Ref.: TIFR/PD/CF17-136/172307

NIT cum Tender Document (TWO PART PUBLIC TENDER) for the following works:

| Design, Fabrication, Supply, Installation, Testing & Commissioning of Cubicle Type Panels for Central Workshop at TIFR, Mumbai As Per Attached Tender Document |

<table>
<thead>
<tr>
<th>Tender No.</th>
<th>TIFR/PD/CF17-136/172307</th>
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<tr>
<td>Estimate Cost</td>
<td>Rs. 56 Lakhs</td>
</tr>
<tr>
<td>Tender Fee</td>
<td>Rs. 1000/- by way of Demand Draft in favour of Registrar, TIFR, Mumbai</td>
</tr>
<tr>
<td>EMD</td>
<td>Rs. 1,12,000/- by way of Demand Draft in favour of Registrar, TIFR, Mumbai</td>
</tr>
<tr>
<td>Type of Tender</td>
<td>Two Part Public Tender</td>
</tr>
<tr>
<td>Time of Completion</td>
<td>06(SIX) Months from the date of award of contract</td>
</tr>
<tr>
<td>Contact Persons</td>
<td>Shri K.B. Kajrolkar (Tel : 22782095), Shri A.P. Singh (Tel. 22782688), Shri Sangam Sinha (Tel. No. 22782325)</td>
</tr>
</tbody>
</table>

Technical Service for any technical clarifications.

| Last Date for Submission of Tender | 11th April 2018 on or before 1730 Hours |
| Date of Opening Technical Bid (Part “A”) | 12th April 2018 at 1500 Hours (Only Technical Bid Part “A”) |

Both Technical Bid (Part A) and Financial Bid (Part B) to be submitted within the due date and time in separate envelopes and marked on top as Part A and Part B. These two sealed envelopes should be further put in one Master Envelope superscribed with the Tender No., Due Date in Bold Letters.

All prospective bidders are requested to visit our website regularly for any such updates/corrigendums.

Please see attached sheet for conditions of tender.
TENDER DOCUMENT

Name of Work

Design, fabrication, supply, installation, testing and commissioning of Cubicle type Panels for Central Workshop at T.I.F.R., Colaba, Mumbai 400 005.
# INDEX

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CHECK LIST

Two Part Bidding
i) Technical Bid Part “A”
ii) Financial Bid Part “B”

Before submitting the tender, the bidder must check the following:

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<th>Sl. No.</th>
<th>Description</th>
<th>Yes/No</th>
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<td></td>
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<tr>
<td>3</td>
<td>Schedule of Quantities (Along with Financial Bid)</td>
<td></td>
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</table>

Signature of the Tenderer with date and seal

Contractor’s Signature  

Date:
GENERAL CONDITIONS OF CONTRACT
GENERAL CONDITIONS OF CONTRACT

1.0 Definition of Terms:

1.1. In constructing these general conditions and the specifications the following works shall have the meanings herein assigned to them unless there is something in the subject or context inconsistent with such construction.

1.2. The term ‘Contractor’/‘Supplier’/‘Bidder’/‘Vender’ shall mean the Tenderer whose tender has been accepted by the Owner and shall include the Tenderer’s heirs, successors and assigns approved by the Purchaser.

1.3. The ‘Purchaser’ shall mean Tata Institute of Fundamental Research, Homi Bhabha Road, Colaba, Mumbai – 400 005 and shall include the Purchaser’s heirs, successors and assigns.

1.4. The term ‘Sub-Contractor’ shall mean the firm or persons named in the contract for any part of the work or any person to whom any part of the work has been sublet with the consent in writing of the Chief Engineer and shall include his heirs, successors and assigns approved by the Purchaser.

1.5. The Term ‘Inspector’ shall mean any person appointed by/or on behalf of the Purchaser to inspect supplies, stores or work under the contract or any person deputed by the Inspector for the purpose.

1.6. The term ‘Particulars’ shall mean, the following:

a) Specifications
b) Drawing
c) Sealed Pattern denoting a pattern sealed and signed by the Inspector.
d) Proprietary make denoting the produce of an individual firm.
e) Any other details governing the construction, manufacture and/or supply as existing for the contract.

1.7. The term ‘Engineer’ shall mean Engineer, Central Services, Tata Institute of Fundamental Research, Colaba, Mumbai or some other person for the time being or from time to time duly appointed in writing by the Owner to act as Engineer for the purpose of the Contract or in default of such appointment the Purchaser.

1.8. The term ‘Specification’ shall mean the specifications annexed to or issued with these Conditions of Contract.

Contractor’s Signature

Date:
1.9 The term ‘Site’ shall mean the place or places at which the Equipment is to be delivered or work done by the Contractor shall include where applicable the lands and buildings upon or in which the works are to be executed and shall also include the place or places at which fabrication and other work is being carried out by the Contractor.

1.10 ‘Electrical Equipment’, ‘Stores’, ‘Work’ or ‘Works’ shall mean and include equipment and materials to be provided and work to be done by the Contractor under the Contract.

1.11 The ‘Contract’ shall mean acceptance of the work order placed on contractor/supplier under section (2) of these conditions and shall include these conditions of Contract, Specifications, Schedule, Drawing, Letter of Intent of the Purchaser and any subsequent amendments mutually agreed upon.

1.12 ‘Tests on Completion’ shall mean such tests are prescribed by the specifications or have been mutually agreed to between the Contractor/Supplier and the Purchaser to be made before the equipment is taken over by the Purchaser.

1.13 ‘Writing’ shall include any manuscript, typewritten or printed statement under or over signature or seal as the case may be. Words importing ‘person’ shall include firms, companies, corporations and association of individuals whether incorporate or not.

1.14 Words importing singular shall also include plural and vice versa where context requires.

1.15 Bidders are advised to visit and inspect the work-site to make themselves fully conversant with the site conditions and nature of work. Any claim by them after the opening of bids on account of themselves being unaware of any site condition shall not be entertained.

2.0 Contract:
2.1 Contractor/Supplier/Manufacturer should send their acceptance letter on receipt of ‘Letter of Intent’ or work order within stipulated period. On expiry of said period or exorbitant delay in commencing or executing the work, the Purchaser shall not be liable to any claim from the Contractor/ Supplier for work entrusted to and may revoke the contract.
3.0 Work at Site
3.1 Access to the works shall be allowed only to the Contractor/Supplier, Sub-Contractors or his duly appointed representatives. The Contractor/Supplier shall not object to the execution of other works by other contractors or tradesman and shall afford them every facility for execution of their several works simultaneously with his own.

3.2 Work at the Purchaser’s premises shall be carried out at such time as the Purchaser may approve but the Purchaser shall give the Contractor/Supplier all reasonable facilities for the same. The Contractor/Supplier shall provide sufficient fencing, notice boards etc. to guard the works and warn the public.

3.3 The Contractor shall obey Central, local and State regulations and enactment pertaining to workmen and labour and the Engineer shall have the right to enquire into and decide all complaints on such matters. The Contractor should comply with the Minimum Wages Act and should also ensure that safe practices are followed by his people at site.

4.0 Delays:
4.1 The Contractor/Supplier shall not be entitled to any compensation for any loss suffered by him on account of delays in commencing or executing the work, whatever the cause for such delays may be, including delays in procuring Government controlled or other materials and delay in obtaining instructions and decisions from Chief Engineer. The Contractor shall, however, merit extension of time as hereinafter mentioned.

5.0 Taking Over:
The equipment when erected at site shall be deemed to have been taken over by the Purchaser when the Engineer will have certified in writing that the equipment has fulfilled the contract conditions.

6.0 Extension of Time:
6.1 If the Contractor/Supplier is delayed in the progress of work by changes ordered in the work, or by any cause, which the Engineer shall decide to justify the delay, then the time of completion shall be extended by a reasonable time. No such extension shall be allowed unless requested for extension is made in writing by the Contractor/Supplier to the Engineer within 15 days from the date of occurrence of the delay.
7.0 Liquidated Damages:

7.1 For all delays, which do not, merit any extension of time, the Contractor/Supplier shall attract 0.5% penalty per week or part thereof subject to a maximum of 5% of the total contract value. The amount of liquidated damages shall be recoverable from the payment due to the Contractor/Supplier.

7.2 The deduction of liquidated damages shall not, however, absolve the Contractor/Supplier of his responsibility and obligations under the contract to complete the work in its entirety and shall also be without prejudice to action by the Purchaser under clause: ‘Termination of Contract by the Purchaser’. After that the same shall be completed by the Institute at the Contractors/Suppliers risk and cost.

8.0 Other Damages:

8.1 The Contractor/Supplier/Manufacturer shall be responsible for all injury to persons, animals or things and for all damage to the works, structure of, and decorative work in the property which may arise from operation or neglect of himself or any of his Sub-Contractor or of his or Sub-Contractor’s employees, whether such injury or damage may arise from carelessness, accident or any other cause whatever in any way connected with the carrying out of this contract. This clause shall be held to include any damage to buildings, whether immediately adjacent or otherwise, any damage to roads, streets, foot paths, as well as all damage caused to the works forming the subject of this contract by frost or other inclemency of weather. The Contractor/Supplier shall indemnify the Purchaser and hold him harmless in respect of all and any expenses on property as aforesaid and also in respect of any claim made in respect of injury or damage under any acts of Government or otherwise and also in respect of any award of compensation or damages consequent upon such claim.

8.2 The Contractor/Supplier/Manufacturer shall reinstate all damage of every sort mentioned in this clause, so as to deliver up the whole of the contract works complete and perfect in every respect and so as to make good or otherwise satisfy all claims for damage to the property of the Owner/third parties.

8.3 The Contractor/Supplier/Manufacturer shall indemnify the Purchaser against all claims which may be made against the Purchaser, by any member of the public or other party, in respect of anything which may arise in respect of the works or in consequence thereof and shall, at his own expense, effect and maintain, until the work has been ‘taken over’ under clause 5.0.
8.4 The Contractor/Supplier/Manufacturer shall also indemnify the Purchaser against all claims which may be made upon the Purchaser whether under the Workmen’s Compensation Act or any other statute in force during the currency of this contract or at common law in respect of any employee of the Contractor/Supplier or of any of his sub-contractor and shall at his own expense effect and maintain until the work has been ‘Taken Over’, with an approved office.

