

PART- C

***(Electrical &
Mechanical Work)***

PROFORMA OF SCHEDULES

(Separate proforma for Civil, Elect. & Hort. Works in case of Composite Tenders)

SCHEDULE 'A'

Schedule of quantities (as per PWD-3) attached BOQ.

SCHEDULE 'D'

Extra schedule for specific requirements / documents for the work, if any: **As attached in tender documents.**

SCHEDULE 'E'

Reference to General Conditions of contract:

AS Per PART A

Name of Work: Renovation/Replacement of existing cup board & Tables of Administration Section (Room Nos. 215 & 217) at ICAR CRIJAF Barrackpore Kolkata. (SH: Electrical Works)

SCHEDULE F:

GENERAL RULES & DIRECTIONS:

Time allowed for execution of work

:

As Per PART A

Officer inviting tender

Maximum percentage for quantity of items of work to be executed beyond which rates are to be determined in accordance with Clauses 12.2 & 12.3

As Per PART A

Definition:

2 (v) Engineer-in-Charge

As Per PART A

2 (viii) Accepting Authority

As Per PART A

2 (x) Percentage on cost of material and labour to cover all overheads and profits.

As Per PART A

2 (xi) Standard Schedule of rate

2 (xii) Department

DSR 2025 & PRESENT MARKET RATE
Central Public Works Department.

9 (ii) Standard CPWD Contract Form GCC 2023, CPWD Form 7/8

Modified & Corrected up to date.

Clause 1

i) Time allowed for submission of P.G., Performance Chart (Time and Progress) and applicable Labour license, Registration with EPFO, ESIC and BOCW Welfare Board or proof of applying thereof from the date of issue of letter of acceptance, in days.

As Per PART A

ii) Maximum allowable extension with rate fee @ 0.1% per day beyond the period in (i) above

As Per PART A

Clause 2

Authority for fixing compensation
under clause-2

As Per PART A

Clause 2A

Whether Clause 2A shall be applicable

As Per PART A

Clause 5

Number of days from the date of issue of letter of
acceptance for reckoning date of start Mile stone(s) as per
table given below:

As Per PART A

Sl. No.	Description of Milestone (Physical)	Time Allowed in days (from date of start)	Amount to be with-held in case of non achievement of milestone
As Per PART A			

Time allowed for execution of work : As Per PART A

Authority to decide:

(i) Extension of time : As Per PART A

(ii) Rescheduling of milestones : As Per PART A

**(iii) Shifting of date of start in case :
of delay in handling over of site As Per PART A**

PROFORMA OF SCHEDULES Clause 5 Schedule of handing over of site

Part	Portion of site	Description	Time period for handing over reckoned from date of issue of letter of intent
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Clause 5

Applicable clause 5 / Clause 5A : As Per PART A

Clause 6

Applicable Clause 6 (CMB / EMB) : As Per PART A

Clause 7

Gross work to be done together with net
payment/adjustment of advances for material
collected, if any, since the last such payment for
being eligible to interim payment

As Per PART A

Clause 7A

Whether Clause 7A shall be applicable

As Per PART A

Clause 10A & 18**As Per PART A**

List of mandatory machinery, tools and plants & testing Equipment to be deployed by the contractor at site, this equipment shall be available in the test room at site.

Earth tester 2. Insulation Tester 3. Steel/Aluminium Ladder 1.5 m to 8 m.
 4. Chase cutting machines. 5. Electrical wire drawing equipment. 6. Torque
 wrench for nut/bolt/screws. 7. Conduit die set. 8. Pipe vice. 9.
 Bench vice. 10. L.T.Megger 500/1000 volts. 11. Tong Tester. 12.
 Multimeter. 13. Hydraulically operated & hand operated crimping
 machine. 14. Portable Ordinary drilling machine. 15. Portable
 Hammer drilling machine. 16. Overhead conduit puller. 17. Vernier caliper
 18. Screw gauge 19. Required other T&P for completion of work.

