.

2.18 Amendment of Tender documents

Before the deadline for submission of tenders, the IISc may modify the tender documents by issuing corrigendum / addendum.

Such corrigendum/ addendum thus issued shall be part of the tender documents and shall be published online in e-Procurement portal.

Prospective Bidders will be given reasonable time for submitting the bid by taking the corrigendum/ addendum into account.

2.19 Documents comprising the Tender

The Technical Bid submitted by the Bidder shall contain the documents as follows:

- a) Earnest Money Deposit paid in the specified form as mentioned in the e-Procurement platform.
- b) Qualification Information as per formats to comply the task created in the e-Procurement Portal under General Terms and Conditions and Technical parameters and Documents required from Bidder.
- c) Any other documents / materials required to be completed and submitted by Bidders in accordance with these instructions. The required documents shall be filled in without exception.

The bidder shall submit the hard copies of the documents / credentials which are uploaded in the tender portal. The documents shall reach the designated office within 3 days from the tender opening date.

The Financial bid shall be submitted by the bidder through e-procurement portal only and no hard copy of financial bid should be attached or disclosed.

The contract shall be for category of works / whole works based on the priced Bill of Quantities submitted by the Bidder.

All prevailing duties, taxes, and other levies like CESS/Royalty payable by the contractor under the contract, or for any other cause, shall be included in the rates, prices and total Tender Price submitted by the Bidder.

2.20 Tender validity

Tenders shall remain valid for a period not less than **180 days** after the deadline date for tender submission. A tender valid for a shorter period shall be rejected by the IISc as non-responsive.

In exceptional circumstances, prior to expiry of the original time limit, the IISc. may request that the Bidders may extend the period of validity for a specified additional period. The request and the Bidders' responses shall be made in writing or by email. A Bidder may refuse the request without forfeiting his earnest money deposit. A Bidder agreeing to the request will not be required or permitted to modify his tender but will be required to extend the validity of his earnest money deposit for a period of the extension, and in compliance with Clause 2.18 and 2.22 in all respects.

2.21 Earnest money deposit:

The Bidder shall furnish, as part of his tender, earnest money deposit (EMD). The Bidder has to pay the Earnest Money Deposit (EMD) in the form of Demand draft drawn on "The Registrar, IISc" payable at "Bangalore".

The bidder has to scan the demand draft and submit it with Technical Bid Documents for our reference. The original DDs has to be submitted along with the hard copies of all the

documents in a sealed cover as a pre-qualification bid (Technical bid) which were uploaded through e-procurement portal.

The EMD amount will have to be submitted by the bidder taking into account the following conditions:

- a) The entire amount must be paid in a single transaction.
- b) The earnest money deposit of unsuccessful Bidders will be returned after awarding the contract to the successful bidder.

The earnest money deposit may be forfeited:

- a) If the Bidder withdraws the tender after tender opening during the period of tender validity,
- b) If the Bidder fails within the specified time limit to
 - i) Sign the Agreement; or
 - ii) Furnish the required Security deposit

2.22 Provisions for Micro and Small Enterprises (MSE):

The MSE registered bidder should upload the registration certificate in the CPP portal along with the technical bid documents. The MSE registration to specify manufacturing / service of the tender item (s).

Policy is meant for procurement of only goods produced and services rendered by MSEs. However, traders are excluded from the purview of Public Procurement Policy.

Participating Micro and Small Enterprises quoting price within price band of L1+15%, will qualify to supply a portion of requirement by bringing down price to L1 price in a situation where L1 price is from someone other than a Micro and Small Enterprises.

2.23 Format and signing of Tender

Successful Bidder shall sign all the pages of the tender document as a token of acceptance of all the terms and conditions of the contract.

2.24 Submission of Tenders

Tenders must be submitted on-line in the e-Procurement portal by the Bidder before the notified date and time.

2.25 Deadline for submission of the Tenders

The Bidder shall submit a set of hard copies of all the documents in a sealed cover to IISc required as a pre-qualification bid (Technical bid) which were uploaded through e-procurement portal. In the event of any discrepancy between them, the original uploaded document in e-procurement shall govern.

The IISc may extend the deadline for submission of tenders by issuing an amendment, in which case all rights and obligations of the IISc and the Bidders previously subject to the original deadline will then be subject to the new deadline.

2.26 Late Tenders

In e-procurement system, Bidder shall not be able to submit the bid after the bid submission time and date as the icon or the task in the e-procurement portal will not be available. IISc will not be liable (or) responsible for any delay due to unavailability of the portal and the Internet link.

2.27 Modification and Withdrawal of Tenders

Bidder has all the time to modify and correct or upload any relevant document in the portal till last date and time for Bid submission, as published in the e-procurement portal.

The Bidder may withdraw his tender before the notified last date and time of tender submission. No Tender may be modified after the deadline for submission of Tenders.

Withdrawal or modification of a Tender between the deadline for submission of Tenders and the expiration of the original period of Tender validity specified in Clause 2.21 above may result in the forfeiture of the earnest money deposit.

2.28 Tender Opening:

The IISc will open all the Tenders received through' online mode, in the presence of the Bidders or their representatives who choose to attend on the specified date, time and place specified. In the event of the specified date of Tender opening being declared a holiday for the IISc. The Tenders will be opened at the appointed time and location on the next working day.

The IISc will evaluate and determine whether each tender meets the minimum qualification eligibility criteria.

Bidder to submit all the Original Documents, which are submitted in e-procurement portal, to the IISc for verification at the time of opening of Tender. The IISc will record the Tender opening.

2.29 Process to be confidential.

Information relating to the examination, clarification, evaluation, and comparison of Tenders and recommendations for the award of a contract shall not be disclosed to Bidders or any other persons not officially concerned with such process until the award to the successful Bidder has been announced.

2.30 Clarification of Tenders

To assist in the examination, evaluation, the IISc may, at his discretion, ask any Bidder for clarification of his Tender. The request for clarification and the response shall be in writing or by e-mail along with the section number, page number and subject of clarification, but no change in the price or substance of the Tender shall be sought, offered, or permitted.

Subject to clause 2.31, no Bidder shall contact the IISc on any matter relating to its Tender from the time of the Tender opening to the time the contract is awarded. If the Bidder wishes to bring additional information to the notice of the IISc, he/she should do so in writing.

Any effort by the Bidder to influence the IISc in the Tender evaluation, or contract award decisions may result in the rejection of the Bidders' Tender.

2.31 Examination of Tenders and determination of responsiveness

Prior to the detailed evaluation of Tenders, the IISc will determine whether each Tender (a) meets the eligibility criteria (b) is accompanied by the required earnest money deposit and; (c) is substantially responsive to the requirements of the Tender documents.

A substantially responsive Tender is one which conforms to all the terms, conditions, and specifications of the Tender documents, without material deviation or reservation. A material deviation or reservation is one (a) which affects in any substantial way the scope, quality, or performance of the Works; (b) which limits in any substantial way, inconsistent with the Tender documents, the IISc's rights or the Bidder's obligations under the Contract; or (c) whose rectification would affect unfairly the competitive position of other Bidders presenting substantially responsive Tenders.

If a Tender is not substantially responsive, it will be rejected by the IISc., and may not subsequently be made responsive by correction or withdrawal of the nonconforming deviation or reservation.

2.32 Correction of errors

No corrections to uploaded bid is permitted by the portal. Tenders determined to be substantially responsive will be checked by IISc.

2.33 Evaluation and comparison of Tenders

Opening of the Financial bid will be preceded by the evaluation of the Pre-qualification Offer (Technical bid), vis-a-vis the capability, capacity and credibility of the Bidder. Evaluation of the Prequalification Offer will be done by the Evaluation Committee constituted for the

purpose. After evaluation is completed, all the Bidders who are qualified will be notified and will be intimated at the time of opening of the Financial bid. Financial bid will be opened in the presence of those who choose to be present or even in the absence of any Bidder.

The IISc will evaluate and compare the Tenders as per comparative statement downloaded from e-procurement portal.

In evaluating the Tenders, the IISc. will determine for each Tender the evaluated Tender Price by adjusting the Tender Price as follows:

- a) Making any correction for errors and
- b) Making appropriate adjustments to reflect discounts or other price modifications offered

The IISc reserves the right to accept or reject any variation, deviation, or alternative offer. Variations, deviations, and alternative offers and other factors which are in excess of the requirements of the Tender documents or otherwise result in unsolicited benefits for the IISc shall not be taken into account in Tender evaluation.

2.34 Negotiations

The Bidder though technically qualified and whose financial offer is the lowest, fails to convince the Tender Evaluation Committee of his capability, capacity, credibility, his offer may be reviewed, and the Bidder intimated accordingly. In such case, the Bidder, who has quoted the lowest price, may be considered and his price may be negotiated as advised by the tender committee.

2.35 Award criteria

Subject to Clause 2.36, the IISc will award the Contract to the Bidder whose Tender has been determined to be substantially responsive to the Tender documents and who has offered the lowest evaluated Tender Price. After technical evaluation the technically qualified bidders will be considered for opening of the financial bids provided that such Bidder has been determined to be eligible in accordance with the provisions of this tender document and subsequent technical clarifications offered by the responsive bidders.

2.36 Right to accept any Tender and to reject any or all Tenders

Notwithstanding Clause 2.35, the IISc reserves the right to accept or reject any Tender, and to cancel the Tender process and reject all Tenders, at any time prior to the award of Contract, without thereby incurring any liability to the affected Bidder or Bidders or any obligation to inform the affected Bidder or Bidders of the grounds for the IISc's action.

2.37 Notification of award and signing of Agreement

The Bidder whose Tender has been accepted will be notified of the award by the IISc. prior to expiration of the Tender validity period by e-mail or confirmed by letter. This letter (hereinafter and in the Conditions of Contract called the "Letter of Acceptance") will state the sum that the IISc. will pay the Contractor in consideration of the execution, completion, and maintenance of the Works by the Contractor as prescribed by the Contract (hereinafter and in the Contract called the "Contract Price").

The notification of award will constitute the formation of the Contract, subject only to the furnishing of a performance security in accordance with the provisions of clause 2.39

The Agreement will incorporate all agreements between the IISc and the successful Bidder /Bidders. It will be kept ready for signature of the successful Bidder in the office of IISc. Following the notification of award along with the Letter of intent. The successful Bidder will sign the Agreement and deliver it to the IISc.

Upon the furnishing by the successful Bidder of the Security deposit, the IISc will issue formal work order.

The successful bidder is required to sign an agreement for the due fulfilment of the contract and start the work immediately on of the acceptance of his tender. A draft of the Articles of

the Agreement is enclosed. The Earnest Money will be forfeited and at the absolute disposal of the Employer if the Contractor defaults from signing the Agreement of in starting the work.

2.38 Security deposit (SD)

Further percentage on the running bills and final bill in addition to Earnest Money Deposit shall be levied from the contractor. When the SD deducted from R.A Bills of the contractor @ **5.5%** of the bill amount exceeds Rs.1.00 Lakh, the amount in excess of Rs. 1.00 Lakh may, at the request of the bidder, be released to him against the production of the bank guarantee issued from a Nationalized/Scheduled bank only for an equal amount in the prescribed form. The bank guarantee should be valid till the completion of the defect liability period.

If the security deposit is provided by the successful bidder in the form of a Bank Guarantee, it shall be issued either by a Nationalized/Scheduled bank.

Failure of the successful Bidder to comply with the requirements of clause 2.38 shall constitute sufficient grounds for cancellation of the award and forfeiture of the earnest money deposit.

2.39 Corrupt or Fraudulent practices

The IISc requires that the Bidders observe the highest standard of ethics during the procurement and execution of such contracts. In pursuance of this policy, IISc.

- a) will reject a proposal for award if it determines that the Bidder recommended for award has engaged in corrupt or fraudulent practices in competing for the contract in question.
- b) will declare a firm ineligible, either indefinitely or for a stated period of time, to be awarded a IISc contract if it at any time determines that the firm has engaged in corrupt or fraudulent practices in competing for, or in executing, a IISc contract.

2.40 Payment Terms

For Civil works: Monthly running account bills.

For Electrical works: 80% against the supply of material and 10% after installation and 10% after testing and commissioning, subject to the other provisions of the tender document.

2.41 Work done as a sub- contractor under a prime contractor will not be considered for qualification. **“Prime Contractor”** means a firm that performs a construction work itself and that the work is directly entrusted to the firm by the owner/ government/ local body/ quasi government/ Government undertaking bodies.

2.42 Make in India

Only “Class-I and Class-II local supplier will be eligible to bid notified vide (DPIIT) Notification No. P-45021/2/2017-PP (BE-II) dated 4th June 2020 amended from time to time.

3. Declaration of Tenderer

Name of Work: SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF
1x320KVA DG SET AND ASSOCIATED ELECTRICAL WORKS AT IAP BUILDING AT IISc,
BANGALORE.

- 3.1 I/We, declare that specifications, plans, designs and conditions of contract on which the rates have been quoted are completely studied by me/us before submitting this tender.
- 3.2 I/We declare that I/We have inspected the work spot and have made myself/ourselves thoroughly conversant and satisfied as regards the field conditions prevalent there, regarding the materials, labour and the particulars of various leads with which the materials required to be brought for the work.
- 3.3 I/We, declare that the rates quoted for items of works for which now tenders are called for are inclusive of leads with which I/We propose to bring the materials. I/We will not have any claims for higher leads, and my/our quoted rates are with all leads and lifts etc.,
- 3.4 I/We, declare that the rates tendered by me/us for this work have not been witnessed by any other contractor/s who has/have tendered for this work.
- 3.5 I/We, declare that I/We, have understood all the conditions mentioned above and also the specifications stipulated in tender condition either by going through myself/ourselves or by getting translated into my/our own mother tongue.

4 Eligibility Criteria

Technical Criteria:

4.1 – Any specialised firms/ company registered under KPWD /CPWD/ Railways/ MES/ Central PSUs/ or any Government department of class I / Class A Electrical contractors are eligible to apply.

4.2 The Bidder should have Experience of having a successfully completed either of the following works:

(a) Three (03) completed works each costing not less than **40%** (forty percent) of the estimated cost i.e. **Rs. 30,75,850**

(Or)

(b) Two (02) completed works each costing not less than **60%** (Sixty percent) of the estimated cost i.e. **Rs.46,13,775**

(Or)

(c) One (01) completed work costing not less than **80%** (eighty percent) of the estimated cost i.e. **Rs.61,51,700**

Note: The Experience certificate / work order should be in the same registered name as per Clause 4.1 and not as a joint venture.

The works should have been completed in last seven (7) consecutive years.

Financial Criteria

4.3 The average annual financial gross turnover should be **30%** of estimated cost in that last five years.

4.4 The minimum annual financial turnover for the two consecutive years should be **30%** of estimated cost.

4.5 The bidder should submit the **solvency certificate** from the bank for 30% of estimated cost. The Solvency should not be more than Six-month-Old ending last day of the month, previous to the month in which tender is invited.

4.6 The average net worth of the bidder as of **2022-23** should be not less than 25% of estimated cost. Necessary certificate by the Chartered Accountant shall be submitted.

4.7 The bidder should have not been blacklisted by any State / Central Govt. Departments / BBMP / PSU/ Central PSUs/ Autonomous bodies / Institutions.

4.8 The bidding capacity of the bidder should be 75% or more of the estimated cost.

The bidder should possess the bidding capacity as calculated by the following formula.

Available bid capacity = $A \times M \times N - B$, where

A = Maximum value of engineering (Civil/ Electrical/ Mechanical as relevant to work being procured) works executed in any one year during the last five years (updated at the current price level), taking into account the completed as well as works in progress.

M = Multiplier Factor (usually 1.5)

N = Number of years prescribed for completion of the work in question.

B = Value (updated at the current price level) of the existing commitments and ongoing works to be completed in the next 'N' years.

4.9 Information on works for which tenders have been submitted and ongoing works as on the date of this Tender.

(A) Existing commitments and on-going works:

Description of work	Place & State	Contract number & date	Name & address of the customer	Value of Contract in Lakhs	Stipulated period of completion	Value of work remaining to be completed in Lakhs	Anticipated date of completion
1	2	3	4	5	6	7	8

[Details to be furnished with necessary work order signed from concerned project in-charge not below the rank of Executive Engineer or Competent Authority. The Work order/Testimonials will be verified, if required]

(B) Works for which Tenders already submitted:

Description of work	Place & State	Name & address of the customer	Estimated value of work in lakhs	Stipulated period of completion	Date when decision is expected	Remark if any
1	2	3	4	5	6	7

4.10 Certificate from Chartered Account stating turn over for the last five financial years is also to be uploaded.

Sl.No	Year	Turn over amount	Remark
1	2018-19		
2	2019-20		
3	2020-21		
4	2021-22		
5	2022-23		

5 Special Conditions

- 5.1.1 Establishment of Labor Camp is strictly prohibited in the premises of Indian Institute of Science Campus. Essential labor for round the clock work at site will be allowed with prior permission of Chair, Department of IAP .
- 5.1.2 Any damage to the existing service lines during execution of work shall be rectified by the bidder at his own cost and risk.
- 5.1.3 Debris shall be disposed-off to an undisputed place of Bangalore outskirts as per the direction of the Chair, Department of IAP, whenever required.
- 5.1.4 Labor employed at the site will not be allowed to use cellphone while working at the site.
- 5.1.5 Supply of Electricity: - Electricity required for construction shall be arranged by the contractor himself. Electricity if supplied to the contractor by the Institute will be metered and amount will be recovered in the Bills as per actual at rates fixed by the Institute. Supply of electricity from the Institute is not mandatory. Non-supply of electricity by the Institute cannot be held as reason for shortfall in progress.
- 5.1.6 Water supply: The Contractor has to make his own arrangement for water supply. However, if water supply to the site at one convenient point is made available by the Institute, the charges for the consumption of water will be borne by the Contractor at 1.50% of the value of the work.
- 5.2 Schedule of Quantities (Bill of Quantities) is attached herewith. It should, however, be clearly understood that these quantities are liable to alterations by omission, addition or variation, at the discretion of the Architects/Chair, Department of IAP .
- 5.3 The drawings together with specifications and conditions of contract are enclosed. These should be studied carefully by the intending tenderers. In the absence of specifications for any item of work, material or ingredient in the specifications, CPWD/MoRTH specifications shall be followed and in the absence of specification for any item, materials are ingredient shall be fixed in all respects in accordance with the instructions and requirements of the Chair, Department of IAP , the work will be the best of the kind.
- 5.4 The tenderer is expected to inspect the site and acquaint himself with the local conditions and will be deemed to have so done before submitting the tender.
- 5.5 The rates quoted shall be for finished work and shall include for all necessary incidental work. Sales or any other tax on materials in respect of this contract will be payable by the Contractor. The Contractors cannot presume any details regarding the contract.
- 5.6 It is entirely the responsibility of the Contractor to arrange for and provide all materials required for successful completion of the work except such special materials that may be supplied if any.
- 5.7 Tenders determined to be substantially responsive will be checked by IISc for any arithmetic errors. Errors will be corrected by the IISc as follows.
- 5.8 Where there is discrepancy between the rates in figures and in words, the lower of the two will be governed.
- 5.9 Where there is a discrepancy between the unit rate and the line-item total resulting from multiplying the unit rate by the quantity, the unit rate as quoted will be governed.
- 5.10 Where there is a discrepancy in entries of unit rate between the Original and Duplicate, the lower will govern.
- 5.11 The Contractor should make his own arrangements to cover the all-round construction area, by providing polyester net/polythene sheet/barricading to avoid inconvenience to other surrounding departments, as directed by the Chair, Department of IAP of the work.
- 5.12 The debris arise during the period of construction will have to be cleared then and there to keep the surroundings clean and tidy. Such debris shall, if not cleared, be cleared at contractor's risk and cost.

5.13 The contractor shall vacate the campus premises with all his men/ materials immediately after completion of the project.

6. GENERAL CONDITIONS

6.1 DEFINITIONS OF TERMS

In constituting these conditions and specifications, the following expressions shall have the meaning, therein assigned to them unless there is something repugnant in the subject of context in consisting with such meanings.