8.5 The Purchaser, with the concurrence of the Engineer, shall be at liberty and is hereby empowered to deduct the amount of any damages compensation costs, charges and expenses arising or accruing from or in respect of any such claims or damages from any sums due to or become due to the Contractor/Supplier.

9.0 Performance Guarantee:
9.1 The successful tenderer/contractor shall deposit an amount equal to 5% of the accepted value of work as Performance Guarantee in the form of Demand Draft/Pay Order/FDR in the name of Registrar,TIFR within 15 days from issue of Acceptance Letter
9.2 The letter for commencement of work shall be issued to the contractor only after submission of Performance Guarantee as mentioned above. The same will be refunded on successful completion of work as certified by the Engineer.

10.0 Security Deposit:
10.1 Earnest Money Deposit (EMD):
Every Bidder has to pay EMD @ Rs. 1,12,000/- by Demand Draft in favour of the Registrar, Tata Institute of Fundamental Research along with the bid. Bid received without EMD shall be rejected and no correspondence whatsoever will be entertained.

For successful tenderer the EMD shall be returned to the contractor, without any interest, after receiving of Performance Guarantee and for unsuccessful Tenderers EMD will be refunded after placing the order on successful tenderer.

10.2 Deductions towards Security Deposit shall be made from running bills @ 2.5% of the billed amount. The Security Deposit shall be released after the defect liability period of 12 months reckoned from the date of completion as certified by Chief Engineer.

11 Guarantee & Defects Liability Period:
11.1 The Contractor/Supplier/Manufacturer shall guarantee that all equipment shall be free from any defect due to the defective materials and bad workmanship and that the equipment shall operate satisfactorily and that the performance and efficiencies of the equipment shall be not less than the guaranteed values. The guarantee shall be valid for a period of 12 months after the date of commissioning as certified by Chief Engineer. Any parts found defective shall be replaced free of all costs by the Contractor/Supplier. The services of the Contractor’s/Supplier’s
personnel if requisitioned during this period for such work shall be made available free of any cost to the Purchaser.

11.2 If the defects be not remedied within a reasonable time, the Purchaser may proceed to do so at the Contractor’s/Supplier’s risk and expense without prejudice to any other rights.

12. Terms of Payment:
12.1 Unless otherwise agreed to in writing between the Purchaser and the Contractor/Supplier, payment for the delivery/commissioning of the equipment/works approved by the Inspector will be made as follows:

a) 65% of the contract price of each consignment delivered as soon as possible after site inspection.

b) 25% of contract price after erection, installation.

c) 10% on commissioning.

d) In addition to this, other remedies under the law and those conditions, the Purchaser shall have lien on each consignment in respect of which 65% has been paid to secure refund of this amount in the event of the same becoming refundable under the terms of the contract or under the law and to secure payment of any other dues under the contract or under the law.

e) In a), b) and c) above, Security Deposit @ 5% of the billed value shall be deducted.

13 Special conditions of Contract governing supplies of the Equipments of this Tender:

13.1 Scope:
13.1.1 This specifications covers the supply of material as per the enclosed details and quantities and supervision of erection and commissioning of the material.

13.1.2 The Contractor/Manufacturer/Supplier shall quote for all the materials along with accessories as mentioned in the enquiry.

13.1.3 All the supply shall be in accordance with relevant I.S. Specifications and recognized standards.

13.2 Technical Data Sheet:
All the tenderers are instructed to fill up the enclosed Technical Data Sheet of materials.

13.3 Inspection & Testing of Material:

Contractor’s Signature 9 Date:
13.3.1 Contractor/Manufacturer/Supplier shall submit the lists of Type Tests and Routine Test conducted on the material in Technical Data Sheet.

13.3.2 All the materials will be tested at factory as per IS Standards of material by our Engineer/Engineers before dispatch at the cost of Contractor/Manufacturer/Supplier.

13.3.3 Contractor/Manufacturer/Supplier shall inform the concerned Engineers for inspection and testing in accordance and fix up the suitable date for the same.

13.4 Test Certificates:
Contractor/Manufacturer/Supplier shall submit the Test Certificates of all materials in the approved proforma of supply authority and arrange necessary approval from the Supply Company and electrical inspector. No separate charges will be payable by department to this account.

13.5 Taxes & Duty:
13.5.1 Contractor/Manufacturer/Supplier shall quote the basic price of material. GST, Delivery Charges, Transit Insurance if any must be indicated separately.

13.5.2 Transit Insurance: The Transit Insurance from the point of dispatch to the site of erection in TIFR, will be in the scope of Supplier and the cost shall be indicated separately.

13.6 Delivery of Material:
13.6.1 Packing:
The Contractor/Manufacturer/Supplier shall be held responsible for loading/unloading of all equipments and for the stores being sufficiently and properly packed for transport by rail, road, sea or air so as to ensure their being free from any loss or damage on arrival at destination. The packing and marking of packages shall be done by and at the expenses of Manufacturer/Supplier. Each package shall contain a packing note quoting purchase order number and detail of the contents.

13.6.2 All the materials must be delivered at site i.e. Tata Institute of Fundamental Research, Homi Bhabha Road, Colaba, Mumbai – 400 005. The unloading & positioning of all equipments at the designated locations specified by Chief Engineer will be in the scope of supplier. The supplier shall arrange for handling equipments, labour for rigging etc. as required.

13.6.3 Material must be delivered at site in all respects as mentioned in the Purchase Order.

13.7 Guarantee:
If during the period of guarantee any fault or defect arises, the material shall be replaced/repaid immediately free of cost, as well as any replacement of accessories required shall be done free of cost.

Contractor’s Signature  

Date:
13.8 **Mistake in Drawing:**
The Contractor/Supplier shall be responsible for and shall pay for any alterations in works due to any discrepancies, errors or omission the drawings or other particulars supplied by him whether such drawings or particulars have been approved by the Purchaser or not.

13.9 **Responsibility for Completeness:**
Any fittings or accessories which may not be specifically mentioned in the specifications but which are usual or necessary are to be provided by the Contractor/Supplier without extra charge and the equipment must be complete in all details.

13.10 **Rejection of Defective Equipment:**
If the Equipment after the acceptance thereof be discovered to be defective, notwithstanding that such defects could have been discovered at the time of inspection or found to have failed to fulfil the requirements of the contract or developed defects after the erection within a period of 12 months from the date of erection, even if such erection is done by the Purchaser, he shall be entitled to give a notice on the Contractor/Supplier setting forth details of such defects or failure and the Contractor/Supplier shall, provided such notice is given within a period of 14 months from the date of such erection or acceptance, forthwith make the defective equipment good or alter the same to make it comply with the requirements of the contract at his own cost and further if in the opinion of the Purchaser, the defects are of such a nature that the defects cannot be made good or required without impairing the efficiency or workability of the equipment or if in the opinion of the Purchaser the Equipment cannot be repaired or altered to make it comply with the requirements of the Contract, the Contractor/Supplier shall, provided a notice given by the Purchaser in this behalf within a period of 14 months from the date of erection or acceptance thereof, remove and replace the same with the equipment conforming to the stipulated particulars, in all respects at the Contractor’s/Supplier’s own cost. Should he fail to do so within a reasonable time, the Purchaser may reject and replace at the cost of the Contractor/Supplier shall be carried out by the Purchaser within a reasonable time with Equipment of the same particulars or if Equipment conforming to the stipulated particulars are not in the opinion of the Purchaser readily procurable, such opinion being final, then with the nearest substitutes.

In the event of such rejection the Purchaser shall be entitled to use the Equipment in a reasonable and proper manner for a time reasonably
sufficient to enable him to obtain replacement equipment as herein before provided.

13.11 **Inspection and Final Tests:**

All tests necessary to ensure that the Equipment complies with the particulars and guarantee shall be carried out at such place or places as may be determined by the Inspector. Should, however, it be necessary for the final test as to performance or guarantee to be held over until the Equipment is erected at site they shall be carried out within one month of completion of erection.

13.12 **Intimation about Delivery:**

If the Purchaser shall have notified the contractor/supplier in writing that the former is not ready to take delivery, no equipment or materials shall be forwarded until an intimation in writing shall have been given to the Contractor/Supplier by the Purchaser that he is ready to take delivery.

13.13 **Delay in erection:**

Wherever erection of an equipment or machinery is the responsibility of the Contractor/Supplier as a term of the contract and in case the Contractor fails to carry out the erection as and when called upon as to do within the period specified by the Purchaser, the Purchaser shall have right to get the erection done through any source of his choice. In such an event, the Contractor/Supplier shall be liable to bear any additional expenditure that the Purchaser may incur towards erection. The Contractor/Supplier shall, however not be entitled to any gain due to such an action by the Purchaser.

13.14 **Definition of Equipment:**

The work `Equipment’ wherever, it appears in these `Special Conditions of Contract’ governing supplier of Equipments in this Tender shall mean all the items specified in the schedule of quantities including switchgears, panels, etc. or parts thereof or what the Contractor/Supplier agrees to supply under Contract as specified in the work order.

14.0 **Termination of Contract by the Purchaser:**

14.1 If the Contractor/Supplier commits any `Act of Insolvency’ or shall be adjudged an Insolvent or shall have an order for compulsory winding up made against him or pass effective resolution for winding up voluntarily, or if the Contractor/Supplier shall suffer any payment under this contract to be attached by or on behalf of any of the creditors of the Contractor/
Supplier, or shall assign the Contract without the prior consent in writing of the Engineer, or shall charge or encumber this Contract or any payments due or which may become due to the Contractor there under, or if the Engineer shall certify in writing to the Purchaser that the Contractor/Supplier -

a) has abandoned the Contract,

or

b) has failed to commence the works, or has without any lawful excuse these conditions suspended the progress of the works for seven days after receiving from the Engineer written notice to proceed,

or

c) has failed to proceed with the work with such due diligence and failed to make such due progress as would enable the works to be completed in accordance with the approved programme of work,

or

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

or

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

or

f) has to the detriment of good workmanship or in defiance of the Engineer’s instructions to the contrary sub-let any part of the contract.
Then and in any of the above said causes, the Purchaser with the written consent of the Engineer may, notwithstanding any previous waiver, after giving seven days notice in writing under the provisions of this clause to the Contractor/Supplier, determine the contract but without prejudice to the powers of the Engineer or the obligations and liabilities of the Contract, the whole of which shall continue to be in force as if the contract has not been so determined and as if the work subsequently executed has been executed by and on behalf of the Contractor/Supplier.