Clause 10B (ii)

Whether Clause 10B (ii) shall be applicable : As Per PART A

Clause 10 C**As Per PART A**

Component of labour expressed as percent of value of work: As Per PART A

Clause 10 CA**As Per PART A****Clause 10 CC****As Per PART A****Clause 11**

Specifications to be followed execution of work. As per direction of the E-in-C.

Clause 12

Authority to decide deviation up to 1.5 times
 of tendered amount **As Per PART A**

Type of work : **Maintenance**

12.2 & 12.3 Deviation limit beyond which clause
 12.2 and 12.3 shall apply for building work

As Per PART A**12.4**

(i) Deviation limit beyond which clauses
 12.2 and 12.3 shall apply for foundation
 work (except items mentioned in earth work
 subhead in DSR and related items)

As Per PART A

(ii) Deviation Limit for items mentioned in
 earth work subhead of DSR and related
 items

As Per PART A**Clause 16**

Competent Authority for
 deciding reduced rates. **As Per PART A**

Clause 18

**List of mandatory machinery, tools & plants
 to be deployed by the contractor at site:**

**All T&P as per requirement
 of work**

Clause 19		As Per PART A
Clause 19C	Authority to decide penalty for each default	As Per PART A
Clause 19D	Authority to decide penalty for each default	As Per PART A
Clause 19G	Authority to decide penalty for each default	As Per PART A
Clause 19K	Employment of skilled / semi-skilled workers.	As Per PART A

Clause 25

Constitution of Dispute Redressal Committee (DRC)

(i)	Conciliator	:	As Per PART A
(ii)	Arbitrator Authority	Appointing :	As Per PART A
(iii)	Place of Arbitration	:	As Per PART A

Clause 32**Requirement of Technical Representative(s) and recovery rate**

Sl. No	Minimum Qualification of Technical representative	Discipline	Designation (Principal Technical/ Technical representative	Minimum experience	Nos.	Rate at which recovery shall be made from the contractor in the event of not fulfilling provision of Clause 36(i)	
						Figures	Words
NOT APPLICABLE							

Assistant Engineers retired from Government services that are holding Diploma will be treated at par with Graduate Engineers.

Diploma holder with minimum 10 years relevant experience with a reputed construction co. can be treated at par with Graduate Engineers for the purpose of such deployment subject to the condition that such diploma holders should not exceed 50% of requirement of degree engineers.

GENERAL AND COMMERCIAL CONDITIONS

1. This section covers the various commercial conditions applicable and to be read in connection with the conditions of contract of the standard form (CPWD-7 / 8) of the department (CPWD) forming part of the tender papers. In the event of any discrepancy between these two, the requirements of the former will be followed.
2. These additional conditions and additional specifications are applicable to all E&M works in general. For specific tenders some of the E&M services may not be a part of the particular tender. In such cases the conditions and specifications which are not related to the works or components thereof mentioned in the schedule of work shall not apply for that particular tender.
3. All the E & M works shall be carried out as per direction and to the entire satisfaction of the Engineer-in-charge.
4. The contractor has to submit all the drawings to the Engineer – in – charge of the works for approval from the competent authority i.e. location of fittings and fixtures, switch boards, power plug etc. with wiring diagram & Layout drawing of all works before execution or procurement of materials.

Unless otherwise specified in the following conditions, the work shall, in general, be carried out as per following specifications:

- a) CPWD General Specifications for Electrical Works – Part-I (Internal), 2023, as amended up to date.
 - b) CPWD General Specifications for Electrical Works – Part-II (External), 2023, as amended up to date.
 - c) Relevant BIS specifications amended up to date.
 - d) Indian Electricity Act 2003 and Indian Electricity Rules 1956 amended up to date.
 - e) Indian electricity rules 1956 amended upto date.
 - f) Commercial and additional conditions and specifications for E & M work for this tender.
 - g) Any other relevant act or rules and local byelaws.
5. If the specifications for any item or its component are not available in the CPWD specifications cited above, relevant BIS specification as amended up to date shall be followed, whether or not the specific reference of a particular BIS specification has been made in this specification / tender document.
 6. Wherever any reference to any Indian Standard specification occurs in the document relating to this contract the same shall be inclusive of all amendments issued thereto or revisions thereof, if any, up to the date of opening of tenders.
 7. All materials should conform to relevant BIS specifications wherever the same exists in absence of stipulation in this tender document.
 8. Where manufacturers furnishes specific instructions / recommendations relating to the materials used in this job and/or their installation, covering points not specifically mentioned in these documents, these instructions shall be followed in all cases and shall be deemed to be included in the schedule of work whether they have been specifically mentioned or not.
 9. Manufacturer's catalogue / literature on installation, testing, maintenance and troubleshooting of major equipment shall be submitted to the department while handing over the installation.