6.2 Institute shall mean the “Indian Institute of Science, Bangalore”.

6.3 “Office” shall refer to the Office of the Chair, Department of IAP .

6.4 “Contractors” shall mean the tenderer whether a firm, registered company, partnership or any individual whose tender has been accepted by Institute or by an Officer (duly authorized in this behalf) on behalf of the Institute and who has entered into agreement with Institute for due fulfillment of the contract and shall include the legal representatives, successors, heirs and assignees of the tenderer.

6.5 “Engineer” shall mean the “Chair, Department of IAP ”, Indian Institute of Science, Bangalore or such other officer as may be appointed to call as the Chair, Department of IAP for the purpose of the contract and shall also mean and include other officers of equivalent rank directly in charge of the work or any part thereof under administrative control of the Director, IISc, Bangalore-12.

6.6 When the Engineer is named as final authority, it includes all the above-mentioned officers and, in such matters, the contractors shall have the right of appeal against the orders up to the Director, IISc, Bangalore, whose decision shall be final and legally binding on all the parties concerned.

6.7 The Chair, Department of IAP named as final authority for any decision taken, shall mean only the Director, IISc, Bangalore or his duly authorized assistant.

6.8 The Engineer in charge shall mean the Chair, Department of IAP directly in charge of the work or his duly authorized assistants.

6.9 Plant shall mean and include any or all plants, machinery, tools and other implements of all description necessary for the execution of the work in a safe and workmen like manner.

6.10 The expression “Works” where used in these conditions shall unless thereby something in the subject or contract repayment to such construction, be construed to mean the work or the works constructed to be executed under or virtue of the contract whether temporary or permanent and whether original, altered, substituted or additional.

6.11 “Contract and contract document” shall mean and include the notice inviting tenders, proceedings of the pre bid meeting, the stamped agreement, conditions of contract, specifications and Schedules ‘B’, drawings and all other connected documents with tender schedule.

6.12 “Specifications” shall mean the specifications annexed and where these are not specifically mentioned shall be as may be detailed and necessary due to particular nature of work as approved by the Chair, Department of IAP .

6.13 “Site” shall mean and include all the area in which operations in respect of the work are carried out. This shall also include materials stacking yards and the area where temporary structures are put up for installing any machinery etc.

6.14 “Tests” shall mean such tests as are required to be carried out either by the contractor or by the Chair, Department of IAP from time to time on completion as detailed in the specifications before the work is certified as being satisfactory and is taken over by the Chair, Department of IAP .

6.15 “Month” shall mean a Calendar month.

6.16 “Prime contractor” means a firm that performs construction work itself and that the work is directly entrusted to the firm by the owner / Government / local body / Quasi

Government / Government undertaking. Words used in singular shall also include the plural & vice-versa where the context so demands.

6.17 CONTRACTOR TO INSPECT SITE:

The contractor shall visit and examine the construction site and satisfy himself as to the nature of the existing roads or other means of communications, the character of the soil for the excavations, the extent and magnitude of the work and facilities for obtaining materials and shall obtain generally his own information on all matters affecting the execution of the work. No extra for charges made in consequence of any misunderstanding or incorrect information on any of these points or on the grounds of insufficient description will be allowed. All expenses incurred by the contractor in connection with obtaining information for submitting this tender including his visits to the site or efforts in compiling the tender shall be borne by the Tenderer and no claims for reimbursement thereof shall be entertained. .

6.18 ACCESS TO SITE:

The Contractor is to include in his rates for forming access to the site, with all temporary roads and gangways required for the works.

6.19 SETTING OUT:

The Contractor shall set out the building in accordance with the plans. All grid/center lines shall be pegged out to the satisfaction of the Engineer. The Contractor shall be responsible for the correctness of the lining out and any inaccuracies are to be rectified at his own expense. He will be responsible for taking ground levels of the site before setting out and recording them without any extra charge.

The Contractor shall construct and maintain proper benchmark at the intersection of all main walls, columns, etc., in order that the lines and levels may be accurately checked at all times.

6.20 TREASURE TROVE:

Should any treasure, fossils, minerals, or works of art of antique interest be found during excavation or while carrying out the works, the Contractor shall give immediate notice to the Engineer of any such discovery and shall make over such finds to the Institute.

6.21 ACCESS FOR INSPECTION:

The Contractor is to provide at all times during the progress of the works and the maintenance period proper means of access, with ladders, gangways etc., and the necessary attendants to move and adapt as directed for the inspection of measurement of the works by the Engineer or their representatives.

6.22 ATTENDANCE UPON ALL TRADERS:

The Contractor shall be required to permit tradesmen/ Specialized agencies appointed by the employer to execute works like water supply, Sanitary, Electrical installation, lifts, air conditioning, hardware and other specialized works. The contractor shall also permit the above mentioned agencies to use his scaffolding and retain the scaffolding till such works are completed. The rates quoted by the contractor shall be inclusive of the above facility.

6.23 GATEKEEPER AND WATCHMAN:

The Contractor from the time of being placed in possession of the site must make arrangements for watching, lighting and protecting the work, all materials, workmen and the public by round the clock on all days including Sundays and holidays at his own risk and cost.

6.24 STORAGE OF MATERIALS:

The Contractor shall provide for necessary sheds of adequate dimension for storage and protection of materials like cement, steel, lime, timber and such other materials including tools and equipment which are likely to deteriorate by the action of sun, wind, rain or other natural causes due to exposure in the open. The cement storage site shall be leak proof and shall hold at least 4 months requirement. All such sheds shall be cleared away and the whole area left in good order on completion of the contract to the satisfaction of the Engineer.

All materials which are stored on the site such as bricks, aggregates etc., shall be stacked in such a manner as to facilitate rapid and easy checking of quantities of such materials.

6.25 COST OF TRANSPORTING:

The Contractor shall allow in his cost for all transporting, unloading, stacking and storing of supplies of goods and materials for this work on the site and in the places approved from time to time by the Engineer. The Contractor shall allow in his price for transport of all materials controlled or otherwise to the site.

6.26 W.C. AND SANITARY ACCOMMODATION AND OFFICE ACCESSORIES AND ACCOMMODATION:

The contractor shall provide at his own cost and expense adequate closet and sanitary accommodation complying in every respect to the rules and regulations in force of the local authorities and other public bodies, for his workmen, for the workmen of nominated sub-contractors and other contractors / specified agencies working in the building, the Chair, Department of IAP of works and other Institute agents connected with this building project and maintain the same in good working order.

The Contractor shall also provide at his own expense adequate office accommodation for the Chair, Department of IAP of works preferably contiguous to his office and shall maintain the same in a satisfactory condition and shall provide light, fan and attendant etc., for the same and shall remove them after completion of the works. He shall arrange to provide latest survey Instruments and at all times maintain the same in good working order at site, to enable the Chair, Department of IAP of works or other representative of Institute to check the lines and levels of the work.

6.27 MATERIALS:

Materials shall be of approved quality and the best of their kind available and shall conform to I.S. specifications. The Contractor shall order all the materials required for the execution of work as early as necessary and ensure that such materials are on site well ahead of requirement for use in the work. The work-involved calls for high standard of workmanship combined with speed and to the entire satisfaction of the Chair, Department of IAP.

6.28 TO ASCERTAIN FROM CONTRACTORS FOR THE OTHER TRADES.

The Contractor shall ascertain from all agencies / Sub-contractors all particulars relating to their work with regard to the order of its execution and the position in which chases, holes and similar items will be required; before the work is taken in hand as no patch works shall be allowed for cutting away work already executed in consequence of any neglect to ascertain these particulars beforehand.

6.29 SAMPLE APPROVAL:

Before ordering materials, the Contractor shall get the samples approved from the Chair, Department of IAP well in time.

6.30 TESTING OF WORK AND MATERIAL:

The Contractor shall, if required by the Engineer arrange to test materials and/or portions of the works at his own cost in order to prove their soundness and efficiency. If after any such test the work or portion of works is found in the opinion of the Engineer to be defective or unsound, the Contractor shall pull down and redo the same at his own cost. Defective materials shall immediately be removed from the site at his own cost.

6.31 FOREMAN AND TRADESMEN:

All Tradesmen shall be experienced men properly equipped with suitable tools for carrying out the work of carpentry and joinery and other specialist trades in a first-class manner and where the Engineer deem necessary, the Contractor shall provide such tools which are considered necessary for carrying out of the work in a proper manner.

All such tradesmen shall work under an experienced and properly trained Foreman, who shall be capable of reading and understanding all drawings, pertaining to this work and the contractor shall also comply with other conditions set out in different clauses of the conditions of the contract.

6.32 PROJECT PROGRAMME OF WORKS AND WEEKLY PROGRESS REPORT:

a) Organization chart:

The contractor should submit the proposed organization chart for the project including the details of staff to be deployed full time on site to the approval of Chair, Department of IAP, where the CHAIR, DEPARTMENT OF IAP raises any objection to either the qualification or experience or required professionalism of any of the staff deployed by the contractor, the same shall be replaced by suitably competent person to the approval of CHAIR, DEPARTMENT OF IAP within 7 days.

b) Program chart:

The Contractor shall furnish the detailed programme of execution for timely completion of the project (inclusive of rainy season). Such a detailed program of works prepared using Industry Standard Scheduling Software like MS Project 2000 or Primavera shall be submitted by the Contractor within ten days after receiving communication of tender acceptance. As per the detailed drawings and schedule of quantities; the contractor shall work out concurrent activities with start and finish times, integrating of all tasks with interface and milestone event drawn and to evaluate for reduction in total project duration through improved over lapping of tasks and activities where feasible. The Contractor shall plan for improved planning and scheduling of activities and forecasting of resource requirements, ability to use the computer effectively to produce timely valid information for Project Management purpose. Accordingly, PERT; CPM Networking shall be drawn. GANNT charts shall also be furnished. The Contractor shall also furnish necessary particulars to the Chair, Department of IAP of works for compiling weekly progress reports in the form furnished by the Institute. A monthly financial programme shall also be submitted.

6.33 CLEARING OF SITE:

The contractor shall after completion of the work clear the site of all debris and left-over materials at his own expense to the entire satisfaction of the Institute. The same should be carted out of the Institute at his own cost.

The contractor shall also clear the labour camp/RMC plant of all types of permanent/temporary structures, soak pits, sump, septic tanks or any other such installations as identified by the CHAIR, DEPARTMENT OF IAP to the entire satisfaction of the Institute. The debris/excess stuff shall be carted out of the Institute at his own risk and cost.

6.34 PHOTOGRAPHS:

The Contractor shall at his own expense supply to the Institute photographs in duplicate copies not less than 25 cm x 20 cm. (10" x 8") along with soft copy, of the works taken from all the portions of the building at intervals of not more than one week during the progress of the work, or at every important stage of construction, as directed by the Chair, Department of IAP of work.

6.35 PROVISION OF NOTICE BOARD:

The Contractor shall provide a notice board on proper supports 3m x 2m (10' x 6') in a position approved by the Engineer. He shall allow for painting and lettering stating name of work; name of Architects; Structural Consultants; General Contractor and Sub-Contractors. All letters except that of the name of the work shall be in letters not exceeding 5 cm. in height and all to the approval of the Engineer. Proper barricading shall be erected all-round the site before commencement of the work.

6.36 PROTECTION:

The contractor shall properly cover up and protect all work throughout the duration of work until completion, particularly masonry, moldings, steps, terrazzo or floor finishes, staircases

and balustrades, doors and window frames, plaster angles corners lighting and sanitary fittings, glass, paint work and all finishing.

6.37 PREPARATION OF BUILDING FOR OCCUPATION AND USE ON COMPLETION:

The whole of the work shall be thoroughly inspected by the Contractors and all deficiencies and defects set right. On completion of such inspection, the Contractor shall inform the Engineer in writing that he has finished the work and it is ready for the Engineer's inspection.

On completion, the Contractor shall clean all windows and doors and all glass panes, including cleaning of all floors, staircases and every part of the building including oiling of all hardware. He will leave the entire building neat and clean and ready for immediate occupation and to the satisfaction of the Engineer.

6.38 The tenderer must understand clearly that the rates quoted are for complete items of works including charges due to materials, labour, all lead and lift, HOM of plant and machineries, scaffolding, supervision, service works, power, all types of royalties, sales tax, labor cess, all types of taxes payable to the Govt and local bodies, overhead charges, etc., and includes all extra to cover the cost of night work if and when required and no claim for additional payment beyond the prices or rates quoted will be entertained for payment subsequently towards any claims on the grounds of misrepresentation or on point that he was supplied with information given by promise or guarantee by the Institute, or by any person whether member of or employee in Institute will not be entertained. Failure on the contractor's part to obtain all necessary information for the purpose of submitting his tender and quoting rates therein shall not absolve him of any risk or liability consequent upon the submission for tender.

6.39 All the works shall be carried out as per specifications prescribed by BIS, National Building code, CPWD / KPWD specifications, relevant IS codes or as directed by the Chair, Department of IAP in the absence thereof.

6.40 In case there is any conflict in the specifications and drawings the decision of the Chair, Department of IAP shall be final and binding on the contractor.

6.41 All the materials shall be got approved by the Chair, Department of IAP before use.

6.42 The rates quoted for in individual items shall include labour, cost of materials conveyance and lift charges for all materials required for successful completion of work and all taxes payable to any authority as per rules in vogue from time to time.

6.43 Necessary pillars shall be constructed by the Contractor for benchmark at no extra cost as directed by the Chair, Department of IAP.

6.44 Site order book shall be maintained in the work spot and the contractor shall sign in the order book in token of having gone through the instructions issued by the inspecting officers and carryout the instructions promptly.

6.45 In the work spot the contractor shall provide suitable temporary office with a covered area of 1000 sq.ft matching that of the Contractor's office with necessary furniture for use of Institute as directed by the Chair, Department of IAP for which no extra payment or compensation shall be claimed. The furniture however will after completion of the work, be the property of the contractor and shall remove them at the close of the contract.

6.46 The contractor shall take all precautions against damage from accident. No compensation will be allowed to the contractors for their tools and plant materials lost or damaged from any cause. The contractor is liable to make good the structure or plants damaged by any other cause at his own cost. The Institute will not pay the contractor for corrections or repairing any damaged portion of work done during construction.

6.47 The contractor shall employ adequate no. of skilled & unskilled labours required for successful timely execution of work. He shall submit daily reports to the Engineer in charge regarding the strength of labour employed both skilled and unskilled.

6.48 The contractor shall furnish weekly medical report showing number of persons ill or

incapacitated and nature of their illness, to the Chair, Department of IAP.

- 6.49 The contractor shall furnish a report of any accident which may occur, within 24 hours of its occurrence to the Chair, Department of IAP.
- 6.50 The contractor shall keep on site of work a qualified Engineer as required as per rules of registration as their authorized representative who will receive all instructions given from the Institute officers. The representative shall have permanent office at site of work where communications can be sent and notices can be served by the Chair, Department of IAP throughout the duration of work.
- 6.51 Prior approval should be obtained from the Chair, Department of IAP for the construction and location of the temporary site office, store sheds and labour quarters, within the premises of the site, similarly the contractor shall get approval of the Chair, Department of IAP regarding the areas to be utilized for stacking the materials etc., for the work.
- 6.52 Reference to detailed specifications are indicated against the items contained in the Schedule 'B', in case there is any item for which no detailed specifications is indicated, it shall be carried out as per specifications intimated by the Chair, Department of IAP. The contractor shall not be entitled for any extra claims or compensation on this account. In case of additional or extra items not covered by the Schedule 'B', the contractor shall carry out the work as per specifications intimated by the Chair, Department of IAP.
- 6.53 The Engineer shall have the right to direct the contractor to progress the various items of works in the manner prescribed by him.
- 6.54 Failure to adhere to any of the above will be sufficient cause for taking action under clause (2) or clause (3) or both along with their sub clauses of conditions of contract.
- 6.55 Contractor shall make arrangements at his own cost to construct approach road for conveyance of materials etc., preferably on the alignment accepted by the Institute to procure land etc. for housing, staff and workmen near the site of the work.
- 6.56 It is not possible for the Institute to release any quarry (metal and sand etc.) for this work. The contractor has to make his own arrangements. No claim regarding leads and lift will be accepted.
- 6.57 The contractor has to make his own arrangements in regard to power supply and water required for construction and drinking water facilities.
- 6.58 Tool, Tax, Octroi, Royalty for collecting earth, gravel, sand, stone, excise duty, sales tax, labour cess or any other tax payable on account of this contract shall be met by Contractor.
- 6.59 The contractor shall be entirely responsible for sufficiency of the scaffolding, timbering, machinery, tools, implement and generally of all means used for fulfillment of the work. Whether such means may not be approved or recommended by the Chair, Department of IAP, the contractor must accept at his own cost all risks of accidents or damages.
- 6.60 After completion of the work, service drawings as per actual execution in Auto CAD should be submitted by the agency for services such as Electrical, Water supply and Sanitary before submission of final bill.
- 6.61 Extra care shall be taken regarding the laborers by providing waist belt, Helmets scaffolding etc. at your own cost and supervision and shall be carried out as per the directions of the Chair, Department of IAP.
- 6.62 **WORKMANSHIP AND LABOUR:**
The quality of all materials, tools, operators and labour used on the work shall be subject to the approval of the Chair, Department of IAP or his authorized agent who shall have power to order immediate removal by the contractor any of the above that may not meet with his

approval.

In case of failure to carry out orders of removal within the time specified, the Chair, Department of IAP or his authorized agents shall get the same removed at the contractor's expense.

6.63 KEEPING DRY AND PUMPING:

Unless otherwise provided for in the contract, the contractor will at his own expense keep all portions of the work free from undue water, whether due to springs, soakage or inclement weather and will use his own implements and machinery for this purpose.

6.64 BAILING OUT OR DEWATERING:

Adequate arrangements shall be made by the contractor for dewatering the foundation trenches and excavation and keeping the same dry while the masonry or concrete work is in progress and till the Chair, Department of IAP considers that the mortar is sufficiently set.

The rates for the various items include the cost of shoring, strutting, coffer dam, channels or other incidental devices necessary for diverting the water met within foundation. The cofferdam and the diversion channel shall, however, be maintained in good and working condition till the completion of the structure or until such time, as in the opinion of the Chair, Department of IAP till the coffer dam or/and diversion channel is no longer necessary. Bailing out water necessitated by the failure to maintain the cofferdam and diversion channel will not be paid for separately under any conditions.

No extra rate shall be paid for removing any stuff outside, which might find excess due to rains or for reasons whatsoever from the sides or bottom of the foundation trenches and excavation or from also where when the dewatering operations are in progress.

The contractor must assure himself by making the necessary investigation regarding the depths to which foundations are likely to go. If any work is ordered to be done beyond dimensions or deviations marked in the drawings, no extra rate other than the rate for the Undertaking of work quoted by the contractor be paid.

The contractor will make himself arrangements for necessary plant such as Pump, engines, and other materials required in this connection.

6.65 FACILITIES FOR INSPECTION:

The work at all times be open for inspection by the Chair, Department of IAP or his duly authorized Assistant and the contractor shall arrange easy access to every part of the work and shall provide such ladders, scaffolding and lifts for this purpose as necessary at his own cost.

6.66 DELIVERY OF WORKS:

The final bill will be prepared after the work is handed over to the Chair, Department of IAP or his duly authorized representative in a thoroughly complete, clean, sound and workman like state.

6.67 EXTRA ITEM:

Whenever the contractor is ordered by the Chair, Department of IAP or the person duly authorized by him to execute any item of work, which is not in his tender, it shall be the contractors duty to see that the order is duly entered in the order book on the work, unless a separate communication to this effect is received by him, it shall be his duty to get the rates sanctioned for the item by the appropriate authority. For any extra item of work not thus ordered either by any entry in the order book or separate communication, the contractor shall have no claim to payment.

6.68 COMPLIANCE WITH BYELAWS AND PROTECTIONS AGAINST ACCIDENTS, ETC:

Contractor is responsible for complying with all acts, bye-laws, Municipal and other regulations for the provision and maintenance of lights during nights, barricading, providing

any other protection that may be necessary and will be liable for all claims that may arise from accidents of nuisance caused by works.