14.2 After the issue of such notice, the Contractor/Supplier shall not be at liberty to remove from site any equipment, tools and materials belonging to him which shall have been placed thereon for the purpose of the works and the Purchaser shall have lien upon such equipments, tools or materials to subsist from the date of such notice and until the notice shall have been complied with.

14.3 If the Contractor/Supplier shall fail to comply with the requirements of said notice for seven days after such notice has been given, the Purchaser shall have the power to enter upon and take possession of the works and site and all equipment, tools and materials thereon, and to engage any other person, firm or agency to complete the works, utilizing the equipment, tools and materials to the extent possible. The Purchaser shall not in any way be responsible for damage or loss of the tools, equipment and materials and the Contractor/Supplier shall not have any compensation therefore.

14.4 Upon completion of the works, the Engineer shall certify the amount of expenditure properly incurred consequent on and incidental to the default of the Contractor/Supplier as aforesaid and such amount shall be deducted from the payments due to the Contractor/Supplier, including the Security Deposit. If the said amount exceeds the payment due to the Contractor/Supplier, the Purchaser shall be at liberty to dispose off any of the Contractor’s/Supplier’s materials, tools or equipment and apply the proceeds for the payments due from the Contractor/Supplier and recover the balance by process of law.

14.5 After the works have been completed after the amounts due to the Contractor/Supplier, the Engineer shall give notice in writing to the Contractor/Supplier to remove the surplus equipment and material from site. If such equipment and materials are not removed within a period of 14 days after such notice, the Purchaser shall have the power to remove and sell the same holding the proceed less the cost of removal and sale, to the credit of the Contractor/Supplier. The Purchaser shall not be responsible for any loss sustained by the Contractor/Supplier from the sale of the equipment and material.
15 **Contractor’s Representative:**

15.1 The Contractor shall employ at least one qualified representative whose name shall have previously been communicated in writing to the Engineer and approved by him to supervise the erection. Any written order or instructions given to the representative shall be deemed to have been given to the Contractor/Supplier. The Engineer shall be at liberty to object to any particular representative/or any persons employed by the Contractor/Supplier on the work and the Contractor/Supplier shall remove the person objected to, on the receipt of the Engineer, in writing, a request requiring him to do so and shall provide in his place another competent representative acceptable to the Engineer.

The Contractor’s/Supplier’s representative shall be a qualified electrical/mechanical engineer and possessing adequate site experience in similar nature of works.

16 **Completion Time:**

Unless otherwise agreed in writing between the Purchaser and the Contractor/Supplier, the work contract shall be completed within **Six months (inclusive of holidays)** from the date of Purchase order issued to Contractor/Supplier by the Purchaser. The contractor shall furnish the completion certificate on completion and commissioning of the works as per enclosed format.

16.0 **Delivery of material at site:**

The Contractor/Supplier/Manufacturer shall arrange for safe transit and delivery of material at site & unload the material at site.

17.0 The quotation should be valid for 90 days after opening of the Technical Bids.

18.0 **Measurements:**

All the measurements of quantities shall be done by the Contractor at his own cost in the presence of Chief Engineer or any authorized person deputed by him who will certify the routes, length and quantities etc. for the purpose of determination of the amount payable.

19.0 Manufacturer/Contractor/Supplier should submit operation, maintenance & spare part list manual for all equipments.

20.0 Manufacturer/Contractor/Supplier should provide training for operation and maintenance free of cost for equipments supplied.
21.0 Eligibility Criteria:
21.1 The Bidder must qualify the following criteria of satisfactory execution of works in the last 5 years ending on the last day of the month previous to the one in which tenders are invited:
   a) Three similar works each of value not less than Rs. 22,40,000/-, or
   b) Two similar works each of value not less than Rs. 23,00,000/-, or
   c) One similar work of value not less than Rs. 44,80,000 /

Note: Similar works means supply, installation, commissioning and testing of Electrical Panels, laying of cables & trays and execution of LT electrical network as per the Technical specifications.

21.2 It must be noted that the tenderer should not have been blacklisted by any government Agency/Institutions of local state Government/Public Sector in India under any contractual relation with them or facing process of penal action as such on complaints of quality. Director, TIFR reserves the right for insisting upon submission of Satisfactory Performance Certificate issued by any such agency.

21.3 Agency should have their office/technical support team in Mumbai area to provide after sales supports.

21.4 Competent Authority reserves right to accept or reject the offer in whole or in part and award the work in whole or in part, as per norms/policies accepted by the Institute.

21.5 Before submitting the bid the bidder should visit the site to assess the nature and magnitude of work. This is essential

22.0 Contractor:
22.1 Contractor should submit the following along with Technical bid.
   a) Xerox of Income Tax Returns for last three years.
   b) Xerox of GST Registration Certificate.
   c) Xerox of Electrical Contractor License No.
   d) PAN No.

23.0 All the equipments supplied should not be manufactured on or before 6 months from the date of issue of Purchase Order to the Contractor/Manufacturer/Supplier.

24.0 The tenderer must furnish the make of major items as per preferred make of materials given elsewhere.

25.0 Description of item in the schedule of quantities is brief and therefore, shall be read in conjunction with the relevant drawings and the specifications and the contractor’s rate shall be deemed to be for such complete work unless otherwise specified by the contractor while tendering. In case any difference or discrepancy between the description in the schedule of quantities and the specifications, the schedule of quantities shall take precedence. In case any difference or discrepancy between the description in the schedule of quantities and the drawings, the description in schedule of quantities shall take precedence. In case of any difference or
discrepancy between drawing and specifications, the specifications shall take precedence.

26.0 **Information to be included with the Proposal:**

The bidder shall submit all information as requested for in Guaranteed Technical Particulars, to enable the Dept./User to make an accurate comparison & evaluation of Tenders without the need of further information from the bidder.

27.0 **Deviation from Tender Specifications:**

Two (2) copies of deviations (if any) suggested by the tenderer shall be submitted along with the tender. Only such deviations as are approved by the Dept./User shall form part of the contract.

28.0 **Co-Ordination with other Agencies:**

The contractor shall work in close co-operation with other agencies working at site & will co-ordinate installation work with the agencies engaged in construction of the building & allied service & exchange freely all technical information so as to make the execution of works smooth.
CERTIFICATE OF COMPLETION AND GUARANTEE

Name of Work: _________________________________________________________

Purchase Order No. & Date: ____________________________________________
Date of Completion of Work: ____________________________________________

Name of Contractor/Company: __________________________________________
With Seal

Tests Conducted:-
   i) Insulation resistance tests on individual equipments & completed & interconnected system.
   ii) Earthing resistance of each earth station and interconnected system.
   iii) Test results of all equipments.
   iv) HV Tests.
   v) Phase Sequence Test.
   vi) Continuity Test.
   vii) Copper Bus Bar Purity Test.

1 CERTIFICATES & DOCUMENTS:
I certify that the installation detailed above has been inspected and tested and that to the best of my knowledge and belief it complies with the latest edition of the Indian Electricity Rules and the relevant I.S. code of practices at the date of contract for the work except as stated below.
Details of departures (if any) from the above.

2 6 Sets of completion drawings & test reports and original tracings showing the installation of as actually executed are enclosed duly certified.

3 The installation is guaranteed for a period of twelve months from the date of taking over by the Institute against defective materials and workmanship. During the period of guarantee such defects in materials and workmanship will be rectified or replaced free of cost to the Institute. The completion certificate for a particular system will be issued by the Institute only on its satisfactory commissioning and the guarantee period for that system will start only from the date of the said certificate.
SCOPE OF WORK & TECHNICAL SPECIFICATIONS

1.0 Scope:
The specifications of

1.1 MAIN CENTRAL WORKSHOP PANEL-I & CNC PANEL
covers design, fabrication, testing (including testing of switchboard at workshop/factory before delivery & after delivery at site) supply, installation, testing & commissioning of cubicle type switch boards and terminations and laying of all cables as per enclosed schedule of quantities, drawing and construction details/notes mentioned in drawing.

1.2 The contractor shall supply all the accessories to make the switch board complete in all respects of panel for WORKSHOP and one no of sub panel named as CNC. The prices of all shall be included of supply, installation and commissioning as per enclosed schedule of quantities, drawing and construction detail/notes mentioned in said drawing.

1.3 Dismantling of existing welding section, existing CNC room panels / switches and removing of existing cables in trench, if provided.

1.4 This specification covers the following as stipulated in Schedule of Quantities.

1.5 Supply, laying & termination of XLPE cable with all its accessories.

1.6 Fabrication, testing (including testing of switchboard at workshop/factory before delivery & after delivery at site) supply, installation & commissioning of cubicle type switch boards and terminations of all cables as per enclosed schedule of quantities, drawing and construction details/notes mentioned in drawing.

2.0 General:

2.1 All the supply and work shall be in accordance with the relevant I.S. Specification and recognized standards and modern approved practice and shall meet the requirement of the latest issue of applicable codes, factory rates and regulations, supply codes and all standard accepted practice in locality where the installation is to be made.

2.2 All the materials and accessories provided by Contractor under terms of this contract shall confirm to the relevant Indian Standard Specifications. Samples of all equipment, materials and accessories to be supplied by the Contractor shall be submitted for the approval of the Engineer before they are used.

2.3 Contractor shall provide all necessary labour, tools, and other requisite work like drilling, cutting, welding etc. at his own cost.
2.4 Good workmanship is the essence of this contract and shall be complied with at all time. The Contractor shall have the works supervised by qualified and experienced engineers. All the defects pointed out by the engineer shall be rectified immediately by the Contractor free of cost.

2.5 The installation shall generally be carried out strictly in conformity with the requirement of latest edition of the Indian Electricity Act, 1910 as amended and the Indian Electricity Rules, 1956 framed there under and all others statutory regulations that may be relevant to the installation.

2.6 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.

2.7 Accidental damage to any property shall be reported immediately to site engineers and letter confirmed in writing.

3.0 **Cable:**

3.1.1 XLPE Aluminium/Copper Conductor cable mentioned in the schedule shall be heavy duty, armoured, power cable with circular solid/stranded Aluminium/copper conductor, XLPE insulated and with galvanized round/strip armoured. XLPE cable must comply with latest amended specification IS 7098 (Part-II), 1985.

3.1.2 All cabling materials, such as cable compound cable lugs, tapes, sand, bricks, jointing material etc. shall be of approved quality and acceptable to Engineer In-Charge.