10. MATERIALS TO BE USED IN THE WORK :

- 10.1 All materials used in the work shall be new and of good quality, conforming to the relevant specifications as per good Engineering practice.
 - 10.2 All the materials proposed to be used in the work should be got approved from Engineer in Charge before use in work.
 - 10.3 The materials to be supplied / provided by the contractor in execution of the work should be ISI marked, wherever applicable and of make as specified in the agreement. Where the make of any particular material is not specified in the contract document, the material shall be supplied as per makes desired by the Engineer-in-charge.
 - 10.4 It will be the responsibility of the contractor / bidder to ensure use of genuine materials in the work. The department reserves the right to get (any / all materials / components) inspected by the manufacturer or their authorized representatives at any stage of the execution of work. If any of the materials, equipment supplied and used in work is found spurious at any stage, then the department reserves the right to ask the contractor to replace it by genuine one and make suitable recovery and / or withheld suitable amount till it is done, even if any payment against that material is already made.
 - 10.5 The department may ask for any valid document like manufacturer's test certificate, document for purchase of the material, document for import / shipment of imported materials etc. as deemed fit by the engineer-in-charge to ascertain genuinely of material supplied by / used in the work by the contractor. The contractor shall remain bound to submit all such documents to the department failing which payment may not be made or if already paid may be recovered / withheld from subsequent running account payment.
 - 10.6 Copies of all purchase documents for all equipment, accessories, fittings, fixtures etc. which carry guarantee / warrantee shall be handed over to the department in suitable form so that proper guarantee of materials are available to the department.
 - 10.7 All the equipment and their components and all the materials to be used in the work shall be suitable for the environmental conditions at the location of the work.
 - 10.8 The materials to be supplied in this work shall be scheduled in such a way that miles stones are achieved and no shortfall is there. At the same time materials should be brought at sight in phases in such a manner so that they are not brought much in advance at site and dumped in work site for long period before installation and guarantee / warrantee of the materials are available for full period i.e. from the date of beneficial use of the material / equipment as per tender conditions. If the materials / equipment are supplied at site much before actual use in work, the department shall not remain bound to accept and make payment for such items of work involving the said materials / equipment. The decision of the engineer in charge will be final and binding on all.
 - 10.9 Dismantle materials, shall be returned to the Client department unless otherwise anything in contrary has been specifically stated in the tender document / BOQ.
- ## 11. RATES:
- 11.1 Unless otherwise provided in the schedule of quantities of the work the rates tendered by the contractor shall be all inclusive and shall apply to all heights, lifts, leads and depths of the building and nothing extra shall be payable to him on this account.

- 11.2 The rates for all items of work shall, unless clearly specified otherwise, include cost of all labours, materials and other inputs involved in the execution of the item irrespective of whether they have been specifically mentioned in the tender document or not.
- 11.3 This being an indivisible works contract, GST, Excise Duty etc. are not payable separately. The rates tendered shall be firm and inclusive of all taxes, duties, cess and levies as applicable (except service tax), and all charges for packing, forwarding, insurance, freight and delivery, installation, testing and commissioning at site, watch and ward etc. including temporary constructional storage, risks, over head charges, general liabilities / obligations and clearance from local bodies and State Fire Services, as applicable. Nothing extra shall be paid. However, fees payable to the local bodies / authorities for such clearance etc. shall be borne by the department. The contractor has to, however, initially make the payment. Likewise service tax applicable shall be initially paid by the contractor and shall be reimbursed to him by the department after verification of payment receipts etc.
- 11.4 Octroi exemption certificate may be issued by the department if required by the contractor. However, the department is not liable to reimburse the octroi duty in case exemption certificates are not honoured by the concerned authorities.