6.69 DISPUTES:

Disputes on the points between the Chair, Department of IAP and the contractors shall be referred to the Department of IAP, whose decision shall be given in writing and shall be final and binding on the contractor.

6.70 TOOLS ETC.,

The contractor shall unless otherwise specially stated in the contract, be responsible for the payment of all import duties, octroi duties, sales tax, quarry fees etc., on all materials and articles brought to site.

6.71 CLEARANCE OF SITE:

The site described and shown on the plan is to be cleared of all obstruction, loose stones and materials, rubbish of all kinds of shrubs and brushwood, the roots being entirely removed.

The products of the cleaning to be stacked in such a place and manner as ordered by the Chair, Department of IAP.

In jungle clearing all trees not marked for preservation, jungle wood and brushwood shall be cut down and their roots entirely removed up. All wood and materials from the clearings will be property of the Institute and should be stacked as the Engineer in charge directs. Trees shall not be cut without prior permission of the Institute.

All holes or hollow, whether originally existing or produced by digging up roots, shall be carefully filled up with earth well rammed to the required density and leveled off, as may be directed.

6.72 LINE OUT:

The contractor shall use necessary measuring instruments, theodolite, workstation and other materials like flags, strings, pegs, nails, pillars, paints, etc., and also Labour required for ascertaining of the initial ground levels at the different stages of excavation and construction of masonry or other structures at his own cost. Any dispute in regard to the accuracy of the measuring instruments and the device shall be subjected to the final decision of the Engineer-in charge of the work.

6.73 MACHINERY: All the machinery that will be employed on the work shall be approved, efficient and thoroughly, complying with the specifications of each machine or parts and shall have been manufactured by reputed and qualified firms. All the machinery employed on the work shall be open to inspection at all working hours, by the Chair, Department of IAP and any defect shall be rectified, repaired, replaced, renewed or remodeled so that its performance in the opinion of the Chair, Department of IAP is satisfactory. Any defective part of the machine, which requires replacement, shall be promptly replaced, failing which the Chair, Department of IAP, shall be at liberty to cause the defective fittings removed from site of work at the cost of the contractor.

6.74 OPERATORS: The machines shall be in charge of efficient and trained operators, which terms shall include drivers, mechanics or other personnel who are actually operating the machines. The Engineer in-charge has the right to test operators, etc., as deemed necessary by him for the class of machinery, which he is to operate and shall drive out such of the operators who fail in the tests.

6.75 SAFETY PRECAUTION: All reasonable safety precautions for the safety of workers shall be taken. The contractors shall be responsible for the maintenance of all regulations under the Factory Act, workmen's compensation. Minimum wages act and other act for the safety and welfare of the workers employed by him. In addition, the contractors shall provide adequate protection to all workers employed by him against natural elements such as rain, sun, wind etc., during working hours and provide free, pure protected drinking water during working

hours.

6.76 NON-STOP OPERATION:

In the continuous or non-stop operations suitable shifts or working hours for each shift shall be maintained. The contractor is liable for all reasonable extra payment for all extra hours of work done by the workers employed by him.

6.77 TESTS:

The Chair, Department of IAP or his authorized representatives shall have full scope and right of entry at all times to examine and test, measure, count, weigh, take bores, or in any manner satisfy himself that the work executed is according to the specifications and required strength. Any portion of work got disturbed, during such tests, shall be made good by the contractors, without extra cost. The Engineer in charge has the right to change the design proportions, mixes within reasonable limits to ensure requisite strength of the structure. Laboratory for requisite tests shall be established by the Contractor at site only, at his own cost.

6.78 ADEQUATE ARRANGEMENTS TO ACHIEVE PROGRESS:

The Chair, Department of IAP shall have the right to advise the contractor on the strength, quality and nature of labour to be employed on work to maintain progress on the work, commensurate with the strength of structure. Similarly, he shall advise the contractor on the nature and adequacy of the machinery that are required on the work.

6.79 DETAILS TO BE FURNISHED FOR ENGAGING SUB-CONTRACTOR FOR SPECIALISED WORKS:

The tenderer shall be required to engage agencies of standing and repute who have experience in executing works of similar nature and magnitude. Such specialized trades cover electrical installation (HT/LT), Lifts, A.C. sanitary and water supply works, firefighting installation and any such other trades as may be directed by the Institute. The successful tenderer shall be required to engage Sub-agencies for such specialized trades only with the prior written approval of the Chair, Department of IAP after giving an opportunity to the Chair, Department of IAP to evaluate the experience and competence of the sub-agency for each trade. In order to ensure implementation of this requirement, it is required that each tenderer shall submit along with his tender, names of three sub-agencies for each trade amongst whom tenderer proposes to engage if successful in the tender. Along with names of sub-agencies for each trade, the tenderer shall furnish in detail the following particulars in respect of each sub-agency in the format furnished in Technical Bid.

All such information concerning sub-agencies shall be furnished along with the tender. Any tender containing insufficient information in this regard is liable for rejection. In the event of non-compliance of this requirement, the Institute shall have the right to nominate any sub-agency who in their opinion meets the selection criteria. In such event it would be incumbent on the successful tenderer, to accept and appoint then nominated sub-agency without demur and on this account, if there is any additional cost, such cost shall be borne by the successful tenderer. The Institute shall have no liability on this account. The Institute has the right to evaluate the experience, reputation etc., of such sub-agencies and on their approval in writing to the successful tenderer, successful tenderer shall be required to engage only such approved agencies for execution.

If the Institute is not satisfied with the performance or capability of the names in the panel furnished by the tenderer, the successful tenderer shall be required to engage an agency nominated by Institute. In all these matters, there shall be no additional financial implication to the Institute. The successful tenderer shall be required to execute works within the accepted rates only and no claim will be accepted due to the Institute, insistence on engaging any sub-agency. The Institute further reserves the right to instruct the successful tenderer to terminate the work of sub-agency at any time during the contract, if the performance is found unsatisfactory. In such case, the successful tenderer shall be required to furnish a further panel of names from whom a similar selection can be made

by the Institute In this instance also, the Institute is not liable for any additional cost. Responsibility for the delay occurred in this process, if any shall rest with the successful tenderer.

It is the responsibility of the successful tenderer to ensure that the sub-agencies engaged in the work comply with all the clauses in the agreement between the Institute and the successful tenderer. It shall be responsibility of the successful tenderer to exercise first line supervision on the works executed by his subagencies including supervision on the quality of materials and workmanship and to ensure that the sub agencies comply with the technical specifications, drawings and bill of quantities. The successful tenderer shall also establish competent site organization technically and administratively to ensure that the works of various sub-agencies are supervised and well co-ordinate to ensure proper sequencing of construction and finishing works and to ensure that the overall time schedule is fully complied with.

The detailed construction programme schedule to be furnished by successful tenderer shall include action plan for procurement of materials and execution of works at site for each of the sub-agency and the detailed construction programme schedule shall reflect proper integration of each component of the building to ensure well-coordinated execution so as to complete the project including services within the stipulated time schedule.

- 6.80 Existing service lines such as electrical, water supply, sewer lines, telephone lines etc., shall be carefully protected and preserved before commencement and during excavation, dismantling /demolition operations. Details of UG facilities shall be provided to the successful tenderer. Any damage caused to the aforesaid service lines, etc., during excavation, demolition/dismantling shall be made good at Contractor's own expense/cost. Restoration of any service lines, which needs to be shifted and found in the proposed site, is the responsibility of the contractor and the agency shall carry out the work as per the direction of Chair, Department of IAP the cost of such work will be borne by the Institute.
- 6.81 Dust nuisance to neighbour shall be minimized by providing and erecting screens to the required height as per direction of Chair, Department of IAP with Aluminium sheets or canvas or other suitable material before commencement of the work. The site shall be cleared off such protection arrangement after virtual completion of work. All the operations shall be carried out strictly in accordance to regulations of municipal and other local authorities and shall be restricted to normal working hours.
- 6.82 No debris or materials got from dismantlement/demolition the building(s) shall be thrown in the public road causing inconvenience to the traffic and any fine or penalty imposed by local authority for non-compliance of this provision shall be borne by the contractor.
- 6.83 The Contractor shall be responsible for any injury to persons, animals, or things and for all structural damage to property which may arise from the operation or neglect of himself and or any nominated sub-contractors, contractor's Employees and or third party whether such injury or damage arising from carelessness, accident or any other cause whatsoever, in any way connected with the carrying out the construction/dismantling/demolition.

The contractor shall take required insurance cover with an approved insurance company as provided in the contract and deposit with the Institute well before commencement of construction/ demolition / dismantling.

- 6.84 **Preservation of trees:** The contractor shall preserve all existing trees in and adjacent to the site which does not interfere with the construction as determined by the Engineer-in charge.
- 6.85 **Drawings and working Details:** The work shall be carried out strictly in accordance with the approved plans and estimates and specifications and as per the instructions of the Chair, Department of IAP, and no deviations or changes are permitted without the written order of the Engineer. The designs and drawings enclosed with the tender documents are only typical and tentative. The working drawings and the working details of the several components of works will be prepared and made available at the time of execution and the contractor shall carryout the work in accordance with such working drawings and working

details.

6.86 Omissions and discrepancies in drawings and instructions:

In all cases of omissions, doubts or discrepancies in the dimensions or discrepancies in the drawings and item of work, a reference shall be made to the Chair, Department of IAP , whose elucidation and elaboration shall be considered as authorized. The Contractor shall be held responsible for any error that may occur in the work through lack of such reference and precautions.

6.87 The contractor shall be responsible for accuracy for all shapes, dimensions, and Alignments both vertical and horizontal etc., of all the components of the work.

6.88 Lands for the use of the Contractors Camp:

The contractor shall have to make his own arrangements at his own cost for construction of living accommodation outside the IISc premises. The Employee shall not provide any space / building for labour camp.

6.89 Undesirable Person to be removed from site:

The contractor shall not employ on site any person who is undesirable, if in the opinion of the Chair, Department of IAP the person or persons at site of work employed on behalf of the contractor is/are considered undesirable. The Chair, Department of IAP shall notify the contractor to this effect and the contractor will be bound by the decision of the Chair, Department of IAP to remove such person or persons from the site of work and from the labour camp. The contractor shall not be entitled to any damage or loss on this account. On the contrary, the contractor shall be liable to compensate the Institute for any loss or damage to the Institute property caused by the employment of such person.

6.90 Labour Statistics:

The contractor shall submit daily reports on the following:

(a) Total No. of labour employed in the working area.

6.91 Execution of work during night times:

The work shall normally be carried out between 08.00 hours and 17.00 hours with a break of one hour and when permitted during night period by the Chair, Department of IAP, the second shift shall be between 17.00 hours and 00 hours with a break of half an hour during night. When ordered to work at night, adequate provision for lighting the working area should be made by the contractor at his cost and got approved by Engineer. The agency shall not be paid extra for the works executed during night.

6.92 Safety code:

- a) The Contractor at a prominent place at work spot should bring these safety provisions to the notice of all concerned by display on notice board. The persons responsible for compliance of the safety code shall be named therein by the contractor.
- b) To ensure effective enforcement of the rules relating to safety precautions, the arrangement made by the contractor shall be open to inspection by the Labour Officer, Engineer or his representatives.
- c) All necessary personal safety equipment's as considered adequate by the Engineer should be kept available for immediate use of persons employed at the site and maintained in the good condition and the contractor should take adequate steps to ensure proper use of equipment by those concerned.
- d) Workers employed on mixing concrete, cement grout, cement mortar shall be provided with protective footwear protective goggles and protective gloves. Those engaged in mixing or stacking cement or any materials injurious to the eye, nose and mouth shall be provided with a face mask and protective cover free of cost by the contractor.
- e) Those engaged in welding work shall be provided with welder's protective eye Shield and gloves. Stonebreakers shall be provided with protective goggle and protective clothing and seated at sufficiently safe intervals.
- f) Those engaged in binding and fabricating steel shall be provided with protective

gloves.

- g) Those engaged in deep cuts, large rock excavation shall be provided with helmets.
- h) All labour / persons at work shall wear helmet compulsorily.
- i) When the work is near any place where there is risk of drowning all necessary equipment's shall be kept ready for use and all necessary steps taken for prompt rescue of any person in danger and adequate provisions should be made for prompt first aid treatment of all injuries likely to be sustained during the course of work.
- j) Adequate and suitable caution and danger signal boards shall be prominently exhibited at road/high tension overhead line/where heavy electrical machines are working where overhead cranes or hoist; derricks, winches are working where blasting zone is demarcated. The content of the board shall be in English and the local language for easy identification.
- k) All scaffolding, ladder, stairways, gangways, staging, centering, form work and temporary support and safety devices etc., shall be sound in strength and constructed and maintained as such throughout its use. The agency shall obtain approval from Chair, Department of IAP for scaffolding, formwork etc., before commencement of work.
- l) No materials on any site of work shall be so stacked as to cause danger or inconvenience to any persons or public.
- m) The Contractor shall provide all necessary fencing and lighting to protect the public/working men from accident and shall be bound to bear the expense of defense of every suit action or other proceedings of law that may be brought by any person for injury sustained owing to neglect of the above precautions and to pay any damages and cost, which may be awarded in any such suit action or proceedings to any such persons or which may with consent of the contractor be paid to compensate any claims by any such person.
- n) No electric cables or apparatus, which is liable to be a source of danger to persons, employed shall remain electrically charged unless a caution Board is put into that effect and close approach to the same is prohibited.
- o) All practical steps shall be taken to prevent danger to persons employed from risk of fire or explosives. No floor, roof or other portion of any building used for residence shall be so over-loaded with debris or materials so as to render it unsafe.
- p) The final disposal of water used for work or removed from work spot as well as the supply used for domestic consumption shall be as directed by the Engineer. The contractor shall make his own arrangement for purification of domestic water supply used by his staff and labour colony and used on the site of work to the satisfaction of the Engineer.
- q) The source of drinking water supply/distribution system in workers colony shall be protected from chances of contamination by poisonous materials epidemic causing infections bacteria etc., by maintaining the source and system under adequate hygienic conditions.
- r) Notwithstanding the above clauses, there is nothing in this to exempt the contractor to exclude the operations of any other Act or Rules in force of the Central Govt., State Govt.

6.93 AWARENESS OF SITE CONDITIONS AND CARRYING OUT OF SITE INSPECTION PRIOR TO TENDER SUBMISSION:

Prior to the preparation and submission of his/her Tender, the Contractor shall make visits to the site and carry out all the necessary inspections and investigations in order to obtain all information and to make his/her own assessment of the conditions and constraints at site, including the means of access to it. The Contractor shall make himself/herself aware of all the features of the site and the working conditions and space and shall, in general, be responsible for obtaining all the necessary and requisite information needed for him/her to prepare and submit his/her Tender.

Should the Contractor require any clarifications he/she shall seek these in writing from the Chair, Department of IAP before submitting his Tender. At no stage will any extra claims be entertained or allowed on any matter or for any reason arising from or as a consequence

of the Contractor's failure to comply with all the requirements stipulated in this Clause.

6.94 WORK AND WORKMANSHIP

To determine the acceptable standard of workmanship, the Chair, Department of IAP may order the Contractor to execute certain portions of works and services under the close supervision of the Chair, Department of IAP. On approval, they shall label these items as guiding samples so that further works are executed to conform to these samples.

6.95 TEST CERTIFICATES

The contractor shall submit copy of test certificates for all the major electrical equipment such as circuit breakers, CTs, PTs, instruments, relays, busducts, rising mains, busbars, cables etc., and panel as a whole, confirming to relevant IS/BIS standards issued by manufacturers.

6.96 SAMPLES AND CATALOGUES

Before ordering the material necessary for these installations, the contractor shall submit to the Chair, Department of IAP/Consultants for approval, a sample of every kind of material such as cables, conductors, conduits, switches, socket outlets, circuit breakers, lighting fixtures, boxes etc., along with the catalogues with their dimensional details. For major items such as sub lighting panels distribution boards, the submission of drawings/catalogues along with technical details shall be enough. Prior to ordering any electrical equipment/material/system, the contractor shall submit to the Chair, Department of IAP/Consultants the catalogues, along with the samples, where applicable, from the approved manufacturer. The contractor shall arrange inspection and testing at the manufacturer's factory or assembly shop for final approval. No material shall be procured prior to the approval of the Chair/Consultant.

Also, the contractor shall ensure that the dimensional details of the equipment fit into the allotted space provided in the building.

6.97 COMPLETION CERTIFICATE

On completion of the electrical installation a certificate shall be furnished by the contractor countersigned by the licensed supervisor, under whose direct supervision the installation was carried out.

6.98 PERFORMANCE GUARANTEE

The contractor shall indemnify the Institute against defective materials and workmanship for a period of one year after completion of the work. The contractor shall also hold himself fully responsible during that period for reinstallation or replacement at free of cost to institute, the following:

Any defective work or material supplied by the Contractor.

Any material or equipment damaged or destroyed as a result of defective workmanship by the contractor.

6.99 RATE ANALYSIS

At any time and at the request of the Chair, Department of IAP the contractor shall provide details or breakdown of costs and prices of any part or parts of the works.

6.100 The Chair, Department of IAP of IISc reserves the rights to delete any item from the contractor's scope of work.

3 CONTRACTOR'S LABOUR REGULATIONS

7.1 DEFINITION:

In these regulations unless otherwise, expressed or indicated the following words and expressions shall have the meaning hereby assigned respectively that is to say:

Labour means workers employed by the contractor or the Institute directly or indirectly through sub-contractor or any other person, or any agent on his behalf on a payment as per prevailing Karnataka State labour regulations and will not include supervisory staff like overseers etc.

Fair wages means whether for item or place of work notified at the time of inviting tenders for the work and where such wages have not been so notified, the wages prescribed by the Karnataka Public Works Department for the district in which the work is done.

Contractors shall include every person whether a sub-contractor head or agent employing labour on the work taken contract.

The relevant orders of Government of Karnataka in regard to payment of wages as amended from time to time shall be followed by the contractor.

7.2 WORKING HOURS:

Normally working hours of a labour employed should not exceed 8 hours a day. The working day shall be so arranged that inclusive of interval for rest if any, it shall not spread over more than 12 hours on any day.

When a worker is made to work for more than 8 hours on a day or for more than 48 hours in any week, he is entitled to double the ordinary rate of wages. Children shall not be made to work.

Every worker shall be given a paid weekly holiday normally on Sunday.

7.3 DISPLAY OF NOTICE REGARDING WAGES ETC.

The contractor shall (a) before he commences his work on contract, display and correctly maintain in a clean legible condition in conspicuous places on the work, notices in English and in the local language spoken by the majority of the workers, giving the rate of wages which have been certified by the Regional Labour Commissioner, as fair wages and the hours of work which such wages are earned, and a copy of such notices shall be sent to the certifying officers.

7.4 PAYMENT OF WAGES:

Wages due to every worker shall be paid to him direct.

7.5 FIXATION OF WAGES PERIODS:

The contractor shall fix the wages period of which the wages shall be payable.

Wages of every worker employed on the contract shall be paid.

In case of establishments in which the wage period is one week, within three days from the end of the wage period wages shall be paid. In the case of other establishment before the expiry of the 7th day or 10th day from the end of the wage period according to the numbers of the workers employed in such establishment does not exceed 100 or exceeds 1000.

When the employment of any workers is terminated by or on behalf of the contractor the wages earned by him shall be paid before the expiry of the days succeeding the one which his employment is terminated.

All payment of wages shall be made on a working day except when the work is completed before the expiry of the wages period in which case final payment shall be made within 48 hours of the last working day at work site and during the time.

NOTE: The term working day means a day on which the labour is employed, and the work is in progress.

7.6 FINE AND DEDUCTIONS WHICH MAY BE MADE FROM WAGES:

The Wages of workers shall be paid to him without any deductions of any kind except the following deductions:

Deductions for absence for duty i.e., from the place or the places whereby the terms of his employment he is required to work. The amount of deductions shall be in proportion to the period for which he was absent.