3.2 **General Rules for Cable Laying:**

3.2.1 Work shall be carried out in neat workman like manner by skilled, experienced and competent workmen in accordance with standard practice.

3.2.2 Cable shall be laid in one piece length between supply and feeding point.

3.2.3 Method of work, routing of cable etc. shall in every case be as per schedule and subject to the approval of Engineer In-Charge.

3.2.4 All new cables shall be megger tested before laying.

3.2.5 Care shall be exercised by providing suitable props for supporting other service lines in ground at the time of excavation. Where cutting of a road/lawn becomes necessary it should be done with the approval of the Engineer In-Charge.
3.2.6 Excavation of trenches shall be executed wherever necessary and the vertical sides of the trenches are kept as straight as possible. The exact location of each trench shall be settled by the Engineer In-Charge on the site, when Contractor is in position to commence the work.

3.2.7 The bottom of trench should be carefully leveled and free from stones but if ingredients and changes of depth are unavoidable, it should be gradual.

3.2.8 When more than one multi core cables are laid in same trench, horizontal inter axial spacing of cables should be taken care of and also assure that fault occurring on one cable will not damage the adjacent cable.

3.2.9 After the cables are laid the trench shall be filled in layer the earth in each layer being well rammed by spraying water and sufficient allowance made for settlement. Extra earth should be removed from the place of trench to the place as decided by Engineer In-Charge.

3.2.10 Before laying cable through existing cable trench, cable trench should be cleaned properly. It is required existing cables to be recharged.

3.2.11 All XLPE/PVC Cables should be supported on their horizontal and vertical run on wall/ceiling, with G.I. saddles, 5 mm thick galvanized M.S. spacers with S.S. screws. The spacers shall be firmly fixed by means of PVC Rawl plugs/fill plugs and nettle fold screws. The interval between supports shall not exceed 400 mm for horizontal run and 500 mm for vertical run.

3.2.12 All the cable running through trenches shall be fixed as per Clause No. 3.2.11 wherever possible.

3.2.13 All the cables route to be marked at the both sides of cable termination with brass plate and letter to be embossed.

3.2.14 Supply & fixing of clamps for cable routes and making holes in walls/slab for cable route are part of cable laying and cost should be included in cable laying. Proper slab cutting machine should be used for making holes in slab.

4.0 **General Rules for laying Copper strip:**

4.1 Installation shall be carried out in neat workman like manner by skilled, experienced and competent workmen in accordance with standard practice.

4.2 Copper strip shall be laid in one piece length.

Contractor’s Signature 22  Date:
4.3 Method of installation, routing of Copper strip etc. shall in every case be as per schedule and subject to approval of Engineer-In-Charge.

4.4 Care shall be exercised by providing suitable props for supporting other service lines in ground at the time of excavation where cutting of road/lawn becomes necessary it should be done with the approval of Engineer-In-Charge.

4.5 Excavation of the trenches shall be executed and the vertical side of the trenches are kept as straight as possible. The exact location of the trench shall be settled by the Engineer-In-Charge on the site, when contractor is in the position to commence the work.

4.6 After the Copper strip is laid the trench shall be filled in layer, the earth in each layer shall be well rammed by spraying water and sufficient allowance made for settlement.

4.7 The interval between the supports shall not exceed 400 mm for horizontal, 500 mm for vertical run.

4.8 Wherever Copper strip joint is necessary it should be done with 6” overlap, proper soldering and bolting.

4.9 Proper tapping holes should be provided on the Copper strip at an interval of 300 mm while laying inside the room.

5.0 **Scope of Work & Technical Specifications for Electrical Panel**

5.1 **Scope:**
This scope shall cover design, manufacture, check test, and supply, installation, testing and commissioning of electrical control panel as described in this specification as per drawings and schedule of quantities.

Panels shall be supplied with the following:

a) Complete switchgears as per approved drawing, BOQ, bus bar, enclosure and metering and controlling accessories.
b) The base channel frame with hardware, nuts, bolts, washers etc.
c) Commissioning spares.
d) All relevant drawings, data and instruction manuals.

5.2 **General Specifications:**
5.2.1 The Panels shall be metal clad, totally enclosed, rigid, floor mounting, air insulated, cubicle type suitable for operation on three phase, 415 V, 50 Hz., and short circuit level as mentioned in the drawings. The indoor panel shall have IP54 protection class construction. The painting of all the metal part shall be as per the painting specification defined in specification.
5.2.2 Panels shall be designed to withstand heaviest condition at site, with maximum expected ambient temperature of 50° c., 100% humidity and salty, dusty weather.

5.3 **Design Criteria:**
For continuous operation at specified ratings, the temperature rise of various equipment/components shall be limited to the permissible values stipulated in relevant standards and/or this specification.

All equipment and components thereof shall be capable of withstanding the mechanical forces and thermal stresses of the short circuit currents listed in the Appendices without any damage or deterioration of the materials.

If required, surge protective devices shall be included in the scope of supply to limit over voltage.

5.4 **Construction:**
**Cubicle Type Panels:**

a) **Structure:**
The Panel shall be metal clad enclosed and be fabricated out of high quality CRCA sheet, suitable for indoor installation having dead front operated and floor mounting type. The design construction shall be such as to allow extension at either end.

All CRCA sheet steel used in the construction of Panels shall be 2 mm. thick and shall be folded and braced as necessary to provide a rigid support for all components. Joints of any kind in sheet steel shall be seam welded, all welding slag grounded off and welding pits wiped smooth with plumber metal. The Panels shall be totally enclosed, completely dust and vermin proof, conforming to degree of protection IP-54. Gaskets between all adjacent units and beneath all covers shall be provided to render the joints dust proof. All doors and covers shall be fully gasketed with neoprene rubber in single piece, joint less and shall be lockable.

All panels and covers shall be properly fitted and secured with the frame and holds in the panel correctly positioned. Fixing screws shall enter into holes, taped into an adequate thickness of metal or provided with bolts and nuts. Self-threading screws shall not be used in the construction of Panels. A base channel of 100 x 50 x 5 mm. shall be provided at the bottom. A clearance of 300 mm. between the floor of the Panels and the bottom of the lower most units shall be provided.

Panels shall be preferably arranged in multi-tier formation. The Panels shall be of adequate size with 20% space to accommodate possible future additional switchgear. The size of the Panels shall be designed in such a way that the internal space is sufficient for hot air movement and the
The electrical component does not attain temperature more than 45ºc. All the electrical component shall be rated for 50ºC.

Knock out holes of appropriate size and number shall be provided in the Panels in conformity with the number, and the size of incoming and outgoing cables.

Alternately, the Panels shall be provided with removable sheet steel plates at top and bottom to drill holes for cable entry at site.

The Panels shall be designed to facilitate easy inspection, maintenance and repair. The panels shall be sufficiently rigid to support the equipment without distortion under normal and under short circuit condition. They shall be suitably braced for short circuit duty.

5.5 Earthing:
   i) Copper earth bus of adequate size shall be provided in the Panels for the entire length of the panel. The framework of the Panels shall be connected to this earth bar. Provisions shall be made for connection from this earth bar on both sides of the panels to the main earthing bar coming from the earth pit. Door earthing shall be provided for all the compartments.
   ii) The earth continuity conductor of each incoming and outgoing feeder shall be connected to this earth bar. The armoured shall be properly connected with earthing clamp, and the clamp shall be made for connection from this earth pit on both sides of the Panels.
   iii) The earth continuity conductor of each incoming and outgoing feeder shall be connected to this earth bar. The armour shall be properly connected with earthing clamp, and the clamp shall be ultimately bonded with the earth bar.

5.6 Labels:
Engraved metal labels shall be provided on all incoming and outgoing feeders. Single line circuit diagram showing the arrangements of circuit inside the distribution board shall be pasted on inside of the panel door and covered with transparent laminated plastic sheet.

5.7 Name Plate:
A name plate with the Panel’s designation in bold letters shall be fixed at top of the central panel. A separate name plate giving feeder details shall be provided for each feeder module door.

Inside the feeder compartments, the electrical components, equipment, accessories like switchgear, control gear, lamps, relays etc. shall suitably be identified by providing stickers.
Engraved name plates shall preferably be of 3 ply (Red-White-Red or Black-White-Black) lamicold sheet. However, black engraved Perspex sheet nameplates shall also be acceptable. Engraving shall be done with square groove cutters.

Name plate shall be fastened by counter sunk screws and not by adhesives.

5.8 Danger Notice Plates:
The danger notice plate shall be affixed in a permanent manner on operating side of the Panels.

The danger notice plate shall indicate danger notice both in Hindi and English and with a sign of skull and bones.

The danger notice plate, in general, shall meet the requirements of local inspecting authorities. Overall dimensions of the danger notice plate shall be 200 mm. wide x 150 mm. high.

The danger notice plate shall be made from minimum 1.6 mm. thick mild steel sheet and after due pretreatment to the plate, the same shall be painted white with vitreous enamel paint on both front and rear surface of the plate.

The letters, the figures, the conventional skull and bones etc. shall be positioned on plate as per recommendation of IS: 2551-1982.

The said letters, the figures and the sign of skull and bones shall be painted in signal red colour as per IS: 5-1978.

The danger plate shall have rounded corners. Location of fixing holes for the plate shall be decided to suit design of the Panels.

The danger notice plate, if possible, should be of ISI certification mark.

Suitable Voltage rated rubber mats to be provided.