12 COMPLETENESS OF TENDER:

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

13 STORAGE AND CUSTODY OF MATERIALS:

The agency has to make his own arrangement for watch and ward of the stores. Their safe custody shall be the responsibility of the contractor till the final taking over of the installation by the department.

14 ACCIDENT:

The department (CPWD) shall not have any responsibility or liability in case of any accident injury to the personnel to the contractor at work site or to the general public at the work site due to mishandling of equipment by the personnel of the contractor or any other similar reason. The responsibilities and liabilities for such accidents and incidents shall be borne in full by the contractor.

15 AFTER SALES SERVICE :

The contractor shall ensure adequate and prompt after sales service in the form of maintenance personnel and spares as and when required with a view to minimize the break down period. Particular attention shall be given to ensure that all spares are easily available during the normal life of the installation.

16 REMOVAL OF SURPLUS MATERIALS AND TOOLS :

After completion of work the agency shall remove his men, materials and debris etc. from site.

17 QUALITY OF WORK AND WORKMANSHIP :

- 17.1 The contractor shall be entirely responsible and answerable for all the works done by him regarding quality, adherence to the laid down specifications, terms and conditions, warranty/guarantee etc. and he shall be liable to bear any compensation that may be levied by the department under any of the clauses of the agreement.
- 17.2 The contractor is advised to visit the site before quoting for his tender to apprise himself about the site environments and other conditions. Drawings and inventories can be seen in the office of the Engineer – in – charge.

18 SITE ORDER BOOK :

Shall be maintained by Major Component

19 WATCH AND WARD :

- 19.1 The contractor will make his own storage of his own materials. The watch and ward of the materials and of the installations would be responsibility of contractor till the work is completed / handed over to the department. Nothing extra shall be paid to the contractor on this account.
- 19.2 Making payment to the contractor in any form against supply of materials / equipment / components or execution thereof shall not absolve the contractor of his responsibility of watch and ward of the equipment / materials etc. and their satisfactory functioning until the same is taken over by the department after successful installation, testing, commissioning and running in period.
- 19.3 No separate storage space will be provided to the contractor for storage of his materials and equipment to be brought at site and used in execution. The available open site space may however be used by the contractor for storage purposes in which case he may build up temporary store at available site space at his own cost.

20 VARIATION IN QUANTITY :

Quantities shown against each item of work or supply are tentative which may vary on either side (plus or minus). This variation shall, in general, be governed by clause no. 12 of the clauses of contract of CPWD form 7 / 8. The contractor should ensure from the Engineer-in-charge and from the site condition the actual quantity required / to be used / to be supplied before bringing the materials at site. In case the actual quantity of material required at the site is less than the stipulated quantity, the contractor cannot claim to supply entire quantity stipulated in the schedule of quantities of work (Schedule – A) as well as cannot demand for payment thereof. The contractor shall therefore, be very careful about the quantity of materials to be supplied / brought at site. The decision of the Engineer-in-charge in this regard shall be final and binding on the part of the contractor. Even if initial payment for supply of materials is made in any form for bringing material at site and if it is found at later stage that the actual requirement is less as per site requirement or as per decision of the Engineer-in-charge, the contractor shall have to take back the additional quantity brought / supplied at site and necessary adjustment shall be made from his next bill on this account. No claim in this regard shall be entertained.

21 NATURAL CALAMITY:

No payment will be made to the contractor for any damage caused by rain, snow fall, floods, dampness, fire, sun or any other natural cause whatsoever during the execution of work. The damage to the work due to above reason, if any, shall have to be made good by the contractor at his own cost and no claim on this account shall be entertained.