Deductions for damage or loss of goods expressly entrusted to the employed person for custody or for loss of money or any other deduction which he is required to account, where such damage or loss is directly attributable to neglect or default.

Deduction for recovery of advance or for adjustment of over payment of wages, advance granted shall be entered in a register.

And other deductions which the Institute may from time to time allow.

7.7 Fine:

No fine shall be imposed on any worker save in respect of such acts and the Commissioner of Labour has approved omissions on his part as.

No fine shall be imposed on a worker and no deduction for damage or loss be made from his wages until the worker has been given an opportunity. Undertaking of showing cause against such fines or deductions.

The total amount of fines which may be imposed in any one wage period on a worker shall not exceed an amount equal to the wages payable to him in respect of that wage period.

No fine imposed on any worker shall be recovered from him by instalments or after the expiry of sixty days from the date which it was imposed.

Every fine shall be deemed to have imposed on a day of the act or omission in respect of which it was imposed.

The contractor shall issue an employment card in Form III to each worker on the day of the worker's entry into the employment. If the worker has already any such card with him for the previous employment of contractor, he shall merely endorse that employment card with relevant entries. On termination of employment, the employment card shall again be endorsed by the contractor and returned to the worker.

7.8 REGISTER OF UNPAID WAGES:

The contractor should maintain a register of unpaid wages in such a form as may be convenient at the place of work but same shall include the following particulars:

- Full particulars of the labourer's whose wages have not been paid.
- Reference number of the muster roll and wage register
- Rate of wages
- The period
- Total amount not paid
- Reasons for not making payment

- How the amount of unpaid wages was utilized
- Acquaintance with dates.

7.9 REGISTER OF ACCIDENTS:

The contractor shall maintain a register of accidents in such form as may be convenient at the workplace but the same shall include the following particulars.

- Full particulars of the laborers who met with accidents.
- Rate of wages
- Sex
- Age
- Nature of accidents and cause of accident
- Time and date of accidents
- Date and time when admitted in Hospital
- Date of discharge from the Hospital.

The agency shall alone be liable to pay compensation for any damage/death /injury sustained by the personnel or any other members of the agency in the course of their work/duty at the Institute during the contract period. Govt. of India issued guidelines on payment of compensation in cases of death / permanent incapacitation of person due to unintended/ unforeseen occurrences during maintenance, operation and provisioning of public services. Under these guidelines, the agency has to pay an amount of Rs. 10 Lakhs as compensation in the cases where a person is died and up to Rs. 7.5 Lakhs in the case of disabled based on loss of earning capacity. Institute has the right to recover further penalty in the cases where the incidents have happened with the negligence of the agency.

7.10 REGISTER OF FINE ETC.

The contractor shall maintain a register of fines and a register of deductions for damages or loss in form Nos. I and II respectively which shall be kept at the place of work.

The contractor shall maintain both in English and local language a list approved by Commissioner for labour clearly stating the acts and commissions for which penalty or fine may be imposed on a workman and display it in a good condition in conspicuous place on the work.

7.11 SUBMISSION OF RETURNS:

The contractor shall submit periodical returns as may be specified from time to time.

7.12 AMENDMENTS:

The Government of Karnataka may from time to time add to or amend the regulations and on may question as to the application interpretation on effect if these regulations the decision of the Commissioner of Labour or Deputy Commissioner for Labour to Govt. in that behalf shall be final.

7.13 Labour Clause

No labourers below the age of 18 years shall be employed on the work.

Payments of wages of labourers. The contractor shall pay not less than fair wage of labourers engaged by him on the work.

EXPLANATION:

(a) The contractor shall notwithstanding the provision of any contract to the contrary cause to be paid wages to labourers indirectly engaged for the work including any labour engaged by his sub-contractors in connection with the same works if the labourers have been immediately employed by him.

(b) In respect of all labours directly or indirectly employed in the works for the performance of the contractor's part of this agreement, the contractor shall comply with or cause to be complied with Govt. of India, Contractors Labour Regulations from time to time, in regard to payment of wages. Wage period, deductions from wages recovery of wages not paid and deductions unauthorized made, maintenance of wage book, wage slips, publication of scale of wage and other terms of employment, inspection and submission of periodical returns and all other matter of a like nature. The Chair, Department of IAP or In-charge Engineer concerned shall have the right to deduct from the money due to the contractors any sum required for making good the loss suffered by a worker

or workers by reason of non-fulfilment of the conditions of the contract for the benefit of the workers, non-payment of wages or of deductions made from his or her wages which are not justified by their terms of the contractor non-observance of the regulations.

(c) For payment of minimum wages, the Contractor is bound to follow the relevant orders of Govt. of India from time to time.

(d) Vis-à-vis the Institute the contractor shall be primarily liable for all payments to be made under and for the observance of the regulations aforesaid without prejudice to his right to claim indemnity from his sub-contractors. The regulations aforesaid shall be deemed to be part of this contract, and any breach thereof shall be deemed to be a breach of this.

7.14 In respect of all labour directly or indirectly employed in the work for the performance of the contractor's part of this agreements the contractor shall at his own expense arrange for the safety provisions as per Karnataka P.W.D. safety code framed from time to time and shall at his own expense provide for all facilities in arrangements and provide necessary facilities as aforesaid he shall be liable to pay penalty of Rs.50/- for each default and in addition the Chair, Department of IAP in charge shall be at liberty to make arrangements and provide facilities as aforesaid, and recover the cost incurred in that behalf from the contractor.

7.15 The contractor shall submit by the 4th and 19th of every month to the Chair, Department of IAP of true statement showing in respect of the second half of the preceding month and the first half of the current month respectively (1) the name of labourers employed by him on the work (2) their working hours, (3) the wages paid to them, (4) the accidents that occurred during the said fortnight showing the circumstances under which they happened and the extent of damage and injury caused to them and (5) the number of female workers who have been allowed, maternity benefit according to clause 19F and the amount paid to them, failing which the contractor shall be liable to pay the Institute a sum of not exceeding Rs. 50/- for each default or materially incorrect statement by deduction from any bill due to the contractor and amount levied as fine.

7.16 In respect of all labour directly or indirectly employed in the works for the performance of the contractor's part of this agreement, the contractor shall comply with or cause to be complied with all the rules framed by Institute from time to time for the protection of health and sanitary arrangements for workers employed by the Indian Institute of Science and its contractors.

7.17 Maternity benefit rules for female workers employed by contractor, leave and pay during leave shall be regulated as follows:

(i) in case of delivery: Leave during maternity leave not exceeding 8 weeks up to and including the day of delivery and 4 weeks following that day.

(ii) In case of miscarriage, up to 3 weeks from the date of miscarriage.

7.18 Pay:

i) In case of delivery: Leave pay during maternity leave will be at the rate of women's average daily earning calculated on the total wages earned on the days when full time work was done during the period of three months immediately preceding the date on which she gives notice that she expects to be confined.

ii) In case of miscarriages: Leave pay at the rate of average daily earnings calculated on the total wages earned on the day's full time works was due during a period of 3 months immediately preceding the date of miscarriage.

iii) Conditions for the grant of maternity leave: No maternity leave benefit shall be admissible to a woman unless she has been employed for a total period of not less than 10 Months immediately preceding the date of delivery /miscarriage.

4 CONDITIONS OF CONTRACT

Clause 1. Security Deposit

Estimated cost of the work put to tender	E.M.D Percentage	S.D. Percentage
(i)	(ii)	(iii)
Rs.76,89,625.00	2%	5.5%
Note : EMD + SD to be limited to 7.5% of the contract value		

- (a) Clause -1(a)** The person/persons whose tender may be accepted (hereinafter called the contractor which expression shall unless the context otherwise requires, include his heirs, executors, administrators and assigns) shall pay Earnest Money Deposit indicated in Column (ii) of the table given below and shall permit Institute (a) to deduct SD at the percentage mentioned in Column (iii) of the table given below of all moneys payable of work done under the Contract, at the time of making such payments to him/them and (b) to hold such deductions as further Security Deposit. The EMD + SD will be limited to 7.5% of the contract value.

E.M.D - Earnest Money Deposit
S.D - Security Deposit

No Interest will be paid on EMD / Further / Additional Security deposit.

(b) Additional or Reduction in Security Deposit

The EMD for the tendered work and additional amount of Security Deposit at the rates mentioned in **Sub-clause 1(a)** above should be, paid by the contractor. The Chair, Department of IAP may allow if a portion of the work is withdrawn from the Contractor under the provisions of Clause 12(a) a proportionate reduction in the amount of security Deposit.

- a) EMD paid along with the tender shall be refunded only after the completion of the defect liability period or payment of final bill whichever is later without any interest.**
- b) 1% labour cess towards workers Welfare Fund on the works expenditure will be recovered from RA bills for depositing the same to the welfare board as per Karnataka Govt. Order. Rates quoted should be inclusive of cess.**
- (c)** However, if the Contractor desires, agency may furnish a BG issued by the Public Sector Undertaking Bank / Scheduled commercial Bank / Nationalized Bank in favour of the Registrar, Indian Institute of Science, payable at Bangalore amounting to **5.5%** of the total contract value valid up to completion of defect liability period in which case EMD deposited by them will be refunded and no recoveries towards security deposit will be effected in the running account bills.
- (d) Dues to Institute, to be set off against Security Deposit.**
All compensation or other sums of money payable by the Contractor to Institute under the terms of this contract may be realized or deducted from any Security Deposit payable to him or from any sums which may be due or may become due by Institute to the Contractor on any account whatsoever and in the event of his security deposit being reduced by reason of any such realization or deduction as aforesaid, the Contractor shall, within ten days thereafter, make good in cash any sum or sums which have been deducted from his security deposit or any part thereof. Otherwise, the amount will be treated as outstanding due from the agency.

(e) Refund of Security Deposit (EMD & SD):

- i)** EMD paid by the contractor at the time of tendering and SD deducted from the R.A bills at the prescribed rates shall be refunded to the contractor immediately after the virtual

completion of the work against production of bank guarantee for an equal amount from any of the Scheduled commercial Bank/Nationalized Bank valid for a period as mentioned in clause (ii) below.

ii) The bank guarantee received as stipulated in (i) above, will be treated as performance guarantee and shall be returned to the contractor after the final bill is paid or after **Twenty Four Months including monsoon period** from the date of virtual completion of the work during which period the work should be maintained by the contractor in good order, whichever is later. The validity of the bank guarantee shall be maintained for the above period.

iii) In case of BG's furnished towards security deposit same shall be returned after completion of the defect liability period.

Clause 2. PENALTY FOR DELAY

a) Written Order to Commence Work

After acceptance of the tender, the Chair, Department of IAP shall issue a written order to the successful Tenderer to commence the work. The Contractor shall enter upon or commence any portion of work only with the written authority and instructions of the Chair, Department of IAP . Without such instructions the Contractor shall have no claim to demand for measurements of or payment for, work done by him.

b) Programme of work

The time allowed for carrying out the work as entered in the tender shall be strictly observed by the contractor. It shall be reckoned from the date of handing over the site to the Contractor not less than 75 percent of work site area comprising a continuous block. The work shall throughout the stipulated period of the contract be proceeded with, all due diligence (time being deemed to be the essence of the contract on the part of the Contractor). To ensure good progress during the execution of the work, the contractor shall be bound (in all cases in which the time allowed for any work exceeds one month) to comply with the time schedule according to the programme of execution of the work as agreed upon and enclosed by the contractor during execution of agreement.

c) Review of progress and responsibility for delay etc.,

The Chair, Department of IAP shall review the progress of all works with the contractor at least once every month. Such a review shall take into account the programme fixed for the previous week, obligations on the part of the Institute for issue of drawings etc, and also the obligations on the part of the Contractor. The review shall also examine the accumulated delays by the contractor if any and mitigation measures proposed by the contractor to overcome the delay.

Apportioning of responsibility for delay between Contractor and Institute.

In case the progress achieved falls short by more than 25 percent of the cumulative programme, the reasons for such shortfall shall be examined and a record made thereof apportioning the responsibilities for the delay between the contractor and the Institute. This record should be signed in full and dated both by the Chair, Department of IAP, and the Contractor. If the contractor refuses to sign the said record, approval of the reasons for delay may be submitted to the DEPARTMENT OF IAP for approval and such approval is binding on the contractor.

Shortfall in progress made up subsequently.

To the extent the shortfall is assessed, as due to the delay on the part of the contractor, a notice shall be issued to him by the Chair, Department of IAP to make up the shortfall. If the shortfall is not made up before the progress of the work is reviewed during the second month succeeding the month in which the shortfall was observed, the Contractor shall be liable to pay penalty as indicated in **Clause 2(d)** below.

Grant of extension of time.

If the delay is attributable to reasons beyond the control of the Contractor, requisite extension of time shall be granted by the Chair, Department of IAP in accordance with **Clause 5** after obtaining the approval of his higher authorities, wherever necessary.

If the Contractor stops the work for 45 days when no stoppage of work is shown on the current Program and the stoppage has not been authorized by the Employer, then The Employer may terminate the Contract at the risk and cost of the contractor.

Settlement of dispute regarding shortfall in progress.

In case of dispute between the Chair, Department of IAP and Contractor regarding the responsibility for the shortfall in progress, the matter shall be referred to the Department of IAP who shall thereupon give a decision within fifteen days from the date of receipt of reference. The decision of the Department of IAP shall be final and binding on the contractor and the Chair, Department of IAP .

d) Penalty for delay

In respect of the shortfall in progress, assessed as due to the delay on the part of contractor as per **Clause 2(b)** and **2 (c)**, the contractor shall be liable to pay as penalty an amount equal to one percent of the contract value of the balance work assessed according to the programme(Clause 35), for every week that the due quantity of work remains incomplete; provided always that the total amount of penalty to be paid under the provisions of this clause subjected to a maximum of 10 percent of the contract value of the entire work as shown in the tender, provided further that in the event of the contractor making up the shortfall in progress within the stipulated or extended time of completion, the penalty so recovered may be refunded on an application in writing by the contractor.

Note: If the Chair, Department of IAP considers it necessary, he shall be entitled to take action as indicated in **Clause 3 (d)** also.

d.(1). Liquidated damages

The Contractor shall pay liquidated damages to the Employer at the rate per day stated in the Contract Data for each day that the Completion Date is later than the Intended Completion Date (for the whole of the works or the milestone as stated in the Contract Data). The total amount of liquidated damages shall not exceed the amount defined in the Contract Data. The Employer may deduct liquidated damages from payments due to the Contractor. Payment of liquidated damages does not affect the Contractor's liabilities.

If the Intended Completion Date is extended after liquidated damages have been paid, the Employer shall correct any overpayment of liquidated damages by the Contractor by adjusting the next payment of bill.

(e) Adjustment of excess/over payments.

Excess/over payments as soon as they are discovered should be adjusted in the next running account bill of the contractor and in case the final bill has already been paid, the excess/over payment made shall be recovered from the Security Deposit of the contractor together with interest at such percentages as Institute may decide from time to time, from the date of such excess or over payment to the date of recovery.

ACTION WHEN WHOLE OF SECURITY DEPOSIT IS FORFEITED

Clause 3. In any case in which under any clause or clauses of this contract the contractor shall have rendered himself liable to pay compensation and/or penalty amounting to the whole of his security deposit including the amount deducted in instalment from his bills as Further Security Deposit, the Chair, Department of IAP on behalf of the Director, IISc shall have power to adopt any of the following courses as he may deem best suited in the interest of Institute.

(a) Forfeiture of Security Deposit.

Without prejudice to Institute's right to recover any loss from the Contractor under sub-clauses (b) and (c) of Clause 3 of the Contract, to rescind the contract (of which rescission notice in writing to the contractor under the hand of the Chair, Department of IAP shall be conclusive evidence). And in that case, the security deposit of the contractor including whole or part of the lump sum deposited by him and also the amount deducted from his bills as Further Security Deposit, shall stand forfeited and be absolutely at the disposal of the Institute.

(b) Debiting cost of labour and materials supplied.

To employ labour paid by the Institute and to supply materials to carry out the work or any part of the work, debiting the contractor with the cost of the labour and the price of the materials (as to the correctness of which cost and price the certificate of the Chair, Department of IAP shall be final and conclusive against the contractor) and crediting him with the value of the work done; in all respects in the same manner and at the same rates as if it had been carried out by the contractor under terms of this contract, and in that case the certificate of the Chair, Department of IAP as to the value of the work done shall be final and conclusive against the contractor.

(c) Recovery of extra cost on unexecuted work

To measure up the work of the contractor and to take such part thereof as is remaining unexecuted out of his hands and to give it to another contractor to complete it in which case any expenses which may be incurred in excess of the sum which would have been paid to the original contractor, if the whole work had been executed by him (as to the amount of which excess expenses the certificate in writing of the Chair, Department of IAP shall be final and conclusive) shall be borne and paid by the original contractor and shall be deducted from any money due to him by Institute Otherwise the amount will be treated as outstanding due from the agency.

(d) Action against unsatisfactory progress

If the contractor does not maintain the rate of progress as required under **Clause 2** and if the progress of any particular portion of work is unsatisfactory even after taking action under **Clause 2(c)** and **2(d)**, the Chair, Department of IAP shall be entitled to take action under **Clause 3(b)** or **3(c)** at his discretion in order to maintain the rate of progress after giving the contractor 10 days notice in writing whereupon the contractor will have no claim for any loss sustained by him owing to such actions.

(e) No compensation for loss sustained on advance action

In the event of any of the above courses being adopted by the Chair, Department of IAP, the contractor shall have no claim to compensation for any loss sustained by him by reason of his having purchased, or procured any materials, entered into any agreements or made any advances on account of, or with a view to the execution of the work or the performance of the contract. And in case the contract shall be rescinded under the provision aforesaid the contractor shall not be entitled to recover or be paid any sum for any work thereof actually performed by him under his contract, unless and until the Chair, Department of IAP shall have certified in writing the performance of such work and the amount payable in respect thereof, and he shall only be entitled to be paid the amount so certified.

- (f) Recovery of 1% of the contract value towards the laborers welfare fund created by the Government of Karnataka will be effected in the running account bills of the contractor.

Clause 4. CONTRACTOR TO REMAIN LIABLE TO PAY COMPENSATION IF ACTION IS NOT TAKEN UNDER CLAUSE-3.

In any case in which any of the powers conferred upon the Chair, Department of IAP by **Clause 3** thereof shall have become exercisable and the same shall not have been exercised, the non-exercise thereof shall not constitute a waiver of any of the conditions hereof and such powers shall notwithstanding be exercisable in the event of any future case of default by the contractor for which under any clause hereof he is declared liable to pay compensation or penalty amounting to the whole of his security deposit and the liability of the contractor for past and future compensation or penalty shall remain unaffected.

Power to take possession of or require removal of or sell contractor's properties.

In the event of the Chair, Department of IAP taking action under **sub-clause (a) or (c) of Clause 3**, he may, if he so desires, take possession of all or any tools, plant, materials and stores, in or upon works or the site thereof or belonging to the contractor, or procured by him and intended to be used for the execution of the work or any part thereof, paying or allowing for the same in account at the contract rates; or in the case of contract rates not being applicable, at current market rates, to be certified by the Chair, Department of IAP whose certificate thereof shall be final. In the alternative, the Chair, Department of IAP may after giving notice in writing to the contractor or his clerk of the works, foreman or other authorised agent, require him to remove such tools, plant, materials or stores from the premises within a time to be specified in such notice; and in the event of the contractor, failing to comply with any such requisition, the Chair, Department of IAP may remove them at the contractor's expense or sell them by auction or private sale on account of the contractor and at his risk in all respect, and the certificate of the Chair, Department of IAP as to the expense of any such removal; and the amount of the proceeds and expense of any such sale shall be final and conclusive against the contractor.