6.0 **Cubicle Type Switchboard**

6.1 All dimensions in mm. (Refer Drg. No. TFR/TSR/DRG/ENCLOSURE PANEL, TFR/TSR/DRG/WORKSHOP PANEL1&2 and TFR/TSR/DRG/CNC PANEL1&2)

6.2 Degree of protection IP 54.

6.3 Danger Notice Board shall be provided.

6.4 The switchboard will be floor mounted & shall be provided with base frame.
6.5 Construction:
   a) Main switch board frame 2 mm thick CRCA Sheet
   b) Base frame (IS Channel) 100 x 50 x 5 mm.
   c) Frame of MCCB & Spare cabinet & measuring instrument cabinet 2 mm thick M.S. CRCA Sheet
   d) Partitions on top & bottom of MCCB 2 mm thick M.S. CRCA sheet
   e) Partition on incoming & outgoing side of the MCCB etc. 6 mm thick Bakelite Sheet /
      side of the MCCB etc. 2 mm thick MS CRCA sheet with rubber grommet bolted.
   f) Cable alley & cable entry chamber frames 2 mm thick MS CRCA Sheet
   g) Fixing bracket/seat for MCCB 3 mm thick M.S. CRCA Sheet
   h) Doors 2 mm thick M.S. CRCA Sheet
   i) Earthing Terminals (for fixing earthing strip of size 25x6 mm) 4 Nos. at top and bottom of switch boards on both sides
   j) Painting shall be done with 7 Tank Process/Sand Blasting complete with two coats of Primer & powder coated paint (100 microns) AL7032 shade.
   k) Gland Plate 3 mm thick CRCA Sheet.
   l) Panels: Entry of incoming & exit of outgoing cable from top and bottom (as per the site requirement)
   m) Metering wiring 2.5 sq.mm Copper (Light Grey/White)
   n) Control wiring 1.5 sq.mm Copper (Light Grey/White)

7.0 Details of Riser Connection & Earthing Connection for Cubicle Type Switch Boards:

<table>
<thead>
<tr>
<th>Type of MCCB</th>
<th>Riser Connection Size</th>
<th>Earthing Connection Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>630 Amp</td>
<td>Insulated tinned copper strip of size 500 sq mm</td>
<td>PVC insulated copper conductor cable of size 1 x 2.5 sq.mm</td>
</tr>
<tr>
<td>250 Amp MCCB</td>
<td>Insulated tinned copper strip of size 200 sqmm</td>
<td>PVC insulated copper conductor cable of size 1 x 2.5 sq.mm</td>
</tr>
<tr>
<td>100 Amp MCCB</td>
<td>Insulated tinned copper strip of size 80 sq mm</td>
<td>PVC insulated copper conductor cable of size 1 x 2.5 sq.mm</td>
</tr>
<tr>
<td>63 Amp MCCB</td>
<td>Insulated Tinned Copper Strip of 50 sq.mm. Copper strip of 30 sq.mm</td>
<td>PVC insulated copper conductor cable of size 1 x 2.5 sq.mm</td>
</tr>
<tr>
<td>Measuring Instrument &amp; Cabinet</td>
<td>Control cable PVC insulated copper conductor of size 2.5 sq.mm.</td>
<td>PVC insulated copper conductor cable of size 2.5 sq.mm</td>
</tr>
</tbody>
</table>
8.0 Please note that general arrangement shown in Drawing No. TFR/TSR/DRG/ENCLOSURE PANEL, TFR/TSR/DRG/WORKSHOP PANEL1 & 2 and TFR/TSR/DRG/CNC PANEL 1 & 2 are tentative and can be changed. Contractor/Panel Manufacturer shall take the necessary approvals from TIFR before fabrication.

9.0 **Details of Panel as per Drawing No.:** TFR/TSR/DRG/Enclosure Panel

i) MCCB (Distribution Type) shall have rotary handle on door and door shall be provided with mechanical door inter lock & defeat mechanism. Rating: 630A, 4 Poles Make: Siemens, 3VA2 SERIES, Type of Protection: ETU, LSI with profinet communication. Breaking Capacity: 55kA In=630 A -1 no

ii) Metering Section should have Digital Voltmeter and Digital Ammeter (Make AE) with selection switch.( make L&T) C.T. Class 1 of suitable rating Indicating Lamp. R,Y,B LED Type, control MCB’s of 0.5 a to 4 A size. - 1 Set

iii) Bus Bar Chamber Set of 4 Nos. R, Y, B, N coloured insulated tinned Copper Bus Bars with supporting insulator, inter connecting Copper strips and other accessories.
   a) Main horizontal bus. Size: 500 sq mm
   b) Main vertical bus Size: 500 sq mm

vi) Set of tinned Copper strip as earthing strip of size 100 sq mm with proper supports (to be fixed in cable Alleys and cable entry chamber). - 1 Set.

10.00 **Details of Panel as per Drawing No TFR/TSR/DRG/WORKSHOP PANEL-1&2**

i) MCCB (Distribution Type) shall have rotary handle on door and door shall be provided with mechanical door inter lock & defeat mechanism. Rating: 630A, 4 Poles Make: Siemens, 3VA2 SERIES, Type of Protection: ETU, LSI with profinet communication. Breaking Capacity: 55kA In=630 A -1 no

ii) Metering Section should have Multipurpose Energy Meter having make: Siemens PAC 4200 with Profinet communication, C.T. Class 1 of suitable rating Indicating Lamp. R,Y,B LED Type, control MCB’s of 0.5 A to 4 A size. - 1 Set

iii) Outgoing Feeders: MCCB, distribution type shall have rotary handle on door & door shall be provided with mechanical door interlock & defeat mechanism. Make: Siemens, 3VA2 SERIES, Type of Protection: ETU, LSI as per the feeder technical specification. Breaking Capacity: 55 kA

**Contractor’s Signature**

Date:
a) Rating: 250 Amp, 4 Pole MCCB 1 No.
b) Rating: 125 Amp, 4 Pole MCCB 2 No.
c) Rating: 100 Amp, 4 Pole MCCB 8 Nos.
d) Rating: 63 Amp, 4 Pole MCCB 18 Nos.

All outgoing feeder shall have LED indication for ON/OFF/TRIP

11.00 Details of Panel as per Drawing No. **TFR/TSR/DRG/CNC PANEL-2**
i) MCCB (Distribution Type) shall have rotary handle on door and door shall be provided with mechanical door interlock & defeat mechanism. Rating: 250A, 4 Poles Make: Siemens, 3VA2 SERIES, Type of Protection: ETU, LSIG with Profinet communication. Breaking Capacity: 55kA In=250 A -1 no

ii) Metering Section should have Multipurpose Energy Meter having make: Siemens PAC 4200 with Profinet communication, C.T. Class 1 of suitable rating Indicating Lamp. R,Y,B LED Type, control MCB’s of 0.5 A to 4 A size. - 1 Set

iii) Outgoing Feeders: MCCB, distribution type shall have rotary handle on door & door shall be provided with mechanical door interlock & defeat mechanism. Make: Siemens, 3VA2 SERIES, Type of Protection: ETU, LSI as per the feeder technical specification. Breaking Capacity: 55 kA

a) Rating: 100 Amp, 4 Pole MCCB 4 Nos.
b) Rating: 63 Amp, 4 Pole MCCB 10 Nos.

All outgoing feeder shall have LED indication for ON/OFF/TRIP

12.0 Please note that general arrangement shown in drawing no. TFR/TSR/DRG/ENCLOSURE PANEL ,TFR/TSR/DRG/WORKSHOP PANEL-1 &2 and TFR/TSR/DRG/CNC PANEL-1&2 PNL-1are tentative and can be changed. Contractor/Panel Manufacturer shall take the necessary approvals from TIFR before fabrication.

13.0 Nut, bolts, washer, screws shall be used of SS 304 (Stainless Steel SS304).

14.0 For other details, please refer enclosed specification and schedule of quantities.

15.0 Fabrication shall have following requirements.
15.1 Fabricator should have in-house fabrication plant/facility with CNC turret punching and NC bending machines.
15.2 Should have in-house 7 tank pretreatment cleaning process and powder coating plant.

Contractor’s Signature  

Date:
15.3 Documentary evidences for the aforesaid requirement should be produced along with the bid.

15.4 Bidders having good experience in electrical distribution systems and instrumentation systems will be preferred.

15.5 Reputed panel manufacturers with all in-house facilities for mechanical sheet metal fabrication, powder coating, electrical wiring, HV test & other electrical testing instruments will be given preference.

15.6 If panel fabrication is to be outsourced by the contractor, the details of such panel manufacturers should be included in the offer.

16.0 Suitable brackets and clamps shall be provided inside the cable alley and cable chamber to hold cable and earthing strip.

17.0 Compartment having MCCB should have 4 mm Bakelite sheet partition between MCCB terminals.

18.0 Proper identification marking shall be provided for all feeders.

19.0 Bus bar shall be of hard drawn electrolytic high conductivity tinned Copper (purity 99.2% & above) and shall be fixed on supports constructed from Epoxy cast resin insulator/Porcelain insulators suitable for 1.1 KV voltage. The supports must be sufficiently close and robust to withstand short circuit current as per IS specifications.

20.0 The bus bar shall be properly spaced in cubicle and shall be insulated with heat shrinkable bus bar insulating tubing etc. with proper colour code.

21.0 Four bolt type earthing terminals shall be provided on panels as per IS Specifications.

22.0 Each feeder should be provided with openable door with pivot type hinges to access the cable terminals & setting device.

23.0 The cable alley to be provided with screwed, openable doors.

24.0 Testing & Inspection:

24.1 Contractor shall have all the testing facilities for testing at Factory & site, including any other test as specified in IS Specification. Contractor shall arrange for all the tests and inspection at factory and site at his own cost. Contractor shall arrange for the visit of three engineers from TIFR for factory inspection.
24.2 Inspection/Testing at Factory:
   a) Physical inspection of Switch Boards frame (stage inspection)
   b) High Voltage Test at 2000 V for one minute.
   c) Insulation Resistance Test at 1000 V/500 V Megger.
   d) Phase Sequence Test.
   e) Continuity Test including control, metering wiring, logic test
   f) Paint thickness test.
   g) Purity of Copper Bus Bar test.

24.3 Inspection/Testing at Site/Stores:
   All tests mentioned above at Sr. Nos. 24.2 will be conducted at site after
delivery of material at site along with the physical inspection before
commissioning.

25.0 All the starters should be wired for remote control operation by providing
cabling upto cable alley with terminal strip.

26.0 Contractor has to provide 2 sets of approved drawings, O&M Manual,
and Test Certificates of all the components after completion of job.