Clause 5. GRANT OF EXTENSION OF TIME

- (a) If the contractor shall desire an extension of the time for completion of the work, he shall apply in writing to the Chair, Department of IAP before the expiry of the period stipulated in the tender or before the expiry of 30 days from the date on which he was hindered as aforesaid or on which the cause for asking for extension occurred, whichever is earlier and the Chair, Department of IAP or other competent authority may if in his opinion, there are reasonable grounds for granting an extension, grant such extension as he thinks necessary or proper. The decision of such competent authority in this matter shall be final.
- (b) The time limit for completion of the work shall be extended commensurate with its increase in cost occasioned by alterations or additions and the certificate of the Chair, Department of IAP or other competent authority as to such proportion shall be conclusive.

Clause 6. ISSUE OF FINAL CERTIFICATE – CONDITIONS REGARDING

On completion of the work the contractor shall report in writing to the Chair, Department of IAP the completion of the work. Then he shall be furnished with a certificate by the Chair, Department of IAP of such completion, but no such certificate shall be given nor shall the work be considered to be complete until the contractor shall have removed from the premises on which the work shall have been executed, all scaffolding, surplus materials and rubbish, and shall have cleaned thoroughly all wood work, doors, windows, wall, floor or other parts of any building, in or upon which the work has been executed, or of which he may have had possession for the purpose of executing the work, nor until the works shall have been measured by the Chair, Department of IAP or other competent authority, or where the measurements have been taken by his Chair, Department of IAP until they have received the approval of the Chair, Department of IAP or other competent

authority, the said measurements being binding and conclusive against the contractor. If the contractor shall fail to comply with the requirements of this clause as to the removal of scaffolding, surplus materials and rubbish, and cleaning on or before the date fixed for the completion of the work the Chair, Department of IAP or other competent authority may, at the expense of the contractor, remove such scaffolding, surplus materials and rubbish, and dispose of the same as he think fit and clean off such dirt etc., as aforesaid and contractor shall be liable to pay the amount of all expenses incurred but shall have no claim in respect of any such scaffolding or surplus materials as aforesaid except for any sum actually realized by the sale thereof.

Note: CLOSURE OF CONTRACT PENDING COMPLETION OF MINOR ITEMS.

In cases where it is not desirable to keep the building contract open for minor items, such as flooring in the bathrooms, etc., which can be carried out only after installation of sanitary work the main contract may be finalized after getting a supplementary agreement executed in the prescribed form by the same contractor for doing the residual work.

Clause 7. Contractor to submit bills monthly in printed form

- (a) A bill shall be submitted by the contractor on or before 15th of each month for all items of work executed in the previous month as required by IISc. The Running account bills will be paid within three weeks from the date of submission of the bill in complete acceptable form after duly checked and certified by concerned Engineer, under normal circumstances.

All bills shall be prepared in the prescribed printed and electronic form in PDF/Excel format in quadruplicate and handed over to the Chair, Department of IAP in charge of the work/ Chair, Department of IAP 's Office and acknowledgment obtained.

The charges to be made in the bills shall always be entered at the rates specified in the tender in full or in part as the case may be, in the case of any extra work ordered in pursuance of these conditions, and not mentioned or provided for in the tender, the charges in the bills shall be entered at the rates hereinafter provided for such work.

(b) Scrutiny of Bills and measurement of work

The details furnished by the Contractor in the bill will be completely scrutinized and the said work will be measured by the Chair, Department of IAP in the presence of the Contractor or his duly authorized agent. The countersignature of the contractor or the said agent in the measurement book shall be sufficient proof to the correctness of the measurements, along with the Test certificates to be produced with the bill, which shall be binding on the contractor in all respects.

- (c) One copy of the passed bill shall be given to the Contractor without any charge.

Clause 8. PAYMENT PROPORTIONATE TO WORK APPROVED AND PASSED.

No payment shall be made for any work estimated to cost rupees five thousand or less until after the whole of the work shall have been completed and certificates of completion given. But in the case of works estimated to cost more than Rs. 5,000 the contractor shall on submitting the bill and after due verification by the Chair, Department of IAP as per Clause 7(b) entitled to necessary Payment proportionate to the part of the work then approved and passed by the Chair, Department of IAP or other competent authority whose certificate of such approval and passing of the sum so payable shall be final and conclusive against the contractor i.e. part payment of submitted RA bills is admissible to contractor. Any such reduced payment amount is admissible for adjustment in the successive RA Bills or Final Bill.

Payment at reduced rates

The rates for several items of works agreed to within shall be valid only when the items concerned are accepted as having been completed fully in accordance with the stipulated

specifications. In cases where the items of work are not accepted as so completed, The Chair, Department of IAP or other competent authority may make payment on account of such items at such reduced rates as he may consider reasonable in the preparation of final or on account bills.

Payment or intermediate certificates be regarded as advances:

All such intermediate payments shall be regarded as payments by way of advance against the final payments only and not as payments for work actually done and completed, and shall not preclude the Chair, Department of IAP or other competent authority from requiring any bad, unsound imperfect or unskilful work to be removed or taken away and reconstructed or re-erected nor shall any such payment be considered as an admission for the due performance of the Contract or any part thereof in any respect or the accruing of any claim, nor shall it conclude determine or affect in any other way the powers of the Chair, Department of IAP or other competent authority as to the final settlement and adjustment of the accounts, or otherwise or in any other way vary or affect the contract.

Submission of Final bill and its settlement

The contractor shall submit the final bill within one month from the date of actual completion of the work in all respects. His claims shall be settled within five months from the date of submission of the bill in complete acceptable form after duly checked and certified by concerned Engineer, under normal circumstances.

Disputed items

Note: The contractor shall submit a list of the disputed items within 30 days from the disallowance thereof and if he fails to do this, his claim shall be deemed to have been fully waived and absolutely extinguished.

Clause 9. Definition of Work :

a. The expression 'Work' or 'Works' where used in these conditions, shall unless there be something in the subject or context repugnant to such construction, be construed to mean the work or works contracted to be executed under or in virtue of the contract, whether temporary or permanent and whether original, altered, substituted or additional.

b. Work to be executed in accordance with specifications, drawings, orders etc.

The contractor shall execute the whole and every part of the work in the most sound and substantial and workmanlike manner, and in strict accordance with the specifications both as regards materials and workmanship. The contractor shall also conform exactly, fully and faithfully to the designs, drawings and instructions in writing relating to the work signed by the Chair, Department of IAP or other competent authority and lodged in his office and to which the contractor shall be entitled to have access at such office, or on the site of the work for the purpose of inspection during office hours. The contractor shall also be responsible for the delivery of structure in sound conditions and the execution of the work strictly in accordance with the specifications of the work.

c. Action where there is no specification

In the case of any class of work for which there is no such specification, then in such a case of the work shall be carried out in all respects in accordance with the instructions and requirements of the Chair, Department of IAP or other competent authority.

d. Work as per Specifications and IS Codes.

The detailed specification, which forms a part of contract, accompanies the tender document. In carrying out the various items of work as described in Schedule B of the tender documents and the additional, substituted, altered items of work, this detailed

specification shall be strictly adhered to, supplemented by relevant provisions of Indian standard specifications, the code of practice; etc., The Indian standard specification, National Building Code and the code of practice to be followed shall be the latest versions of those listed in the detailed technical specifications. Any class of work, not covered by the detailed technical specifications, shall be executed in accordance with the instructions and requirements of the Chair, Department of IAP and the relevant provisions of the Indian standard specifications.

Clause 10. Alteration in quantity of work, specifications and designs, Additional work, deletion of work

The Chair, Department of IAP shall have power to make any alternations in, omissions from additions to or substitutions for the original specification, drawings, designs and instructions that may appear to him to be necessary or advisable during the progress of the work. For that purpose or if for any other reason it shall in his opinion be desirable, he shall have power to order the Contractor to do and the contractor shall do any or all the following: -

- a) Increase or decrease the quantity of any work included in the contract.
- b) Omit any such work.
- c) Change the character or quality or kind of any such work,
- d) Change the levels, lines, positions and dimensions of any part of the work,
- e) Execute additional work of any kind necessary for the completion of the works and
- f) change in any specified sequence, methods or timing of construction of any part of the work.

Contractor bound by Chair, Department of IAP 's instructions

The Contractor shall be bound to carry out the work in accordance with any instructions in this connection which may be given to him in writing signed by the Chair, Department of IAP or other competent authority and such alteration shall not in any way vitiate or invalidate the contract.

Standard Quantity Take-off (SQT)

Contractor within **14 days** of Issue of LOI to submit the Project Manager & seek approval for the Standard quantity Take-off sheets for all the items mentioned in the Tender BOQ, after due referencing the Tender/ GFC drawings and the Technical Specification. Upon approval, the SQT shall remain the base document for initiating any change orders/ variation in accordance to Clause 31, tracking the daily project progress, and for the measurement sheets.

Orders for variations to be in writing

1. No such variations shall be made by the Contractor without an order in writing of the Chair, Department of IAP ; provided that no order in writing shall be required for increase or decrease in the quantity of any work where such increase or decrease is the result of the quantities exceeding or being less than those stated in the 'Schedule B' provided also that if for any reason the Chair, Department of IAP shall consider it desirable to give any such order verbally, the Contractor shall comply with such order without any confirmation in writing of such verbal order given by the Chair, Department of IAP , whether before or after the carrying out of the order, shall be deemed to be an order in writing within the meaning of the clause; provided further that if the Contractor shall within seven days confirm in writing to the Chair, Department of IAP and if such confirmation is not contradicted in writing within fourteen days by the Chair, Department of IAP , it shall be deemed to be an order in writing by the Chair, Department of IAP .
2. **a)** Any additional work which the contractor may be directed to do in the manner above specified as part of the work shall be carried out by the Contractor on same conditions in all respects on which he agreed to do the main work and same rates as are specified in the tender for the main work. However, change in the Undertaking rates tendered and accepted shall be considered in respect of items under which the quantity of work performed

exceeds tendered quantity by more than 25 percent and this actual change in rate will be restricted only to such excess quantity (i.e. beyond 125 percent of the tendered quantity).

(b) Rate for excess quantity beyond 125 percent of tendered quantity

The Additional quantity which exceeds 125 percent of the tendered quantity shall be paid at the rates entered in or derived from Schedule of Rates prevalent at the time of executing additions and alterations plus or minus the overall percentage of the original tendered rates over the current Schedule of Rates (KPWD) of the year in which the tender is accepted (as per the comparative Statement prepared at the time of acceptance of the tender).

(c) Rates for additional, substituted, altered items of work

If the additional, substituted or altered work includes any class of work for which no rate is specified in the contract, then such work shall be carried out at the rates specified for or derived from similar item of work in the agreement. In the absence of similar items in agreement, rate shall be as specified for or derived from similar items in the schedule of rates of KPWD prevalent at the time of execution of such additional substituted or altered items of works, plus or minus the overall percentage of original tendered rates over the current schedule of rates of (KPWD) the year in which tender is accepted as mentioned in sub clause (b) above. With regard to the question whether the additional, substituted or altered item/items of work/works is / are similar or not, to that/those in the agreement / in the Schedule of Rates of KPWD and the decision of the DEPARTMENT OF IAP shall be final and binding on the contractor.

(d) Determination of rates for items not found in Estimate or Schedule of Rates

If the rates for additional, substituted or altered work cannot be determined in the manner specified in sub **clauses (b) and (c)** above, then the contractor shall within 7 days of the date of receipt by him of the order to carry out the work, inform the Chair, Department of IAP of the rates which it is his intention to charge for such class or work, supported by analysis of the rate or rates claimed. Thereupon the Chair, Department of IAP shall determine the rate or rates on the basis of observed data and failing this, on the basis of prevailing market rates. Under no circumstances the contractor shall suspend the work on the plea of non- settlement of rates for items falling under this clause. In the event of any dispute regarding the rates for such items the decision of Chair, Department of IAP , DEPARTMENT OF IAP shall be final.

Working out the data rates for non-SR/ non tendered items shall be based on the procedures laid down in the standard rate analysis format of KPWD Bangalore circle Bangalore. The data rates shall be approved by the Chair, Department of IAP , DEPARTMENT OF IAP and shall be binding on the contractor.

Clause 11. TIME LIMITS UNFORSEEN CLAIMS

Under no circumstances whatever shall the contractor be entitled to any compensation from Institute on any account unless the contractor shall have submitted claim in writing to the Chair, Department of IAP or other competent authority within 30 days of the cause of such claim occurring.

Clause 12. NO CLAIM TO ANY PAYMENT OR COMPENSATION FOR DELETION OF WHOLE OR PART OF WORK

- (a) If at any time after the execution of the contract documents, the Chair, Department of IAP or other competent authority shall, for any reason whatsoever, require the whole or any part of the work as specified in the tender, to be stopped for any period or require the whole or part of the work (i) not to be carried out at all or (ii) not to be carried out by the tendered contractor, he shall give notice in writing of the fact to the contractor who will thereupon

suspend or stop the work totally or partially as the case may be. In any such case, except as provided hereunder, the contractor shall have no claim to any payment of compensation whatsoever on account of any profit or advantage which he might have derived from the execution of the work in full but which he did not so derive in consequence of the full amount of the work not having been carried out, or on account of any loss that he may be put on account of materials purchased or agreed to be purchased, or for unemployment of labour recruited by him. He shall not also have any claim for compensation by reason of any alterations having been made in the original specifications, drawings, designs and instructions, which may involve any curtailment of the work, as originally contemplated.

(b) Payment for materials already purchased or ordered by contractor.

Where, however, materials have already been purchased or agreed to be purchased by the contractor before receipt by him of the said notice the contractor shall be paid for such materials, at the rates determined by the Chair, Department of IAP or other competent authority provided they are not in excess of requirements and are of approved quality, and/or shall be compensated for the loss, if any, that he may be put to, in respect of materials agreed to be purchased by him, the amount of such compensation to be determined by the Chair, Department of IAP or other competent authority whose decision shall be final.

(c) Labour charges during stoppage of work

If the contractor suffers any loss on account of his having to pay labour charges during the period during which the stoppage of work has been ordered under this clause, the contractor shall on application, be entitled to such compensation on account of labour charges as the Chair, Department of IAP or other competent authority, whose decision shall be final, may consider reasonable. Provided that the contractor shall not be entitled to any compensation on account of labour charges if in the opinion of the Chair, Department of IAP or other competent authority, the labour could have been employed in the same locality by the contractor for the whole or part of the period during which the stoppage of the work has been ordered as aforesaid.

(d) Time limit for stoppage of work

The period of stoppage ordered by the Chair, Department of IAP or other competent authority should not ordinarily exceed six months. Thereafter the portion of works stopped may be treated as deleted from this agreement if a notice in writing to that effect is given to the Chair, Department of IAP or other competent authority by the contractor within seven days after the expiry of the above period.

Execution of work deleted:

The portion of work thus deleted may be got executed from the same contractor on supplemental agreement on mutually agreed rates, which shall not exceed current Schedule of Rates plus or minus tender percentage.

Clause 13. ACTION AND PENALTY IN CASE OF BAD WORK

If at any time before the security deposit is refunded to the contractor, it shall appear to the Chair, Department of IAP or other competent authority that any work has been executed with unsound, imperfect or unskilful workmanship or with materials of inferior quality, or that any materials or articles provided by him for the execution of the work are unsound or of a quality inferior to that contracted for, or are otherwise not in accordance with the contract, it shall be lawful for the Chair, Department of IAP or other competent authority to intimate this fact in writing to the contractor and then notwithstanding the fact that the work, materials or articles complained of may have been paid for, the contractor shall be bound forthwith to rectify, or remove and reconstruct the work so specified on whole or in part as the case may require, or if, so required shall

remove the materials or articles at his own charge and cost and in the event of his failing to do so within a period to be specified by the Chair, Department of IAP or the competent authority in the written intimation aforesaid, the contractor shall be liable to pay a penalty not exceeding one percent on the amount of the estimate for every day not exceeding ten days during which the failure, so continues and in the case of any such failure the Chair, Department of IAP or other competent authority may rectify or remove, and re-execute the work or remove and replace the materials or articles complained of, as the case may be at the risk and expense in all respects of the contractor should the Chair, Department of IAP or other competent authority for any valid reasons consider that any such inferior work or materials as described above is to be accepted or made use of, it shall be within his discretion to accept the same at such reduced rates he may fix thereof.

Clause 14. WORK TO BE OPEN TO INSPECTION - CONTRACTOR OR RESPONSIBLE AGENT TO BE PRESENT

(a) All works under or in course of execution or executed in pursuance of the contract shall at all time be open to the inspection and supervision of the Chair, Department of IAP or other competent authority and his Chair, Department of IAP, and the contractor shall at all times during the usual working hours, and at all other times at which reasonable notice of the intention of the Chair, Department of IAP or other competent authority Chair, Department of IAP to visit the work shall have been given to the contractor, either himself be present to receive orders and instructions or have a responsible agent duly accredited in writing present for the purpose. Orders given to the contractor duly authorized agent shall be considered to have the same force and effect as if they had been given to the contractor himself.

(b) Employment of Minimum Technical Staff

The Contractor shall employ the following technical staff during execution of this work:

- a) One qualified Graduate Engineer & One qualified Diploma Engineer, when the cost of the work to be executed up to 1 Crore,
- b) Two qualified Graduate Engineer & Three qualified Diploma Engineer, when the cost of the work to be executed from 1 Crore to 10 crores;
- c) Three qualified Graduate Engineer & Six qualified Diploma Engineer, when the cost of the work to be executed above 10 crores;
- d) In addition to (i) and (ii) above, the contractor shall employ different types of such technical personnel as may be required and sufficient for execution of work and directed by the Chair, Department of IAP to ensure efficient execution of work.
- e) The technical staff so employed, should be available at site whenever required by Engineer in-charge to take instructions.
- f) If the contractor fails to employ the technical staff as aforesaid, he shall be liable to pay a sum of Rs. 25000 (Rupees Twenty thousand only) for each month of default in the case of Graduate Engineers and Rs. 15000 (Rupees Ten thousand only) for each month of default in case of Diploma Holders.
- g) If the Contractor himself possesses the required qualification and is available at the site for receiving instructions from the Chair, Department of IAP and other competent authority vide **sub-clause (a)** above it will not be necessary for the technical staff to be available at site for receiving instructions.

Clause 15. NOTICE TO BE GIVEN BEFORE WORK IS COVERED UP

The contractor shall give not less than five days' notice in writing to the Chair, Department of IAP or his Chair, Department of IAP in charge of the work before covering up or otherwise placing beyond the reach of the measurement any work in order that the same may be measured; and correct dimensions thereof taken before the same is so covered up or placed beyond the reach of measurement, and shall not cover up or place

beyond the reach of measurement, and work without the consent in writing of the Chair, Department of IAP or other competent authority or his Chair, Department of IAP in charge of work; and if any work shall be covered up or placed beyond the reach of measurement, without such notice having been given or consent obtained, the same shall be uncovered at the contractor's expense, and in default thereof no payment or allowance shall be made for such work or for the materials with which the same was executed.

Clause 16. CONTRACTOR LIABLE FOR DAMAGE DONE, AND FOR IMPERFECTIONS FOR TWELVE MONTHS AFTER CERTIFICATE OF COMPLETION

If the Contractor or his workmen or servants shall break, deface, injure or destroy any part of a building in which they may be working, or any building, road fence, enclosure or grassland or cultivated ground contiguous to the premises on which the work or any part thereof is being executed, or if any damage shall be done to the work, while it is in progress from any cause whatever or if any imperfections become apparent in it within Twelve months of the grant of a certificate of completion, final or otherwise, by the Chair, Department of IAP or other competent authority the contractor shall make good the same at his own expenses, or in default the Chair, Department of IAP or other competent authority may cause the same to be made good by other workmen, and deduct the expenses (of which the certificate of the Chair, Department of IAP or other competent authority shall be final) from any sums that may be due or may thereafter become due to the contractor, or from his Security Deposit or the proceeds of sale thereof, or of a sufficient portion thereof.

The Defects liability period shall be extended for as long as defects remain to be corrected. Every time notice of a Defect is given, the Contractor shall correct the notified Defect within the length of time specified by the Institute.