27.0 Codes & Standards:
27.1 The equipment shall comply with the requirement of latest revision of
   following standard issued by BIS (Bureau of Indian Standards), unless
   otherwise specified.
   IS-2147  - Degree of Protection provided by enclosures for low voltage
            switch gear exceeding 1000 V
   IS-0237  - General requirement of switch gear & control gear for
            voltage not exceeding 1000 V
   IS-3043  - Code of Practice for earthing
   IS-3618  - Method of pre-treatment of MS Sheets for phosphetizing
   IS-6005 (1979) - Method of pre-treatment of MS Sheets for phosphetizing
   IS-0375 (1963) - Marking & arrangement of Bus Bars, Power & Control/
                    Auxiliary wiring
   IS-5578 (1970) - Marking & arrangement of Bus Bars, Power & Control/
                    Auxiliary wiring
   IS-8626  - Factory Built Assemblies of Switch Boards
   IS-3914  - Code of Practice for selection of A.C. Induction Motor Starter
   IS-4604  - Specification for heavy duty Air Break Switches & composite
            units of Air Break Switches & fuses for voltage not exceeding
            1000 V
   IS-1882  - A.C. Motor Starters of voltage not exceeding 1100 V
   IS-2959  - A.C. Contactors of voltage not exceeding 1000 V
   IS-0694 (1977) - PVC insulated cable & Aluminium conductor
   IS-8130 (1976) - PVC insulated cable & Aluminium conductor
   IS-1248  - Direct acting Electrical Indicating Instruments
   IS-2208  - Low voltage fuses
   IS-9224 (1979) - Low voltage fuses
   IS-2705  - Current Transformer
   IS-2516  - A.C. Breakers
   IS-6875  - Control Switches & Push Buttons
   IS-0722  - Integrating Instruments
   IS-3231  - Relays
   IS-1554  - Armoured Cable
1.0 **Switchgear Assembly**

1.1 **Short Circuit Rating**:

   a) Short Circuit rating : 
      for 1 Sec. (KA rms.)

1.2 Degree of Protection :

1.3 Switchgear completely : Yes/No
   Assembled, wired & tested at factory.

2.0 **BUS BAR & RISER CONNECTIONS**

2.1 Material & Grade :

2.2 Cross Sectional area mm² : Yes/No
   (As per specification)

2.3 Purity (99.2% & more) : Yes/No

2.4 Minimum clearance of bare Bus bar and connection :

   a) Phase to Phase mm :

   b) Phase to ground mm :

   c) Phase to Neutral mm :

   d) Neutral to ground :

2.5 Bus bar provided with

   a) Insulating Sleeve : Yes/No

   b) Phase barriers : Yes/No

   c) Cast Resin Shrouds for joints : Yes/No

2.6 Bus bar support spacing mm.
3.0 CURRENT TRANSFORMER

3.1 Make :

3.2 CT ratios :

3.3 Class of insulation :

3.4 Metering C.T.
   a) VA burden :

   b) Class :

4.0 SECONDARY WIRING
   (Control & Metering)

4.1 Wires identified at both
    Ends with markers Yes/No

5.0 TERMINAL BLOCK

5.1 10% spare terminals :
     Yes/No

     Furnished

6.0 S.S. Bolts/Nuts :
     Yes/No

7.0 Contractor/Bidder/Sub-contractor/Sub-manufacturer/Manufacturing
     facility:

7.1 CNC Machine, CNC Turret, :
     Yes/No
     NC Bending Machine

7.2 7 Tank treatment :
     Yes/No

7.3 Testing Facility
   a) List of Equipments :

8.0 Sub-Contractor/OEM
    Details (Attached Profile) :
     Yes/No

Contractor’s Signature

Date:
# List of Material to be used

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
<th>Brand/Manufacturer</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>XLPE Armoured Cable</td>
<td>CCI / Finolex / Asian / Nicco</td>
</tr>
<tr>
<td>2</td>
<td>Voltmeter (Digital)</td>
<td>AE/MECO/RUSHABH/Schneider</td>
</tr>
<tr>
<td>3</td>
<td>Ammeter (Digital)</td>
<td>AE/MECO/RUSHABH/Schneider</td>
</tr>
<tr>
<td>4</td>
<td>C.T. (Moulded Case/Resin Cast) (Rectangular)</td>
<td>AE/MECO/Control Group/Enercon</td>
</tr>
<tr>
<td>5</td>
<td>LED Type Indicating Lamp</td>
<td>GE/SIEMENS</td>
</tr>
<tr>
<td>6</td>
<td>Bakelite Fuse Base &amp; Carrier</td>
<td>GE</td>
</tr>
<tr>
<td>7</td>
<td>Selector Switch</td>
<td>L&amp;T</td>
</tr>
<tr>
<td>8</td>
<td>PVC insulated Copper Conductor cable for control wire &amp; earthing</td>
<td>Finolex/Anchor/RR Kable</td>
</tr>
<tr>
<td>9</td>
<td>Copper Lugs, heavy duty</td>
<td>Hex/Dowell/Comet</td>
</tr>
<tr>
<td>10</td>
<td>Bakelite Sheet</td>
<td>Hylam or equivalent</td>
</tr>
<tr>
<td>11</td>
<td>Crimping Compound for lugs</td>
<td>Dowell/Comet</td>
</tr>
<tr>
<td>12</td>
<td>Nuts, Bolts, Washers, Screws</td>
<td>Stainless Steel SS 304</td>
</tr>
<tr>
<td>13</td>
<td>Multifunction Meter</td>
<td>Siemens</td>
</tr>
<tr>
<td>14</td>
<td>Terminal Strip</td>
<td>Connect Well/ELMAX</td>
</tr>
<tr>
<td>15</td>
<td>L.T. 1.1 KV armoured/unarmoured copper Cable</td>
<td>NICCO, CCI, Finolex, Asian</td>
</tr>
<tr>
<td>16</td>
<td>Copper Plate/Copper Strip/Copper Bus bar</td>
<td>Electrolytic 99.2% pure</td>
</tr>
<tr>
<td>17</td>
<td>Straight Joint Termination Kit</td>
<td>Raychem</td>
</tr>
<tr>
<td>18</td>
<td>Brass Gland, heavy duty</td>
<td>Dowell’s/Comet</td>
</tr>
<tr>
<td>19</td>
<td>MCCB</td>
<td>Siemens</td>
</tr>
<tr>
<td>20</td>
<td>Control Circuit MCB</td>
<td>Legrand</td>
</tr>
</tbody>
</table>