Clause 17. CONTRACTOR TO SUPPLY PLANT, LADDERS, SCAFFOLDINGS, ETC., AND IS LIABLE FOR DAMAGES ARISING FROM NON-PROVISION OF LIGHT, FENCING ETC

The contractor shall supply at his own cost all materials, plant, tools, appliance, implements, ladders, scaffolding, and temporary works required for the proper execution of the work whether in the original, altered or substituted form and whether included in the specification, or other documents forming part of the contract or referred to in these conditions or not, and which may be necessary for the purpose of satisfying or complying with the requirements of the Chair, Department of IAP or other competent authority as to any matter as to which under these conditions he is entitled to be satisfied, or which he is entitled to require together with carriage therefore, to and from the work. The contractor shall also supply without charge the requisite number of persons with the means and materials necessary for the purpose of setting out works, and counting, weighing and assisting in the measurement or examination at any time and from time to time of the work or the materials. Failing this, the same may be provided by the Chair, Department of IAP or other competent authority at the expense of the contractor and expense may be deducted from any money due to the contractor under the contract or from his security deposit or the proceeds of sale thereof, or of a sufficient portion thereof. The contractor shall provide necessary fencing and lights required to protect the public from accident, and shall also be bound to bear the expense of defense of every suit, action or other legal proceedings, that maybe brought by any person for injury sustained owing to neglect of the above precautions and to pay any damages and costs which may be awarded in any suit, action or proceedings to any person, or which may with the consent of the contractor be paid for compromising any claim by any such person.

Clause 18. Measures for prevention of fire

The contractor shall not set fire to any standing jungle, trees, brushwood or grass without a written permit from the Chair, Department of IAP . When such permission is given, and

also in all cases when destroying cut or dug up trees, brushwood grass, etc., by fire the contractor shall take necessary measures to prevent such fire spreading to or otherwise damaging surrounding property.

Clause 19. Liability of contractor for any damages done in or outside work Area.

Compensation for all damages done by contractor or his men whether in or beyond the limits of Institute property including any damage caused by spreading of fire mentioned in Clause 18 shall be estimated by the Chair, Department of IAP and the estimate of the Chair, Department of IAP on appeal shall be final and the contractor shall be bound to pay the amount of the assessed compensation on demand failing which the same will be recovered from the contractor as the damages in the manner prescribed in clause 1(c) or deducted by the Chair, Department of IAP or other competent authority from any sums that may be due or become due from Institute to the contractor under this contract or otherwise.

The contractor shall bear the expenses of defending any action or other legal proceedings that may be brought by any person for injury sustained by him owing to neglect of precautions to prevent the spread of fire and shall pay any damages and cost that may be awarded by the court in consequence.

Clause 20. Work on Notified Holiday

No work shall be done on any notified holiday without the sanction in writing of the Chair, Department of IAP or other competent authority.

Clause 21. WORK NOT TO BE SUBLET

- (a) The contract shall not be assigned or sublet by the contractor. However, any specific portion of the work which is of a specialized nature and normally not executable by a general contractor could be got done by the specialized agencies which are executing such works, after obtaining the specific approval of the Chair, Department of IAP in writing in each case. Such consent to sublet the work, if given, shall not relieve the contractor from any liability or obligation under the contract and he shall be responsible for the acts, defaults and neglects of any sub-contractor or his agents, servants or workmate as fully as if they were the acts, defaults or neglects of the contractor, his agents, servants or workmen.

Consequences of subletting work without approval, becoming insolvent, bribing etc., by contractor and action against the contractor.

If the contractor shall assign or sublet his contract or any portion thereof without the specific approval of the Chair, Department of IAP or attempts to do so or become insolvent or commence any proceedings to get himself adjudicated as insolvent or make any composition with his creditors or attempts so to do or if any bribe, gratuity, or indirectly be given, promised or offered by the contractor or any of his servants or agents to any officer or person in the employ of Institute in any way relating to his office or employment or if any such officer or person in the employment or if any such officer or person shall become in any way directly or indirectly interested in the contract, the Chair, Department of IAP or other competent authority may thereupon by notice in writing rescind the contract and the security deposit of the contractor shall thereupon stand forfeited and be absolutely at the disposal of Institute and the same consequences shall ensue as if the contract had been rescinded under Clause 3 here of and in addition, the contractor shall not be entitled to recover or be paid for any work actually performed under contract.

- (b) **Recovery of excess payments based on excess measurements and action against contractor.**

Whenever it is noticed that excess payments have been made to the contractor based on excess measurements recorded by the Chair, Department of IAP in the measurement book and countersigned by the contractor or his duly authorized agent, action shall be taken to recover the excess payments together with interest immediately. Action may also be taken to remove the name of the contractor from the approved list of contractors and also to blacklist him.

Change in classification of excavations accepted not permitted.

Once the measurements mentioning the classification of the excavations are recorded in the measurement book and the same is signed by the contractor or his authorized agent in token of acceptance, no request for reclassification by the contractors shall be entrained.

(c) Criminal proceedings against IISc Officer and Contractor for the lapses.

Institute also reserve the right to initiate criminal proceedings against the concerned Institute Officers who are directly responsible for the lapse and the contractors who have colluded with the officers of the Institute in the lapse and fraudulently received amounts not due to them legitimately.

Clause 22. SUM PAYABLE BY WAY OF COMPENSATION TO BE CONSIDERED AS REASONABLE COMPENSATION WITHOUT REFERENCE TO ACTUAL LOSS.

All sums payable by a contractor by way of compensation under any of these conditions shall be considered as reasonable compensation to be applied for the use of Institute without reference to the actual loss or damage sustained and whether any damage has or has not been sustained.

Clause 23. SETTLEMENT OF DISPUTES -TIME LIMIT FOR DECISION

- (a)** If any dispute or difference of any kind whatsoever were to arise between the Chair, Department of IAP and the contractor regarding the following matters namely,
- (i)** The meaning of the specification's designs, drawing and instructions herein before mentioned,
 - (ii)** The quality of workmanship or materials used on the work and
 - (iii)** Any other question, claim right, matter, thing whatsoever, in any way arising out of or relating to the contract, designs, drawings, specification, estimates, instructions, or orders, or those conditions, failure to execute the same whether arising during the progress of the work, or after the completion, termination or abandonment thereof, the dispute shall, in the first place, be referred to the Department of IAP who have jurisdiction over the work specified in the contract. The Department of IAP shall within a period of fifteen days from the date of being requested by the Contractor to do so give written notice of its decision to the Contractor.

If the decision of the Department of IAP is not acceptable to the contractor, he may approach the **Director, IISc within** a period of 15 days for settlement.

(b) Director, IISc decision's final.

Subject to other form of settlement hereafter provided, the Director's decision in respect of every dispute or difference so referred shall be final binding upon the contractor. The said decision shall forthwith be given effect to and contractor shall proceed with the execution of the work with all due diligence.

(c) Remedy when Director's decision is not acceptable to contractor.

In case the decision of the Director is not acceptable to the contractor, he may approach the Law Court at Bangalore for settlement of dispute after giving due written notice in this regard to the Director within a period of ninety days from the date of receipt of the written notice of the decision of the Director. Further, the Bangalore courts alone shall have the exclusive jurisdiction.

(d) Time limit for notice to approach Court of law by contractor

If the Director has given written notice of his decision to the contractor and no written notice to approach the law court has been communicated to him by the contractor within a period of ninety days from receipt of such notice, the said decision of Director shall be final and binding upon the contractor.

(e) Time limit for notice to approach law court by contractor when decision is not given by Director, IISc as at (b).

If the Director fails to give notice of his decision within a period of ninety days from the receipt of the contractor's request in writing for settlement of any dispute or difference as aforesaid, the Contractor may within ninety days after the expiry of the first named period of ninety days approach the Law Courts at Bangalore giving due notice to the Director.

(f) Contractor to execute and complete work pending settlement of dispute.

Whether the claim is referred to the Director or to the Law Courts, as the case may be, the contractor shall proceed to execute and complete the works with all due diligence pending settlement of the said dispute or differences.

(g) Obligations of the Chair, Department of IAP and contractor shall remain unsettled during considerations of dispute.

The reference of any dispute or difference to the Director or the Law Court may proceed notwithstanding that the works shall then be or be alleged to be complete, provided always that the obligations of the Chair, Department of IAP and the contractor shall not be altered by reason of the said dispute or difference being referred to the Director or the Law Court during the progress of the works.

Clause 24. CONTRACTOR TO PAY COMPENSATION UNDER WORKMEN'S COMPENSATION ACT.

(a) The contractor shall be responsible for and shall pay any compensation to his own workmen payable under the relevant Workmen's Compensation Act for injuries caused to the workmen. If Institute pays such compensation on behalf of the contractor it shall be recoverable by Institute from the contractor under as per relevant clauses.

(b) Contractor to pay expenses of providing medical aid to workmen.

The contractor shall be responsible for and shall pay the expenses of providing medical aid to any workman who may suffer a bodily injury as a result of an accident. If Institute incurs such expenses, the same shall be recoverable from the contractor forthwith and be deducted without prejudice to any other remedy of Institute, from any amount due or that may become due to the contractor.

Clause 25. CONTRACTOR TO PROVIDE PERSONAL SAFETY EQUIPMENT FIRST AID APPARATUS, TREATMENT etc.

The contractor shall provide all necessary personal safety equipment and first aid apparatus for the use of the persons employed on the site and shall maintain the same

in good condition suitable for immediate use, at any time and shall comply with the following regulations in connection therewith: -

- The worker will be required to use the equipment so provided by the contractor and the contractor shall take adequate steps to ensure proper use of the equipment by those concerned.
- When work is carried on in proximity to any place where there is a risk of drowning; all necessary steps shall be taken for the prompt rescue of any person in danger.
- Adequate provision shall be made for prompt first - aid treatment of all injuries likely to be sustained during the course of the work.

Clause 26. Minimum Age of Person Employed by Contractor

(a): No contractor shall employ

- Any person who is under age of 18 years.
 - Who does not produce a valid certificate of vaccination against epidemic diseases in respect of himself/ herself as well as all the members of his/her family.
- (b) The contractor shall provide potable water facilities to the workers. Similar amenities shall be provided to the workers engaged on large works in urban area.
- (c) Removal of persons not satisfying conditions (a) (i) & (ii)

The Chair, Department of IAP or other authority is authorized to direct the removal or to remove through - his own agency, from the work any person referred to in sub-clauses (a) above not satisfying these conditions and no responsibility shall be accepted by the Institute for any delay caused in the completion of the work by such directions for removal.

- (d) Payment of fair and reasonable wages by contractor.

The contractor shall pay fair and reasonable wages, which shall not be less than the minimum wages fixed by Govt. of India from time to time to the workmen employed by him in the contract undertaken by him. In the event of any dispute arising between the contractor, and his workmen on the ground that the wages paid are not fair and reasonable the dispute shall be referred without delay to the Chair, Department of IAP or other competent authority, who shall decide the same. The decision shall not in any way affect the conditions in the contract regarding the payment to be made by Institute at the agreed tender rates.

Clause 27. CONTRACTOR NOT ENTITLED TO ANY CLAIM OR COMPENSATION FOR DELAY IN EXECUTION OF WORK IN BORROW PITS.

The contractor shall not be entitled to claim compensation if there is any delay in the execution of the work on account of water standing in borrow pits and Compartments. The rates are inclusive for hard or cracked soil, excavation in mud, sub-soil water or water standing in borrow pits and no claim for extra rate shall be entertained, unless otherwise specified.

Clause 28. METHOD OF PAYMENT OF BILLS

Payment to contractors shall be made by RTGS by the Institute.

Clause 29. SET OFF AGAINST ANY CLAIM OF INSTITUTE

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

Clause 30. RATES INCLUSIVE OF SALES TAX AND LABOUR CESS AND ROYALTY

- (a) The rates to be quoted by the contractor shall be inclusive of all taxes like GST , Labour cess, Royalty etc., No extra payment on this account will be made to the contractor.
- (b) When there is a change in existing taxes from time to time i.e. upward or downward is admissible accordingly
- (c) All quarry fees, octroi dues levied by the state or any local body or authority and ground rent, if any, charged by the Chair, Department of IAP for stacking materials should be paid by the contractor.

Clause 31. IMPORTANCE OF SAFETY

In addition to Contractor's Contractual Obligations on Safety as per the relevant clauses stated, The Contractor shall comply with all safety standards to the satisfaction of the Employer's Representative.

In respect of all labour, directly or indirectly employed on the project for the performance and execution of the Contractor's Work under the Contract, the Contractor shall at its own expense arrange for all the safety provisions as listed in (i) Safety codes of C.P.W.D. and Bureau of Indian Standards, (ii) The Electricity Act, (iii) The Mines Act, and Regulations, Rules and Orders made there under and such other acts as applicable. Precautions as stated in the safety clause are the minimum necessary and shall not preclude the Contractor taking additional safety precautions as may be warranted for the particular type of work or situations. Also mere observance of these precautions shall not absolve the Contractor of his liability in case of loss or damage to property or injury to any person including but not limited to the Contractor's labour, the Employer's, Architect's, Employer's Representative's and Project Manager's representatives or any member of the public or resulting in the death of any of these.

The Contractor shall institute and implement to the satisfaction of the Project Manager a construction safety programme, including:

- 1 Preparing a Site-specific written safety programme consistent with the EHS Plan, Indian law and best practices. As a minimum, the programme shall require applicable safety equipment for all workers, use of barriers and barricades around potentially dangerous areas, protection of workers working under elevated conditions, accident reporting, first aid provisions etc.
- 2 Weekly safety reviews and 'risk assessments' shall be carried out in conjunction with the Project Manager and the Employer in order to identify potential safety hazards and to mitigate against them.
- 3 Attending weekly or as scheduled safety meetings at site conducted by the site safety representative of project manager
- 4 The Contractor will be required to provide all personnel entering the Site an Identity and safety rules card and verbal explanation of the safety programme.
- 5 Requiring all Sub-Contractors and other workers under the responsibility of the Contractor (including the Vendors or later phases of the construction of the Project) to adhere to the written safety programme as per approved format.

Experienced safety officers with adequate number of supporting personnel shall be appointed by the Contractor for full time on the site during the Contract period.

NON-COMPLIANCE OF REGULATIONS

If the Project Manager or the Employer's Representative notifies the Contractor of non-compliance with the foregoing regulations, the Contractor shall immediately, if so directed, or in any event not more than eighteen (18) hours after receipt of such notice, make all reasonable efforts to correct such non-compliance. If the Contractor fails to do so, the Employer may suspend all or any part of the Work. When the Contractor has undertaken satisfactory corrective action, Employer shall lift the suspension of the Work. The Contractor shall not claim any extension of time to complete the Work or additional fees due to any such work suspension.

The Client reserves the right to levy penalty if the safety norms such as not wearing helmets, safety gloves/belts/shoes/jackets. etc., even after a written notice by the enforcing authority, a penalty of Rs. 10,000/- per day per event or till the safety norms are adhered to in addition to stopping of work till the safety norms are adhered

Clause 32 Refund of Security Deposit (EMD & SD):

The Security Deposit lodged/paid by a Contractor shall be refunded to him after the final bill is paid or after the successful completion of defect liability period, during which period the work should be maintained by the Contractor in good order, whichever is later.

Clause 33 BAR CHART / CPM CHART:

BAR chart /CPM chart shall be produced during agreement by the contractor. According to the bar chart work is to be executed otherwise penalty will be levied for the delay of work

Indian Institute of Science, Bangalore-12
A P P E N D I X

1.Name of the work	SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF 1x320KVA DG SET AND ASSOCIATED ELECTRICAL WORKS AT IAP BUILDING AT IISc, BANGALORE.
2.Date of commencement of work	Within Ten days from the date of issue of work order or the date of handing over the site whichever is later
3.Time of Completion	3 Months
4.Frequency of interim Certificate and payment	Once in every month.
5.Further Security deposit	5.5% on the running bills and final bill in addition to earnest money deposit. When the S.D. deducted from the R.A. Bills of the contractor @ 5.5% of the bill amount exceeds Rs.1.00 Lakhs, the amount in excess of Rs.1.00 Lakh may, at the request of the contractor, be released to him against the production of bank guarantee issued from a Nationalised /Scheduled Bank only for an equal amount in the prescribed form. The bank guarantee should be valid till the completion of the defect liability period.
6. Defects liability period / retention amount from the final bill/release of balance of deposit.	The security deposit lodged/paid by a contractor shall be refunded to him after the final bill is paid or after Twelve (12) months from the date of completion of the work, during which period the work so executed should be maintained by the contractor in good order, whichever is later.
7. Penalty for delay	In respect of the shortfall in progress, assessed as due to the delay on the part of contractor as per clause 2(b) and 2(c), the contractor shall be liable to pay as penalty an amount equal to one percent of the estimated cost of the balance work assessed according to the programme, for every day that the due quantity of work remains incomplete, provided always that the total amount of penalty to be paid under the provisions of this clause shall not exceed 7 ½ percent of the estimated cost of the entire work as shown in the tender, provided further that in the event of the contractor making up the shortfall in progress within the stipulated or extended time of completion, the penalty so recovered may be refunded on an application in writing by the contractor.
8. Period for payment of Running Bill	Three weeks from the date of submission of each Running account bills by the Contractor.
9. Period for submitting the final Bill	One month from the date of virtual completion of the work by the Contractor.

10. REFERENCES

I.S. STANDARDS OF ELECTRICAL WORKS

Sl.No	STANDARDS	TITLE
	Code of Practice / Guide	
1	IS : 732 – 1989	Code of Practice for Electrical wiring installations.
2	IS : 4648 – 1968	Guide for Electrical layout in residential buildings
3	IS : 80614 – 1976	Code of Practice for Design, installation and maintenance of service lines up to and including 650V.
4	IS : 7752 (Part-1) - 1976	Code of Practice for interior illumination : General requirements and recommendations for welding interiors.
5	IS : 4347 – 1967	Code of Practice for hospital lighting
6	IS : 6665 – 1972	Code of Practice for industrial lighting
7	IS : 2672 – 1966	Code of Practice for Library lighting
8	IS : 10118 (Part-1) - 1982	Code of Practice for selection, installation and maintenance of switcher and Control gear : Installation.
9	IS : 4146 – 1983	Application guide for voltage transformers.
10	IS : 3043 – 1987	Code of practice for earthing.
11	IS : 5216 (Part-2) - 1982	Guide for safety procedures and practices in electrical work : General.
12	IS : 4237 – 1982	General requirements for switchgear and control gear for voltages not exceeding 1000 V AC or 1200 V DC.
13	IS : 6875 - (Part-1) - 1973	Control switches (Switching devices for control and auxiliary circuits including 1000 V AC and 1200 V DC : General requirements and tests.
14	IS : 10027 – 2000	Composite units of Air-Break switches and rewirable type fuses for voltages not exceeding 650 V AC.
15	IS : 4064 (Part-1) - 1978	Composite units of Air-Break disconnecter, Air-Break switch disconnecter and fuse- combination units for voltages not exceeding 1000 V AC or 120 V DC : General requirements.
16	IS : 8828 – 1996	Electrical accessories - circuit breakers for over current protection for household and similar installation.
17	IS : 2516 (Part-1/Sec01)-1985	Circuit-Breaks : Requirements and tests : Voltages not exceeding 1000 V AC or 1200 V DC.

18	IS : 5039 – 1983	Distribution pillars for Voltages not exceeding 1000 V AC or 1200 V DC.
19	IS : 8544 (Part-4) - 1979	Motor starters for voltages not exceeding 1000 V : Reduced voltage AC starters, two- step auto transformer starters.
20	IS : 9537 (Part-1) - 1980	Conduits for electrical installations General requirements
21	IS : 9537 (Part-4) - 1983	Conduits for electrical installations : Pliable self recovering conduits of insulating materials.
22	IS : 3854 – 1997	Switches for domestic and similar purposes.
23	IS : 1293 – 1988	Plugs and sockets outlets of rated voltage up to and including 250 Volts and current up to and including 16 Amperes.
24	IS : 2418 (Part-1) - 1977	Tubular Fluorescent lamps for general lighting services : Requirements and tests.
25	IS : 9900 (Part-1) - 1981	High pressure mercury vapor lamps : Requirements and tests.
26	IS : 1913 (Part-1) - 1978	General and safety requirements for luminaries : Tubular fluorescent lamps.
27	IS : 10322 (Part-1) - 1982	Luminaries : General requirements
28	IS : 302 (Part-1) - 1979	General and safety requirements for household and similar electrical appliances.
29	IS : 6236 – 1971	Direct recording electrical measuring instruments.
30	IS : 2705 (Part-1) - 1992	Current transformers : General requirements.
31	IS : 2448 (Part-1) - 1963	Adhesive insulating tapes for electrical purposes : Tapes with cotton textile substrates.
32	IS: 8130-1984	Code for Conductor Construction
33	IS: 5831-1984	Code for Insulation & sheath material
34	IS:694-1990	PVC insulated Flexible Single Core Wire/ Unarmoured Multicore/ Flat Cables. For working voltage upto & including 1100V.
35	IS:1554(Part-1)-1988	Copper or Aluminium Conductor, PVC insulated, extruded inner sheathed PVC, galvanised steel wire/strip armoured, extruded PVC sheathed LT Control/Power Cable. For working voltage up to & including 1.1KV.
36	IS:3975-1990	Code for Number of Strips in armouring construction.

37	IS: 7098/II/85	XLPE insulated HT & AB Cables. For working voltage 6.35/11KV.
38	IS:14255-1995	Code for Aerial Bunched Cables.For working voltage up to 1.1KV.
39	IS:13573/VDE 0278/IEC 60502/HD 629.1.S2 CENELEC	Code of Type tests for HT termination jointing kit.
40	IS 7569:1987	Cast Acrylic Sheets for use in Luminaires
41	IS 8030:1976	Specifications for Luminaires for Hospitals
42	IS 10242: Part 3: Sec 6: 1986	Electrical installations in ships: Part 3 Equipment, Section 6 Luminaires & accessories
43	IS 10322: Part 2 1982	Specification for Luminaires - Part 2: Constructional Requirements
44	IS 10322: Part 3 1984	Specification for Luminaires - Part 3: Screw & Screw Less Terminals
45	IS 10322: Part 4 1984	Specification for Luminaires - Part 4: Method of Tests
46	IS 10322: Part 5: Sec 1: 2012	Luminaires: Part 5 Particulars requirements, Sec 1 General Purpose Luminaires
47	IS 10322: Part 5: Sec2: 2012	Specifications for Luminaires - Part 5 : Particular Requirements - Section 2: Recessed Luminaires
48	IS 10322: Part 5: Sec4: 1987	Luminaires: Part 5 Particulars requirements, Section 4 Portable general-purpose luminaires
49	IS 13383: Part 1 : 1992	Photometry of Luminaires - Method of Measurement - Part 1: Luminaires for use in interior Lighting
50	IS 13383: Part 2 : 1992	Methods of Photometry of luminaires: Part 2 Luminaires for road & street lighting
51	IS 13383: Part 3 : 1992	Photometry of Luminaires - Method of Measurement - Part 3: Luminaires for Floodlighting
52	BSEN 10025 Grade 5, 355JO (or) ASTM A 572-50	Steel sheet thickness
53	IS 875 Part 3	Wind Velocity
54	IS 2062 (or) ASTM A 572-50	Base Plate
55	BSEN ISO 1461 (or) ASTM A123 (or) IS 2629	Galvanized in single hot dip / With Average 70 Microns
56	BS 5135	Welded Single L-Seam Joint
57	AISI 304 Grade	Stainless Steel Wire Rope (Factor of Safety: TR No. 7)
58	IS 1239	Maximum Load Carrying Capacity (Lantern)

59	IS 9595 (or) IS 10178 AWS	Single Section & Single Joint welded
60	ASTM - A 123 and 153	Hot dip Galvanized in Single dipping with not less than 65 Microns

ABBREVIATIONS:

The following abbreviations wherever they appear in the specifications, shall have the meaning or implication hereby assigned to them:

Mm	Millimetre
Cm	Centimetre
M	Metre
Km	Kilometre
Mm /sqmm 2	Square Millimetre
Cm /sqcm 2	Square centimetre
Dm /sqdm 2	Square decimetre
M /sqm 2	Square metre
Cm / cubic cm 3	Cubic centimetre
Dm / cubic dm 3	Cubic decimetre
M3/cum 3	Cubic metre
ml	Millilitre
kl	Kilolitre
Gm	Gram
Kg	Kilogram
Q	Quintal
T	Tonne
Fps system	Foot pound second system
°C	Degree Celsius temperature
Fig	Figure
Re/Rs	Rupee/ Rupees
No	Number
Dia	Diameter
AC	Asbestos cement
CI	Cast Iron
GC	Galvanised corrugated
GP	Galvanised plain
GI	Galvanised iron
PVC	Polyvinyl chloride
RCC	Reinforced cement concrete
SW	Stone ware
SWG	Standard wire Gauge

11. TECHNICAL SPECIFICATION

The work shall be carried out as per CPWD / KPWD Specification and relevant IS codes. In case of discrepancy between technical specification and BOQ, the BOQ prevails.

SECTION-I SPECIFICATIONS (GENERAL)

11.0 SCOPE

A) The specification covers the general requirement for manufacturing, inspection, testing & supply, installation, testing & commissioning of 320 KVA SILENT Diesel Engine driven alternator suitable for operation with Auto Mains Failure system along with AMF panel, cabling etc as per the site. Loading, unloading, transportation of new D.G., new AMF Panel are in the scope of Supplier/Contractor including requisite Civil works.

B) The alternator is driven by I. C. Diesel Engine as per following technical specifications.

Specification for the Alternator - Section II

Specification for Engine - Section III

Specification for soundproof enclosure - Section IV

Specification for AMF Panel (inclusive of - Section V Control & Monitoring Panel)

C) Vendor to obtain statutory permissions like CEA, PCB/ CPCB as per the requirement. The offered DG set must have type approval meeting CPCB-4 norms for smoke emission and also noise emission.

11.1 Documents to be submitted with Technical Bid:

a) Alternator

b) Engine

c) AMF Panel

d) Documentation

G.A. drawing of the complete assembly shall be submitted for approval before commencement of work.

11.2 ENVIRONMENT

The DG set shall be suitable for satisfactory operation under the following conditions:

Ambient Temperature range: 8 C (min.) to 36 C (max.)

Precipitation during monsoon: Heavy rainfall

Relative Humidity: 98%

Altitude from MSL: Around 900 Mtr.

Location: Bangalore

11.3 Installation location

The DG set shall be installed outdoor in acoustic enclosure (specification for which has been provided in the document) at Indian Institute of Science, Bangalore-560012, Karnataka.

11.4 General

- a. All the supply & work shall be in accordance with the relevant IS Specifications, recognized standards, modern approved practice and shall meet the requirements of the latest issue of applicable codes, factory rules and regulations, supply codes.
- b. All the materials & accessories provided by Contractor under terms of this contract shall confirm to relevant IS Specifications samples of all equipment's, materials, and accessories to be supplied by Contractor shall be submitted for the approval of Engineer before the use.
- c. Contractor shall provide all necessary labor, tools, scaffolding and requisite work like drilling, cutting, welding at his cost.
- d. Good workmanship is the essence of this contract and shall be complied with at all times. The Contractor shall have the works supervised by qualified & experienced Engineer. All the defects pointed out by the Engineer shall be rectified immediately by the contractor free of cost.
- e. Applicable Indian Electricity Rules, Act (latest), CPCB Norms and all other statutory regulations that might be relevant to the installation shall be followed.
- f. No alteration which may affect the structures and architecture of building shall be done without the prior approval of the engineer. All work shall be carried out in such a manner that it should not

cause any inconvenience to other works which are under progress. The Contractor shall cooperate with other agencies in the area for the smooth execution of all works.

- g. Accidental damage to any property shall be reported immediately to site engineers and letter confirmed in writing.
- h. Operation and Maintenance spares: -
Bidder shall provide the list of spares required as standby to maintain the DG Set in Good working condition.

11.5 Tests and Inspection:

The authorized representatives from IISc may visit the works during manufacture of equipment to assess the progress of work as well as to ascertain that only quality raw materials are used for the same. They shall be given all assistance to carry out the inspection without any extra cost.

To conduct factory and site load test as per requirement as stated in the Tender specification including sufficient sized load bank in order to conduct full load testing as required. **For factory test, the cost of travelling to the factory, lodging & boarding expenditure of 2 persons to be included in the rate quoted.**

For Diesel Engine:

Manufacturer's internal test certificates in line with IS-10002 / BS-5514 shall be furnished for review and vetting by the engineer/engineers during inspection of combined assembly DG set.

For Alternator:

Manufacturer's internal test certificates in line with IS-4722 - 1968 shall be furnished for review and vetting by the engineer/engineers during inspection of combined assembly DG set.

11.6 All major items/equipment's i.e. engine & alternator in assembled condition, associated AMF panel etc. shall be offered for inspection & testing at factory/ manufacturers work.

- a) Complete set along with AMF panel shall be tested for control wiring, manual, automatic start, stop function including fault tripping/ protection of the set. AMF panel shall be tested separately for all routine & functional test prior to load test.
- b) Dimensions and Alignment.
- c) DG Set control panel, safety / protective devices, interlocks, IR, HV, Phase sequence, voltage regulation, frequency.
- d) Partial load test at 50% and 75 % for one hour each and fuel consumption will be recorded
- c) Full Load testing of complete set at 100% rated load with acoustic enclosure till the differential temperature remain steady but not less than 3 h r s . The engine and alternator parameter shall not exceed the guaranteed value during the testing. Fuel consumption shall be recorded.
- d) Overload testing at 10% overload for one hour immediately after the full load test.
- e) Over speed test (1.2 times the rated speed for 2 minutes)
- f) Transient response and Governor response tests for sudden application and rejection of loads of 25%, 50%, 75% & 100% of the rated capacity.
- g) Smoke test certificate as per rules.
- h) The noise level at 1 m from the enclosure and the temperature rise inside the enclosure shall be measured during the load test.

DG Vendor to Study Site & Confirm Transportation of DG set to location without Dismantling any component after Factory Test is Conducted. **Vendor to make all constructional damages good to any part of the building during transportation, unloading.**

11.7 Site Testing:

Following tests shall be conducted at site in the presence of the Engineer during commissioning. The contractor shall provide all testing equipment, labour and

consumables required for the testing (Diesel oil shall be arranged by the contractor only) with DG set load testing as stipulated in specifications/BOQ. Entire cost is to be borne by Vendors.

- a) Checking the alignment by engine manufacturer's representative and obtaining approval.
- b) HV, IR, continuity, phase sequence, frequency, voltage regulation test on alternator, control panel and cabling.
- c) Checking the AMF operation both on auto and manual mode, start, stop, tripping / protection, IR, HV, functional and routine tests.
- d) Checking the DG Set safeties and interlocks for satisfactory operation.
- e) Checking vibration levels.
- f) Testing of individual protective devices on engine and alternator & ensuring that the wiring is carried out properly.
- g) The DG set shall be tested for load available at site for minimum one hour. All the readings shall be logged to evaluate the fuel consumption, lube oil pressure, water and oil temperature vis-à-vis the electrical load.

Any deviation from the guaranteed parameters shall be made good and these performance parameters should be measured once again till the required results are achieved.

The DG set shall be deemed to be commissioned after satisfactory performance of all associated equipments.

11.8 Compliance:

- a) The DG set being provided by the bidder shall comply with latest environment protection rules and latest BIS standards. Conformance label as per the said rule is to be affixed on the DG set. A copy of each type approval certificate and conformity of production certificate is to be provided in along with the offer. Supplier shall clearly specify the codes and standards for designing manufacturing, inspection and testing of the DG Set along with the bid. The DG Set shall have one-hour overload capacity of 10% in every twelve hours of duration of operation.
- b) All the cables route to be marked at both sides of cable termination with brass plate and letter to be imposed.
- c) Other staff training shall include training sessions provided on site after hand over of the system. The training sessions shall be given by an experienced and competent engineer familiar with system installed. The scope of training provided shall include full operating instructions in the use of DG Set.
- d) The contractor shall provide operating instruction as required for operating the system. "Hands-on" demonstrations of the operation of all system components and the entire system including program changes and functions shall be provided.
- e) The contractor and/or the systems manufacturer's representatives shall provide printed Sequence of Operation sheets for ready reference.

SECTION -II ALTERNATOR SPECIFICATION

1.0. Rating & General

The DG Set shall be Prime Power rating Duty as per ISO: 8528-1. It comprises of alternator which shall be self -excited, self-regulated and shall be rated for an output of 320 KVA Continuous Duty Power at 415 Volts, 3 Phase, 50 Hz suitable for the 4 wire system exclusive of power requirement of auxiliaries. Winding is to be STAR connected and neutral shall be brought out through a separate terminal and will be solidly grounded.

Rating	:	320 KVA (Continuous Duty)
Voltage	:	415 Volt 3 Phase with neutral brought out through separate terminal
Frequency	:	50 Hz Degree
of Protection	:	IP23
RPM	:	1500 RPM
Duty Rating	:	Continuous S1 Short
circuit withstand	:	
Capacity	:	3 times FLC for 10seconds
Overload	:	10% overload for one hour in 12 hours
Suitability for parallel	:	
Operation Harmonic	:	
Distribution factor	:	NL L-L □2.5%
Unbalanced Load	:	25%
Ball Bearing	:	SINGLE

1.1 Excitation

Self-excited, self-regulated and with brushless type **solid state excitation** facility. The rectifier shall be suitable for operation at high ambient temperature at site as indicated in Specification. Over excitation protection shall be provided as per Alternator Manufacturer standard.

2.0 Standards

The alternator shall be in accordance with latest editions of the following standards:

- i) IS : 4722/ 68 & BS : 2613/ 1970. The electrical performance of rotating electrical machine.
- ii) IS : 4889/ 68 & BS : 269/1970, Rules for method of declaring efficiency of electrical machine.
- iii) Other IS/BS/IEC/EN applicable for design, manufacturing, testing and supply of subject Alternator/DG set like IEC 43, BS 6250, EN62581, IS13364 (I&II) with CE marking.

3.0 Voltage Regulation:

An automatic voltage regulator system compatible with excitation system described above shall be provided, so as to furnish a performance as defined herein under all conditions of loads. The AVR shall be static type with provision for control from remote through push buttons.

4.0 Performances:

Voltage regulation from no load to rated load shall be within a range of 2.5% for rated voltage. The frequency regulation from no load to full load shall be as defined by the Engine Governor. Voltage dip for any addition of load upto and including 60% load shall not exceed 15% of rated voltage and shall recover to and remain within the steady band within not more than 1.5 sec. Similarly, the frequency shall recover to the steady state frequency band within 5 seconds. The windings shall not develop hot spots exceeding safe limits due to an imbalance of 25% between any two phases from no load to full load.

5.0 Enclosure

Alternator enclosure should be screen protected drip proof (IP23) conforming to IS : 4691 – 1968.

6.0 Terminal Box

It shall be suitable for necessary PVC insulated 1.1 KV grade 3 Nos. of 3.5Core240 sqmm Al. armoured cable conforming to IS : 1554 – Part – I with sufficient space for trifurcation inside the box. Necessary individually removable gland plates, cable lugs, connections shall all be included. Suitable segregation shall be available for other cables such as excitation, control etc. The terminal box shall be suitable for withstanding the mechanical and thermal stresses developed due to any short circuit at the terminals.

Two Nos. earth terminals on opposite side with vibration proof connections, nonferrous hardware etc. With galvanized or plated and passivated washers of minimum size 12 mm dia. shall be provided.

7.0 Windings : Class H insulation shall be used.

8.0 Space Heaters

Space heater to be incorporated in the alternator to maintain the winding temperature such that it does not absorb moisture during long idle periods. The heater terminals shall be brought to a separate terminal box suitable for 240 V 50 Hz AC supply.

9.0 Under Speed Protection:

Alternator shall be provided with under speed protection.

10.0 Wave Form:

Sinusoidal Wave form with THD content line to line on no load shall be less than 5%.

12.0 Transient Voltage Dip:

Transient voltage Dip due to sudden application of full load shall be taken care.

13.0 Radio interference shall meet VDE 0875(N).

14.0 Painting, Packing and Transport

All metal surfaces shall be thoroughly cleaned of scale, rust, and grease etc. prior to painting. Cleaned surface shall be given two coats of primer and prepared for final painting. Final finish shall be free from all sorts of blemishes.

The equipment shall be shipped to site suitable packed to prevent and damage. Each package shall have labels to show purchaser's name, purchase order and equipment no. Suitable lifting lugs etc. shall be provided and lifting points shall be clearly marked on the package. Packing shall be suitable for storage at site for a minimum period of 8 months.

SECTION - III ENGINE SPECIFICATION

1.0 SPECIFICATIONS FOR DIESEL ENGINE

1.1 Engine

The major subassemblies of the prime mover shall be as follows:

- i) Four stroke diesel oil engine, Battery starting type, Turbocharged, coolant cooled/Water cooled, Forced feed lubricated with its auxiliaries.
- ii) Steel channel fabricated common base plate (skid) for engine and alternator along with anti-vibration mounting pads.
- iii) Flex Plate cum Fly Wheel Bolted type coupling method between Engine and Single Bearing type Alternator.
- iv) Control system for the Diesel engine.

1.2. The engine shall be rated suitably to meet the requirement of alternator at its maximum rating and overload of 10% of the rated output for 1 hour in 12 hours of running as per Prime Power Duty definition mentioned in ISO:8528-I.

13 The diesel engine offered shall be suitable for operation with high speed diesel oil as per IS : 1460 Grade A. Performance requirement of the engine shall meet the requirement of IS-10002/BS-5514 standards (latest editions).

14 The diesel engine shall be furnished with all accessories like governor, daily service fuel tank, exhaust piping with exhaust silencer (Residential type silencer) and spark arrestor etc. The fuel tank shall be 480Ltr Capacity and shall be fitted within Acoustic Enclosure with visual fuel level indicator/ Gauge, fuel level switches, fuel filling in remote mode with steel channel structure to mount the tank and inter-connecting fuel piping,

15 The engine set shall have proper instrumentation & control for semi - automatic operation as per the following:

1.5.1 Unit Start-Up

The DG set shall be started by means of battery. The unit shall be controlled locally for inspection, periodic start-up, check and normal operation. It shall have the facility to remotely switch on/off through auxiliary potential free contacts of relay to be provided in the AMF Panel. The engine control circuit shall provide terminal contacts for permissive signal to run/ stop from an external relay contact that will close by shorting the terminals and allow the engine to start/ stop on remote mode from Owner's control panel.

1.5.2 Unit Shut Down

The shutdown of DG shall be made effective through a STOP solenoid switch mounted in the engine. The DG set shall permit:

- a) Immediate automatic shut-down of the unit due to irregular operation and shall have provision for creating audio-visual signals of shut- down cause at the AMF panel which shall include the following:
 - i) Low lube oil pressure (through a pressure switch).

- ii) High Jacket water temperature (through a temperature switch)
 - iii) Diesel tank fuel level low(through a level switch).
 - iv) Engine fails to start.
 - v) Engine over speed.
- b) To facilitate generation of these fault signals suitable instruments/relays having required potential free contacts shall be provided for effecting the above. All these potential free contacts shall be wired to terminate in a separate terminal strip with proper identification in the engine local control panel. Status of potential free contact shall be changed as soon as above-mentioned parameters reaches/ crosses their acceptable limits. Initially during the starting lube oil pressure switch shall be bypassed and will regain its normal status after start. **Necessary provision shall be made for remote starting/stopping of the engine through push buttons mounted in the AMF panel.** All the above-referred contacts shall be wired up to a terminal strip for wiring up to remote AMF panel.

16 Operation

Suitable facilities shall be provided for operation and monitoring of the Engine which shall include the following: -

For status monitoring (local), following gauges shall be available in engine local control panel.