**Contractor’s Signature** 34  
**Date:**
TATA INSTITUTE OF FUNDAMENTAL RESEARCH
Technical Services

SCHEDULE OF QUANTITIES
# Schedule of Quantities

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Description in Brief</th>
<th>Qty.</th>
<th>Rate/Unit</th>
<th>Amount Rs.</th>
<th>Ps.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1)</td>
<td>Fabrication, testing and supply of Cubicle type floor mounted, switch board fabricated from MS sheet (CRCA) suitable for 415 V, 3 Phase, 4 Wire, 50 Hz A.C. supply, complete with earthing to frame switches (MCCB), switch (MCCB) doors, cable Alley etc. &amp; provided with (please refer drawing No. TFR/TSR/DRG/WORKSHOP PANEL-2 as per enclosed Technical Specifications):</td>
<td>1 No</td>
<td></td>
<td></td>
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<tr>
<td>2)</td>
<td>Installation, Testing and commissioning of above switch board (Item No. 1) site specified by Electrical Engineer. (All incidental civil work including raising foundation as per the requirement )for installation, , termination of earthing strip and other related work shall be included in Vendor’s Scope).</td>
<td>JOB</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3)</td>
<td>Fabrication, testing and supply of Cubicle type floor mounted, switch board fabricated from MS sheet (CRCA) suitable for 415 V, 3 Phase, 4 Wire, 50 Hz A.C. supply, complete with earthing to frame switches (MCCB), switch (MCCB) doors, cable Alley etc. &amp; provided with (please refer drawing No. TFR/TSR/DRG/CNC PANEL-2 and enclosed Technical Specifications):</td>
<td>1 No.</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Sr. No.</td>
<td>Description in Brief</td>
<td>Qty.</td>
<td>Rate/Unit</td>
<td>Amount</td>
<td>Rs.</td>
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</tr>
<tr>
<td>4)</td>
<td>Installation, Testing and commissioning of above switch board (Item No. 3) site specified by Electrical Engineer. (All incidental civil work including raising foundation as per the requirement) for installation, termination of earthing strip and other related work shall be included in Vendor’s Scope).</td>
<td>JOB</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5)</td>
<td>Fabrication, Installation testing and supply of Cubicle type floor mounted, switch board fabricated from MS sheet (CRCA) suitable for 415 V, 3 Phase, 4 Wire, 50 Hz A.C. supply, complete with earthing to frame switches (MCCB), switch (MCCB) doors, cable Alley etc. &amp; provided with (please refer drawing No. TFR/TSR/DRG/ENCLOSURE PANEL- and enclosed Technical Specifications):</td>
<td>Job</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>6)</td>
<td>Dismantling of existing Switch Board panel of welding panel from the foundation, CNC PANEL and DB’s used for all machinery, switches and determination of all its incoming and outgoing power and control cables, earthing strips and other related accessories &amp; shifting to the location as specified by Electrical Engineer. (Removing includes existing incoming &amp; outgoing cables up to its end).Also Providing temporary power for required unit as per the site requirement. (Please note that the rate shall be inclusive of determination and removal of existing machine cables from DB).</td>
<td>JOB</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Sr. No.</td>
<td>Description in Brief</td>
<td>Qty.</td>
<td>Rate/Unit</td>
<td>Amount</td>
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<tr>
<td>7)</td>
<td>Installation, commissioning &amp; fixing of distribution Board on wall/column with termination and Lugging of respective of same need to be confirmed with TIFR engineer. (Please note that only TPN DB with MCCB/MCB shall be provided by TIFR free of cost and other required material for installation shall be supplied by the contractor.)</td>
<td></td>
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</tr>
<tr>
<td>a)</td>
<td>16 Ways 3 phase 4 wire 415 v</td>
<td>6 Nos.</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>b)</td>
<td>12 Ways 3 phase 4 wire 415 v</td>
<td>12 Nos.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c)</td>
<td>8 Ways 3 phase 4 wire 415 v</td>
<td>6 Nos.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>d)</td>
<td>4 Ways 3 phase 4 wire 415 v</td>
<td>6 Nos.</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>e)</td>
<td>8 Ways 1 phase 230 v</td>
<td>10 Nos.</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>8)</td>
<td>Supply of XLPE insulated, PVC sheathed Copper conductor armoured cable, suitable for Voltage up to 1.1 KV of size:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a)</td>
<td>4 Core x 35 Sq.mm.</td>
<td>100 mtrs.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b)</td>
<td>4 Core x 25 Sq.mm.</td>
<td>400 mtrs.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c)</td>
<td>4 Core x 16 Sq.mm.</td>
<td>400 mtrs.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>d)</td>
<td>4 Core x 10 Sq.mm.</td>
<td>150 mtrs.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>e)</td>
<td>4 Core x 6 Sq.mm.</td>
<td>400 mtrs.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>f)</td>
<td>4 Core x 4 Sq.mm.</td>
<td>200 mtrs.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>g)</td>
<td>4 Core x 2.5 Sq.mm.</td>
<td>200 mtrs.</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>9)</td>
<td>Supply FRLS PVC insulated, Unsheathed single core with annealed bare multistrand 100% electrolyte grade copper conductor flexible cable suitable for Voltage up to 660V/1.1 KV of different sizes &amp; different colors (R,Y,B&amp;N)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a)</td>
<td>4.0 sq.mm.</td>
<td>200 mtrs.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b)</td>
<td>2.5 sq.mm.</td>
<td>500 mtrs.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c)</td>
<td>1.5 sq.mm.</td>
<td>2000 mtrs.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10)</td>
<td>Supply of PVC insulated, PVC Sheathed Aluminum conductor armoured cable, suitable for Voltage upto 1.1 KV of size:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a)</td>
<td>3 ½ Core x 240 Sq.mm.</td>
<td>200 Mtrs.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b)</td>
<td>3 ½ Core x 185 Sq.mm.</td>
<td>100 Mtrs.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sr. No.</td>
<td>Description in Brief</td>
<td>Qty.</td>
<td>Rate/Unit</td>
<td>Amount</td>
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<tr>
<td>11)</td>
<td>Laying of armored cable (pvc colored wire) on the existing walls/ceiling /existing trench/ existing cable Trucking/through existence RCC Spun pipe laid at time of excavation works with GI saddles (all civil work if necessary is in laying scope).</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a)</td>
<td>3 ½” Core x 240 Sq.mm.</td>
<td>200 Mtrs.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b)</td>
<td>3 ½” Core x 185 Sq.mm.</td>
<td>100 Mtrs.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c)</td>
<td>4 Core x 35 Sq.mm.</td>
<td>100 Mtrs.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>d)</td>
<td>4 Core x 25 Sq.mm.</td>
<td>400 Mtrs.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>e)</td>
<td>4 Core x 16 Sq.mm.</td>
<td>400 Mtrs.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>f)</td>
<td>4 Core x 10 Sq.mm.</td>
<td>150 Mtrs.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>g)</td>
<td>4 Core x 6 Sq.mm.</td>
<td>400 Mtrs.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>h)</td>
<td>4 Core x 4Sq.mm.</td>
<td>200 Mtrs.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>i)</td>
<td>4 Core x 2.5 Sq.mm.</td>
<td>200 Mtrs.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12)</td>
<td>Laying of pvc wire (through conduit pipe) on the existing walls/ceiling /existing trench/ existing cable Trucking/through raceways with GI saddles</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a)</td>
<td>1 Core x 4.0 Sq.mm.</td>
<td>200 Mtrs</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b)</td>
<td>1 Core x 2.5 Sq.mm.</td>
<td>500 Mtrs</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c)</td>
<td>1 Core x 1.5 Sq.mm.</td>
<td>2000 Mtrs</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13)</td>
<td>Laying of 25 mm x 3 mm of copper on insulator fixed on walls, ceiling and through channel or tunnel. (cost of the insulator shall be inclusive in laying of the bus.)</td>
<td>20 Mtrs.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14)</td>
<td>Termination of PVC insulated and sheathed armoured Copper/ Aluminium Conductor cable through heavy duty brass gland and heavy duty Copper lugs complete with cable size marker and dressing of cable in cable trenches reroute of cables etc. of following sizes.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sr. No.</td>
<td>Description in Brief</td>
<td>Qty.</td>
<td>Rate/Unit</td>
<td>Amount</td>
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<tr>
<td></td>
<td>(use Double compression gland for 240 sq.mm, 70 sq.mm cables)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a)</td>
<td>4 Core x 2.5 Sq.mm. (Copper)</td>
<td>40 Nos.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b)</td>
<td>4 Core x 6.0 Sq.mm. (Copper)</td>
<td>50 Nos.</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>c)</td>
<td>4 Core x 10.0 Sq.mm. (Copper)</td>
<td>50 Nos.</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>d)</td>
<td>4 Core x 16.0 Sq.mm. (Copper)</td>
<td>50 Nos.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>f)</td>
<td>4 Core x 25.0 sq.mm (Copper)</td>
<td>30 Nos.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>g)</td>
<td>4 Core x 35.0 Sq.mm. (Copper)</td>
<td>4 Nos.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>h)</td>
<td>3 ½” x 185.0 Sq.mm. (Aluminium)</td>
<td>4 Nos.</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>i)</td>
<td>3 ½” Core x 240 Sq.mm. (Aluminium)</td>
<td>8 Nos.</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>15) Termination of PVC insulated Copper wire with appropriate copper lugs of following sizes</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>a)</td>
<td>1 Core x 4.0 sq.mm.</td>
<td>50 Nos.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b)</td>
<td>1 Core x 2.5 sq.mm.</td>
<td>100 Nos.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c)</td>
<td>1 Core x 1.5 sq.mm.</td>
<td>400 Nos.</td>
<td></td>
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<td></td>
<td>16) Supply, installation, testing &amp; commissioning of Plate Electrode Earth Station at a depth of not less than 3.5 mtrs. with smooth surface tinned Copper plate of size 600 x 600 x 6 mm and with salt, char coal, other accessories and complete with brick masonry and PCC chamber with heavy duty C.I. frame and cove with appropriate painting, funnel, 25 mm C-Class G.I. pipe (for watering), 75 mm dia. heavy duty 6 kgs/cm² PVC pipe for tinned Copper strip between tinned Copper Plat and top of chamber and tinned Copper earthing BUS of size 50 x 6 mm as per drawing and also tinned copper strip of size 50 x 6 mm between copper plate and earth bus at the top of the chamber. Charcoal: 80 kg./Earthing Station Salt: 80 kg./Earthing Station</td>
<td>2 Nos.</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Sr. No.</td>
<td>Description in Brief</td>
<td>Qty.</td>
<td>Rate/Unit</td>
<td>Amount Rs. Ps.</td>
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<tr>
<td>17)</td>
<td>Supply of PVC insulated unsheathed heavy duty stranded Copper conductor cable of size 1 core, 95 mm² rated at 0.66/1.1 K of Green Colour.</td>
<td>200</td>
<td>Mtrs.</td>
<td></td>
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<tr>
<td>18)</td>
<td>Laying of above cable (95 sq mm)</td>
<td></td>
<td></td>
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<tr>
<td>a)</td>
<td>At a depth of 750 mm with sand bed and masonry bricks over it, complete with excavation and refilling of earth.</td>
<td>100</td>
<td>Mtrs.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b)</td>
<td>Laying of above cable (95 sq mm) on the existing walls/ceiling complete with suitable size of GI supports and GI saddles.</td>
<td>150</td>
<td>Mtrs.</td>
<td></td>
<td></td>
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<tr>
<td>19)</td>
<td>Supply &amp; installation of Earthing BUS on PCC/RCC wall of size 50x6 mm with length 1000 mm/1 Meter with tapped holes at every 200 mm.</td>
<td>2</td>
<td>Sets.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20)</td>
<td>Crimping and termination of 95 Sq.mm. Copper Conductor cable with Copper lugs.</td>
<td>12</td>
<td>Nos.</td>
<td></td>
<td></td>
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<tr>
<td>21)</td>
<td>Supply and installation including all job and accessories of 1.1 kV grade 2 mm Thick insulating electro mat as per IS-15652:2006 varying width up to 1 meter, CPRI tested, complete with all the required materials and accessories.</td>
<td>50</td>
<td>M²</td>
<td></td>
<td></td>
</tr>
<tr>
<td>22)</td>
<td>Fabrication, Supply and installation of MS support completely painted made from MS angle / MS channel / flat of different sizes as per site requirement.</td>
<td>200</td>
<td>Kgs.</td>
<td></td>
<td></td>
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<tr>
<td>23)</td>
<td>Fabrication and Supply of different sizes of termination / Junction boxes made from 2 mm thick CRCA steel duly painted with seven tank powder coated treatment.(with gland plate of 3mm thick CRCA sheet suitable for cable size of 240 sq mm, 95 sq mm and 70 sq mm).as per the site condition</td>
<td>150</td>
<td>Kgs.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sr. No.</td>
<td>Description in Brief</td>
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<tr>
<td>24)</td>
<td>Supply and installation of braided copper wire of size 25 mm complete with clamps etc.</td>
<td></td>
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</tbody>
</table>
| 25)     | Supply, fixing and laying Raceways with cover (On trays) Raceways shall be fixed on the wall/MS channel with GI clamps for finished levels as per the site conditions or through partitions with all accessories. **The rate shall be inclusive of the cost of the Raceways.**
| a)      | 100 mm x 40 mm Aluminium raceways, 2 mm thick                                        |
| 26)     | Supplying & fixing of 2mm thick GI Perforated type cable Trays of Asian /Profab Engineers make The cable tray shall be fixed to the ceiling/wall with MS angle support with 35mmx2mm thick GI slotted 'C' channel Patti at an interval of 1 meter / or the MS angle iron fabricated support depending upon the location. **The rate shall include the cost of Supports.**
| a)      | Cable Tray=150 mm wide x 50 mm height.                                                |
| b)      | Cable Tray=300 mm wide x 50 mm height.                                                |
| 27)     | Removal of existing conduit pipes With wires from walls, ceiling, columns, beams, existing trench etc. |
| 28)     | Supply of MS Conduit pipe heavy duty and duly painted with Red oxide of sizes with wall thickness of 1.8 mm  
| a)      | Size 1” Dia  
| b)      | Size 3/4” Dia  |