- i) Engine Lube oil pressure gauge
- ii) Engine Jacket water.
- iii) Ammeter for battery charging.
- iv) DG set in Local / Remote / Manual indication.
- v) Digital hour-cum-RPM indicator.

17 Lubricating oil system

- 1.7.1 The engine shall be complete with its own self-contained lubricating oil system in which all the moving parts shall be lubricated by force feed system with the pump driven by the power drawn from the engine.
- 1.7.2 The lubricating oil sump shall have such capacity so as to ensure continuous operation of 48 hours without makeup.
- 1.7.3 Heat exchanger type in-built lube oil cooler shall be provided for cooling the lube oil.
- 1.7.4 Full flow paper / felt element lube oil filters (simplex / duplex) shall be provided at the beginning of lubricating oil circuit. Filter shall be equipped with a by-pass arrangement to make it possible to change the filter (while the engine is running) by using by-pas filter.
- 1.7.5 As per the manufacturer's standard design, lube oil pump shall be provided for providing lubrication when the engine is not running.

18 Starting system

The engine shall be started from cold by automotive type lead acid battery both locally or from remote.

1.8.1 Electrical system

Engine electrical system shall consist of the following:

- i) **Battery:** Automotive low maintenance type lead acid battery of reputed brand and having sufficient capacity & terminal voltage for continuous duty application and for 3 consecutive no. of starts of the engine shall be supplied. Battery capacity & the

connecting cables sizes shall be adequate so as to avoid problem of poor starting of the engine. The battery capacity shall not be less than 12Volt 180AH. Supplier shall furnish details of Battery capacity calculations along with the bid.

- ii) **Dynamo:** A dynamo shall be provided with the engine. This Dynamo shall be generating a charging current whenever the engine is operating. This shall be sufficient to continuously charge the battery.
- iii) For facilitating battery trickle /boost charging during idling of engine, the battery shall have a static battery charger to be installed in the AMF panel.
- iv) **Starter Motor:** The cranking of the engine shall be through a starter motor. The starter motor shall be provided with sealed type bearing.
- v) All the interconnecting cables (Except main Power cable) with require no. of core for interconnecting fuel tank level switches, DG starting battery to Engine and to AMF panel, all the engine control/ protection parameter from engine to AMF panel including interconnection of AMF panel to Owners MCC panel where DG incomer & Main incomer are located shall be in the Vendor scope of supply. Supplier shall furnish details of electrical parts & its make for which the make/details are not mentioned in the tender.

19 Exhaust System

- 1.9.1 Exhaust piping shall be provided by the Vendor as per the Pollution Control Board's guidelines of the relevant state.
- 1.9.2 Exhaust piping system should be adequately insulated and protected by a robust Aluminium cladding cover over glass wool and a shield to prevent fuel spray on to the cladding cover, in case of failure of fuel injector piping. The exhaust piping system shall be complete in all terms to provide the exhaust piping from engine to outside atmosphere within battery limit.
- 1.9.3 Exhaust silencers (residential type) with spark arrestor shall be supplied with the engine. The silencer shall be provided with 50 mm thick glass wool insulation and with 26 SWG Aluminium cladding.
- 1.9.4 The silencer shall be straight through type with drain plug at lowest point and one accessible clean out part. The silencer shall be finished with rust preventive primer. Flexible sections shall be connected between the exhaust pipe and the engine exhaust manifold. The flexible exhaust pipe shall be of carbon or stainless steel, smoke tight and inner diameter same as of exhaust pipe. The exhaust piping shall be extended beyond roof of the shed.
- 1.9.5 All the additional pipe, bellow, vertical length, right angle bend, horizontal length including cladding of pipe with all required glass wool cladded with Aluminium foil/sheet as deemed fit, shall be supplied by the Vendor. The DG Set shall be kept in open. Details of lengths for each part of the exhaust system shall be indicated.

110 Fuel Oil System

- 1.10.1 The fuel oil circuit shall include: -
 - i) Independent daily service tank of 480ltrs. capacity or continuous operation of 12 hours shall be provided. The fuel tank shall have provision for flanged inlet/outlet connections, vent, top cover with opening, overflow drain, drain plug, breather and also necessary level monitoring instrumentation and alarm. Fuel tank shall be installed/ housed within Acoustic Enclosure.
 - ii) Manual type fuel transfer pump for filling of fuel tank like in automobiles as per site condition.
 - iii) Pipe, flanges, fittings, valves, gaskets and all other material required for the circuit i.e. from fuel tank to Engine.

- iv) Full flow fuel filters, fuel inlet & outlet, air vent, drain plug etc. Level indicator inside the fuel tank and level switch (High & low) indication on Control Panel with alarm to be provided.
- v) Fuel tank shall be fabricated from 2 mm thick CRCA sheet.
- vi) The fuel level shall be measured through a dip stick / Gauge /Electronic fuel indicator with high and low level indications.
- vii) Fuel tank shall be provided with strainer.
- viii) Fuel tank connected to engine with wire braided fuel pipes.
- ix) The fuel tank shall be painted after Antirust treatment as mention in Sound Proof Enclosure specifications.
- x) The minimum capacity of fuel tank shall be 480Ltr with lockable top cover.
- xi) The fuel tank preferably shall be located at Subbase/ within Acoustic Enclosure as per approved design by DG Set OEM/ Manufacturer.

1.11 Cooling System

- 1.11.1 The engine waste heat shall be dissipated to a closed circuit water system which in turn shall be cooled by radiator cooling system driven by the power from the engine. The proposal shall be complete including the necessary pipe work for radiator, accessories etc. for the cooling system.
- 1.11.2 Engine jacket water shall be circulated by an engine driven self priming pump.
- 1.11.3 Jacket water valve / Thermostatic switches for temperature control and alarm will be provided as per design.
- 1.11.4 Radiator Heat Ducting shall be provided as per the site condition.

1.12 Engine Governor

- 1.12.1 An over speed device required to shut off the system.

1.12.2 Fly Wheel

Engine shall be fitted with a heavy flywheel with guard to ensure smooth operation throughout the speed range and at rated power. The effect of this fly wheel shall be such that cyclic irregularity of the system should comply with (or better than) the limit laid down in BS-5514.

1.13 Name Plate

A corrosion resistant name plate of proper size shall be securely fastened by stainless steel pins at an easily visible and accessible point on the engine and gear unit. The name plate shall be stamped with the following information.

- i) Type, Model and Serial Number
- ii) Brake Horse Power
- iii) RPM
- iv) Manufacturer's Name
- v) Conform to which standard.
- vi) Weight
- vii) Firing order of the engine.
- viii) P.O.No.

In addition to the above an arrow shall be stamped at an easily observable point on the engine to indicate direction of rotation.

SECTION - IV SOUND PROOF ENCLOSURE

1.0 CONSTRUCTION

- a) The Enclosure should be designed for easy access to serviceable parts.
- b) Modular construction for easy assembling and dismantling.
- c) Fabricated out of CRCA sheet of 1.6 mm. Base Frame shall be made out of ISMC of suitable sections or made out of sheet steel minimum of thickness 5 mm.
- d) The hardware shall be of high tensile grade i.e. bolts of 10.9/8.8 grade. Hardware should be passivized.
- e) Battery should be accommodated in a separate tray in the enclosure.
- f) There should be provision for drain plugs for draining mobile oil.
- g) The doors should be gasket with high quality EPDM gaskets to avoid leakage sound.
- h) The door handles should be lockable type and tamper-proof.

1.1 PAINTING (for Fuel tank, Soundproof Enclosure, AMF Panel, Control Panel etc.)

- a) The sheet metal components should be hot dip seven tank pre-treated.
- b) Proper Antirust treatment shall be provided to suit the location
- c) To have long life of container it should be P.P. based powder coated (inside as well as outside).
- d) Base frame should be epoxy quoted when fabricated.

1.2 ACOUSTIC ENCLOSURE

- a) Sound proofing of enclosure should be done with quality rock wool/mineral wool confirming to IS-8183 of 64 Kg/M³ density.
- b) The rock wool /Glass wool should further be covered with fibre glass cloth/fiber tissue paper fire resistive and perforated powder coated sheet of 0.6 mm thickness.
- c) Residential silencer shall be provided within the DG to control the exhaust noise.
- d) Interconnection between silencer and engine should be through stainless steel flexible hose/pipe.
- e) Attenuators should be provided to control sound at air entry to the container and exit from the container.

1.3 VENTILATION AND AIRCIRCULATION

The system shall be engineered to provide air inlet/exhaust acoustic louvers for efficient air circulation and shall have following special features:

- a) Adequate ventilation is to be provided to meet air requirement for combustion and heat removal.
- b) The temperature inside the enclosure shall not exceed 40 degree centigrade above ambient under full load condition while ambient is below 35 Deg. C. under the shed. There should be no Derating due to temperature under Full load condition (100% load).

1.4 ELECTRICAL

- a) The earthing point shall be isolated through DMC insulator mounted on enclosure.
- b) Control panel should be mounted in the container itself. All parameters should be visible from outside and all push buttons accessible easily.

1.5 GENERAL

- a) Engine carries warranty/guarantee of engine manufacturer for the DG Set in the enclosure of Silent Diesel Generating Set.
- b) Emergency Stop Push Button shall be provided outside the container. The maximum sound pressure level shall be average <70 db(A) at one meter from the enclosure at Free field condition at 75% load as per CPCB-4 Norms.

SECTION - V AMF panel

Supply, Erection, testing and commissioning of AMF panel with auto start /Stop suitable for 320 KVA DG Sets. The panel is of cubical type base mounting control panel with hinged doors, undrilled bottom gland plate, aluminium Bus Bar with the accommodation for 4P,630 A MCCB for alternator with thermal O/L relay, short circuit protection, Microprocessor based AMF DG Set controller module with supply failure timer, Restoration timer, 3 impulse automatic engine start/stop logic, Mains/generator voltage, 436V and 8/12 window annunciator panel. capacity bypass switch and frequency sensing, DG Controller as per DG Set manufacturer standard Practice controller with water temperature/Lube oil pressure/ engine speed, Voltage/ampere/Frequency/ KVA, Running-hour count, No of starts, Fault indication, over / under speed, Fails to start, Low oil pressure, High engine temperature, Under/over voltage, over current, Earth fault relay, with indications for Mains on, Load on Mains, Battery charger on Push buttons AMF module by pass Mode, Battery charger unit with inbuilt Auto/Manual and Flat/Boost facility.

1.0 AMF Panel (inclusive of Control &Monitoring)

The AMF panel shall be inbuilt with DG set type with hinged type doors suitable for 415 Volt 50 Hz AC supply.

- i. The normal power supply shall be constantly monitored by a mains voltage monitor. When the mains voltage fail or drops below 80%, D.G. set should start.
- ii. System shall permit 3 attempts for starting the DG set: failing which the annunciation circuit shall be activated for alarm.
- iii. If the engine starts during 3 attempts & the engine reaches its operating speed and the alternator its operating voltage, the cranking circuits shall be isolated, and the load shall be transferred to the DG set.
- iv. Upon return of the normal supply voltage of 90% (adjustable & selectable) of the rated voltage for a minute, the load shall be transferred to the normal source. However, the DG set shall continue running for 3 minutes and then stop.
- v. If the DG set fails to start and reach its operating speed in 25 seconds in three attempts the DG set shall automatically be disconnected and locked in isolated position.
- vi. A clock / time switch shall be provided for automatic run of lube oil primer pump of the Engine for a specified period of time. The DOL starter of the lube oil priming pump shall be provided in the AMF panel. The control signal as per the preset time shall be used to start & stop the DOL starter.
- vii. The AMF system shall include a battery charger for trickle / boost charging of AMF panel battery and DG set battery during DG set idling period. The charger shall be of approved capacity to cater to the battery requirements.

- viii. All control fuses shall be of link type (HRC) conforming to ISS. Rewireable fuses shall not be accepted. All fuses shall be readily accessible for replacement. Fuses shall have an operating indicator which will be visible without removal of fuses from the service. It shall not be necessary to remove any piece of equipment or to disconnect any wiring before replacing the fuses.
- ix. The following details of the existing DG sets / Control panels can be collected from the site before quoting.
 - a) Engine Make/ Model
 - b) Alternator Make/ Frame Size/ KVA Rating
 - c) Date/ Month/ Year of Commissioning
 - d) Type of Governor existing.
 - e) Type of AVR existing.
 - f) DG Set Controller Make/ Model existing.
 - g) Panel SLD/ Wiring Drawing.
 - h) Qty x Type of MCCB used in existing Panel.

ix AMF panel should be suitable to accommodate incomer and outgoing with armoured copper control cable as reference incomer, 3Nos. of 3.5 core 240 sqmm armoured cable for output from AMF Panel to Building Distribution Panels.

2.0 **Construction:**

- 2.01 All dimensions in mm.
- 2.02 Degree of Protection IP54.
- 2.03 Danger Notice Board shall be provided.
- 2.04 AMF Panel shall have following sections.
 - i) Control & Monitoring Section.
 - ii) Change over & power section.
- 2.05 Main Switch Board frame : 2 mm thick CRCA sheet.
- 2.06 Base Frame : 100 x 40 x 4 mm
(Base frame should be independent of Main Panel)
- 2.07 Frame for MCCB : 2 mm thick CRCA sheet
Protection relays, Contactors, instruments etc.
- 2.08 Partitions(internal/external) : 2 mm thick CRCA sheet
- 2.09 Fixing bracket for MCCB, Protection Relays, Contactors, Rectifiers & other Control & Monitoring compartments : 3 mm thick CRCA sheet
- 2.10 Doors : Hinged type door made of 2 mm thick CRCA sheet
- 2.11 Earthing Terminals (interconnected with 25 x 3 mm Copper strip) : 2 Nos
- 2.12 Gland Plate : 3 mm thick CRCA sheet
- 2.13 Rating of Busbar : 800 Amps aluminum Bus bar

- 2.14 Riser Connections for MCCB's ----- do -----
- 2.15 Breaking Capacity : 50 KA
- 2.16 Control Circuit Voltage : 110 V 50 Hz AC
- 2.17 Control Circuit wiring : 2.5 sq. mm PVC FRLS
Insulated Copper wire
- 2.18 Control cable from DG Set to AMF & PCC : 2.5 sq.mm, 4sq.mm Copper
conductor armoured (No. of cores
depend on Control
Circuit/Mounting)
- 2.19 Panel manufacturer should have in house fabrication plant with CNC turret punching & NC bending machine. Manufacturer should have 7 tank pre-treatment cleaning process & powder coating plant. If panel fabrication is to be outsourced by the contractor, the details of such panel manufacturers should be included in the offer.

SECTION - VI

TECHNICAL DATA SHEET & DOCUMENTATION
(DOCUMENTS TO BE SUBMITTED WITH TECHNICAL BID)

1.0) DATA SHEET (Alternator)

Sr. No.	Details of Particulars	To be filled by Vendor
1.	Make :	
2.	Governing Specifications	
3.	Full load output in KVA	
4.	Ingress protection class of enclosure	
5.	Speed/ Frequency	
6.	No. of phases	
7.	Is neutral brought out?	
8.	Voltage between phase/ neutral	
9.	Regulation band of voltages	
10.	Short time overload at : 110 % load	
11.	Efficiency at 0.8 p.f. at various loads	
12.	Exciter type	
13.	Three phase sustained short circuit current	
14.	AVR make, type & response time AVR shall be suitable for control from remote through push buttons.	
15.	Overall dimensions set (mm)	
16.	Weight of set overall (kg)	
17.	Head room needed for lifting/ Servicing	
18.	Other features of Alternator which are not covered above	

DATA SHEET - ENGINE

Sr.No.	DESCRIPTION	To be filled by Vendor
	GENERAL	

1.	Model no.	
2.	Manufacturer : Cummins/ Caterpillar India/ Perkins/Volvo Penta	
3.	Number of cylinders	
4.	Bore/stroke	
5.	Displacement volume(cc)	
6.	Compression ratio/bmfp	
7.	Piston travel-continuous Speed	
8.	Continuous HP at max. Continuous rated speed.	
9.	Continuous max. Rated rpm	
12.	Normal working rpm	
FUEL SYSTEM		
14.	Fuel consumption at 0.8 power factor with	
a)	256 KW/320KVA	
b)	192 KW/240 KVA	
c)	128 KW/160KVA	
d)	64 KW/80KVA	
15.	Fuel tank capacity	
LUBRICATION SYSTEM		
18.	Lube oil grade	
19.	Lube oil consumption	
20.	Lube oil filter - type and replacement period	
COOLING SYSTEM		
21.	Type of mechanism of cooling	
AIR INLET SYSTEM		
	Air filter: type and replacement period	
22.	HP/WATTS absorbed by radiator fan	
EXHAUST SYSTEM		
23.	Exhaust gas temperature at At stack at full load	
24.	Maximum permissible exhaust back pressure at full load	
STARTING SYSTEM		
25.	BATTERY a) Make b) Voltage grade c) AH capacity d) Solenoid start switch make e) Whether suitable for 6consecutive starts (yes/no)	

Cabling (specify cable sq.mm, no. of cores) All control cables of 2.5 sq.mm. Copper armoured	
26.	Instrumentation system Make of level switch Make of pressure switch Make of mechanical Hour meter/ Digital hour Meter Make of pressure gauge, temperature gauge and other gauges.
27.	Noise level at 1 m,< 70 db
28.	Governor Type, make and tolerance

Note:

1. Information/data marked as **To be filled by Vendor** shall be furnished by the bidder along with the offer. Failure to furnish data/information shall make the offer liable for rejection.
2. The bidder may supplement the data sheet to suit the particular design and model of engines offered and ensure that all relevant technical data and information are included in the datasheet.
3. Complete technical data on all auxiliary items such as governor, pumps, motors (if any), starting system, instrumentation and control system, etc. shall be included in the datasheet.
4. The materials details for the above items as applicable shall also be furnished.
5. List of deviations if any, shall be furnished as per Annexure -I indicating respective clause no. & details of deviation thereof.

Approved Makes

Sl.No.	ITEM DESCRIPTION	MAKE
1	Engine	Cummins/ Perkins/ Caterpillar/ Mitsubishi/Kirloskar
2	Alternator	Stamford/ Leroy Somer
3	Air circuit breaker	Schneider / L&T / ABB /SIEMENS
4	MCCB	Schneider / L&T / ABB / SIEMENS
5	Relays	AVK-SEGC / ABB / Tele technique / L&T /Schneider
6	Power factor relay	Epcos / Ducati / Beluk / Enercon / Meher
7	Change over switch	HPL / Schneider / L&T / ABB
8	Power contactors	L&T / ABB / SCHNEIDER / TELEMCHANIQUE
9	Instrument transformers	Kappa / Kalpa / Intrans / Voltamp
10	Capacitor banks with series reactors with harmonic filters	Epcos / Ducati / Meher
11	LT panel fabrication including Bus duct	Power Control Equipments / Lotus Power gear / CPRI Approved
12	Meters	Conserv/ L&T/ AE/Elmeasure
13	Panel accessories / terminal block	As per manufacturer specified make
14	MCB / MCB DB	Legrand / Schneider / Havells / L&T / ABB
15	ELCB / ELMCB / RCBO	Legrand / Schneider / Havells / L&T / ABB
16	LT Cable	Poly Cab / Havells /KEI
17	End Termination Materials	Dowels / SMI / Wago
18	MS Powder coated Cable Tray	As per panel fabricator
19	PVC Conduits - FRLS	VIP / Avon / Precision / Universal
20	PVC Wires& Flexible Cables - FRLS	Polycab/ Havells/ Anchor
21	Modular switches and socket	Anchor Woods / MK / Legrand / L&T Oris
22	Industrial sockets	Legrand / L&T / ABB
23	Light fixtures - working area	Philips / Wipro / Thorn / GE
24	Light fixtures - decorative	Philips / Wipro / Thorn / GE
25	Street light pole	Klite / Shubham / Jindal
26	Glands - Single / Double Compression	Dowells
27	Aluminium / Copper Lugs	Dowells
28	Aviation Light	Bajaj / eq.
29	Surge Arrestors	L&T / ABB / OBO Betterman