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**Contractor’s Signature**  
**Date:**
<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Description in Brief</th>
<th>Qty.</th>
<th>Rate/Unit</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>29)</td>
<td>Installation of above MS conduit pipes on wall, Ceiling, Structural Steel complete with GI Supports, saddles, Brackets etc. at a height 15 Mtr. With necessary accessories to fix light fixture and junction boxes, bends for conduit to raceway, if required.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a)</td>
<td>Size 1” Dia.</td>
<td>400 Mtrs.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b)</td>
<td>Size 3/4” Dia.</td>
<td>400 Mtrs.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>30)</td>
<td>Supply and installation of lighting switchboard boxes with switches (6 amps), fan regulator cover plate and frame, Internal Wiring on wall etc. Legrand Myrius</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a)</td>
<td>8 Module boxes</td>
<td>6 Nos.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b)</td>
<td>12 module boxes</td>
<td>10 Nos.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c)</td>
<td>18 module boxes</td>
<td>6 Nos.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>31)</td>
<td>Supply and installation of switchboard boxes with switch &amp; socket (16 amps), for wall mount fan regulator cover plate and frame, Internal Wiring on wall etc Legrand Myrius</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a)</td>
<td>8 Module boxes</td>
<td>6 Nos.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>32)</td>
<td>Termination of 1.5 sq.mm FRLS PVC insulated single core stranded flexible cables in Switch board boxes complete with copper lugs etc.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a)</td>
<td>6/8 Module boxes</td>
<td>6 Nos.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b)</td>
<td>12 module boxes</td>
<td>10 Nos.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c)</td>
<td>18 module boxes</td>
<td>6 Nos.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>33)</td>
<td>Supply and installation of Ceiling rose complete with junction boxes etc.</td>
<td></td>
<td></td>
<td>150 Nos.</td>
</tr>
</tbody>
</table>

Contractor’s Signature 43  Date:
<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Description in Brief</th>
<th>Qty.</th>
<th>Rate/Unit</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>34)</td>
<td>Supply and connecting of 1.0 sq.mm 3 core flexible cables between ceiling rose and Existing Light fixtures (Approx one meter length for each Light fixture)</td>
<td>150 Nos.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>35)</td>
<td>Installation of T5 Tube light fixtures 2 x 28 watts or 3 x 28 watts or LED 50 watts fixtures complete with all accessories &amp; ball catch, junction box &amp; other accessories extra as required. (tube light fixtures/led fitting will be supplied by TIFR at free of cost), at existing place or elsewhere as per the instruction of engineer.</td>
<td>150 Nos.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>36)</td>
<td>Removal of existing old cables from walls, ceiling, beam, columns, existing trenches etc. of following size &amp; properly stocking them in the cable yard.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a)</td>
<td>1.5 Sq.mm.</td>
<td>50 Mtrs.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b)</td>
<td>2.5 Sq.mm.</td>
<td>50 Mtrs.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c)</td>
<td>4.0 Sq.mm.</td>
<td>70 Mtrs.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>d)</td>
<td>6.0 Sq.mm.</td>
<td>100 Mtrs.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>e)</td>
<td>10.0 Sq.mm.</td>
<td>150 Mtrs.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>f)</td>
<td>16.0 Sq.mm.</td>
<td>200 Mtrs.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>g)</td>
<td>25.0 Sq.mm.</td>
<td>200 Mtrs.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>h)</td>
<td>50.0 Sq.mm.</td>
<td>200 Mtrs.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>i)</td>
<td>95.0 Sq.mm.</td>
<td>50 Mtrs.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>37)</td>
<td>Removal of existing conduit pipes with wires from walls, ceiling, columns, beams, existing trench etc.</td>
<td>300 Mtrs.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Sr. Description in Brief

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Description in Brief</th>
<th>Qty.</th>
<th>Rate/Unit</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>38)</td>
<td>Breaking of existing workshop floor concrete at ground level of following mentioned depth &amp; width (to accommodate pipe or to create trench for laying cables from DB to load point.) as per the site requirements. Also all unwanted debris/rabbit/broken material need be disposed at nearest BMC dumping yard and filling the generated trenches with PCC 1:2:4</td>
<td>10 M³</td>
<td></td>
<td></td>
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<tr>
<td>a)</td>
<td>40 mm depth &amp; width</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>b)</td>
<td>60 mm depth &amp; width</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c)</td>
<td>75 mm depth &amp; width</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>d)</td>
<td>100 mm depth &amp; width</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>e)</td>
<td>165 mm depth &amp; width</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>39)</td>
<td>Providing labor, material, Equipments for structural steel work at all level including supplying cutting, fabricating welding, erecting and fixing in position for concrete trenches including painting with primer of approved steel primer also includes cutting edge concrete grounding MS angle fastening.</td>
<td>200 Kgs.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>40)</td>
<td>Structural steel work at all levels in M S plain and chequered plates including, supplying, cutting, fabricating, Welding, erecting and fixing in position including painting with a primer coat of approved steel primer. Notes: Welding weights connection bolts, and nut shall not be measured for the payment but the cost of which shall be deemed to have been included in the rate.</td>
<td>200 Kgs.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sub Total</th>
<th>GST</th>
<th>Freight</th>
<th>Transit Charges</th>
<th>Grand Total</th>
</tr>
</thead>
</table>

**Contractor’s Signature** 45  
**Date:**
1) DETAILS OF PANEL SHALL BE REFER FROM THE TECHNICAL SPECIFICATION.
2) ALL PVC FLEXIBLE WIRE SHALL BE PROVIDED WITH THE PHASE & N/L COLOR CODE.
3) PL. NOTE THAT G.A. DRG. IS TENTATIVE AND CAN BE CHANGED AS PER THE PROJECT REQUIREMENT.
Earthing Bus (refer enlarged view 'B').

Ground Level

125 thk. Brick work.

50 x 6 Tinned Copper Strip.

600 x 600 x 6 Tinned copper Plate.

C.I. Frame
Funnel
P.C.C. 1:4:8
75Ø P.V.C. Pipe.
25Ø G.I. Pipe.
Charcoal salt

Epoxy Insulator.

50 x 6 thk. Earthing Bus.

50 x 6 thk. Copper Strip.

Brick work.

75Ø P.V.C. Pipe.

Tinned Copper Strip 50 x 6 Fixed to Copper Plate with S.S. Bolt & Nut and also welded/brazed.

600 x 600 x 6 Tinned copper Plate.

COPPER PLATE DETAILS (ENLARGED VIEW 'A').

R1- Earthing Bus Size changed by KBK

date: 12 JAN. 2018
drg. no.: TFR / TSR / 2138 -R1

scale:
N. T. S.
drn. by: RAJEEV
chkd. by: K.B.KAJROLKAR A.P.SINGH.
appd. by: S. N. IYER

TATA INSTITUTE OF FUNDAMENTAL RESEARCH.
Homi Bhabha Road, Navy Nagar, Colaba, Mumbai-400 005
NOTE:

1) DETAIL'S OF PANEL SHALL BE REFER FROM THE TECHNICAL SPECIFICATION.

2) ALL PVC FLEXIBLE WIRE SHALL BE PROVIDED WITH THE PHASE & N/L COLOR CODE.
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3) PL. NOTE THAT G.A. DRG. IS TENTATIVE AND CAN BE CHANGED AS PER THE PROJECT REQUIREMENT.
NOTE:
1) DETAILS OF PANEL SHALL BE REFER FROM THE TECHNICAL SPECIFICATION.
2) ALL PVC FLEXIBLE WIRE SHALL BE PROVIDED WITH THE PHASE & N/L COLOR CODE.
3) PL. NOTE THAT G.A. DRG. IS TENTATIVE AND CAN BE CHANGED AS PER THE PROJECT REQUIREMENT.
Instructions to Bidder

1. **PART “A” (Technical Bid) consisting of Technical Bid & Commercial Terms** and **PART “B” (Price Bid) consisting of only Price** shall be submitted in separate sealed envelopes duly super scribed with the tender enquiry number, and the due date in bold letters, addressed to the Admn. Officer (Purchase), Tata Institute of Fundamental Research, Homi Bhabha Road, Colaba, Mumbai – 400 005. The envelopes should be clearly marked on top as either PART “A” or PART “B”. The two sealed covers should be further put in a master cover super scribed with the Tender Enquiry No., Due Date in bold letters, addressed to the Admn. Officer (Purchase), Tata Institute of Fundamental Research, Homi Bhabha Road, Colaba, Mumbai – 400 005. The sealed master envelop has to be delivered by hand/courier at the security Gate Officer of TIFR on or before 17.30 hrs on the due date specified. The technical bid will be opened in the presence of attending tenderers at 15.00 hrs on the due date at Purchase Section, TIFR Mumbai. Tenders submitted after 17.30 hrs. on due date will not be considered.

2. **In case the PART ‘A’ and Part ‘B’ bids are not sealed in separate envelopes the tender will be rejected.**

3. **The technical bid should not contain any indication of the price.**

4. After scrutiny of Technical Bids, Price bids of only those bidders who are shortlisted on technical basis will be opened at on later date. The opening date, time and venue will be intimated to the technically successful bidder.

5. **Bidders who have not accepted the job/order awarded to them or withdrawn from the tender process OR whose EMD/Security deposit has been forfeited in the past their bids will not be considered and treated as ineligible / disqualified.**
6. After downloading the documents please inform your company details such as name, address, telephone nos., contact person and email address etc. by email to us. (deepak.baghele@tifr.res.in, kalpana@tifr.res.in, suchita.raut@tifr.res.in) to enable us to inform prospective bidder for any corrigendum/changes if any; in the Tender document before due date.

7. Quotation must be valid for a period of 90 days from the due date.

8. In case the quotation is not sealed in the envelopes the tender will be rejected.

9. Tenders containing correction, overwriting will not be considered. Late or delayed/Unsolicited quotations/offers shall not be considered at all. These will be returned to the firms as it is. Post tender revisions/corrections shall also not be considered.

10. Tenderer should sign on all the pages of the technical bid and the price bid.

11. In case of any interpretational issues in this tender, the interpretational decision of the TIFR shall be Final & binding on the bidder.

12. TIFR reserve the right to ask for or to provide any clarification, changes after the release of this tender.

13. If equipment offered is to be imported, arrangements for import will be made by us.

14. Tenders who do not comply with any of the conditions are liable to be rejected.

15. The Institute shall be under no obligation to accept the lowest or any other tender received in response to this tender notice and shall be entitled to reject any tender without assigning any reason whatsoever.
16. TIFR reserves the right to place the order for part/reduced quantity than what is specified in the tender

17. The delivery period should be specifically stated and earlier delivery may be preferred.

18. Specifications are basic essence of the product. It must be ensured that the offers must be strictly as per our specifications. At the same time it must be kept in mind that merely copying our specifications in the quotation shall not make the parties eligible for consideration of the quotation. A quotation has to be supported with the printed technical leaflet/literature of the quoted model of the item by the quoting party/manufacturer.

ADMINISTRATIVE OFFICER
(PURCHASE SECTION)
TIFR, MUMBAI