22 INSPECTION AND TESTING :

- 22.1 The Engineer-in-charge or his authorized representative may inspect any material at manufacturers' works and may witness routine tests as per relevant Indian Standard Specifications or other relevant specifications at manufacturers' works.
- 22.2 The contractor shall give in writing advance notice to the Engineer-in-charge and arrange for such inspection / presence for testing at manufacturers work. The TA/DA etc. of the departmental personnel who will be deputed to witness the tests etc. shall be borne by the Department.
- 22.3 The Engineer-in-charge or his authorized representatives shall have, at all the reasonable times, access to the contractor's premises or works or other works where manufacturing / fabrication shall be done and shall have the power, at all reasonable times, to inspect and examine the materials and workmanship during its manufacture or fabrication.
- 22.4 Inspection of imported materials at foreign works shall however not be carried out by the department. These materials shall be inspected and tested at site. Manufacturers' original test certificates and document of import / shipment should be provided to the department along with the materials without which no payment should be made to the contractor.
- 22.5 The contractor shall arrange for all the materials and labour required in connection with inspection of equipment or for any testing to be carried out at his works / manufacturers' works or at site of installation. Notice of such inspection / presence for testing shall be given by the contractor to the Engineer-in-charge at least fifteen days in advance.
- 22.6 Notwithstanding approval for such tests / inspection of equipment / components by the Engineer-in-charge or his authorized representative, the contractor shall be required to perform site tests as desired by the Engineer-in-charge and prove the correctness of ratings and performance of equipment / components and materials supplied and / or installed by him as per contract specifications and conditions at his own cost.
- 22.7 The Engineer-in-charge reserves the right to reject any equipment / machinery / material should it, on tests after installation, be found not to comply with contract specifications or its performance is not satisfactory.
- 22.8 Final inspection and testing will be done by the Engineer-in-charge or his authorize representative as per details to be indicated by the Engineer-in-charge.
- 22.9 It shall be the responsibility of the contractor to get the installation inspected and passed by the local authorities concerned, as may be required by the local bye laws. The contractor will extend all help including test facilities to the representatives of the local bodies. In case the contractor fails to make desired facilities available during inspection, the department reserves the right to provide the same at the risk and cost of the contractor. The observation of the local authorities will be promptly attended by the contractor. The installation will be accepted by the department only after receiving clearance from the local bodies / fire authorities. The inspection charges leviable by the local / statutory authorities for the inspection shall however, be borne by the department.

23 COMPLETION DRAWING AND MANUAL :

In addition to the mode and form of submission of completion drawings and manuals as stipulated in the relevant CPWD Specifications for various sub-heads of E&M works, the contractor shall also submit soft copy of the completion drawings in CD / DVD.

24 POWER SUPPLY AND WATER SUPPLY :

No Power & Water Supply shall be provided by the department for the purpose of execution of the E&M work, except for testing and commissioning of installations. The contractor shall make his own arrangement in this regards. The power supply for testing and commissioning will be given at one point inside the premises and the contractor shall have to make arrangement for required cabling work and switch gears for extension of the power to the required location for testing. This will be applicable to all sub-heads of E&M works.

25 WORKS TO BE DONE BY THE CONTRACTOR

- 25.1 Unless otherwise mentioned in the tender documents, the following works shall be done by the contractor and therefore, their cost shall be deemed to be included in their tendered cost – whether specifically indicated in the schedule of quantity / work or not:
- 25.2 Preparation of all layout, working drawings for execution of the work (E&M) components and submission to the Engineer-in-charge for approval within 15 days from the scheduled date of commencement of the work.
- 25.3 Foundations for equipment / structures / pumps including vibration isolation spring / pads.
- 25.4 All minor building works necessary for installation of equipment such as making of openings in walls / floors, either of RCC or brick masonry, foundation trench for fuel line and cable, making of opening in walls or in floors and restoring them to their original condition / finish and necessary grouting etc. as required.
- 25.5 Dismantling of brick wall, if any, for inserting / positioning / placement of equipment, Control panel / Diesel Tanks or for taking ducting / cable tray / pipes and rebuilding / making good the same to its original position / finish for the same nothing extra shall be paid by the department.
- 25.6 Making good all damages caused to the structure during installation and restoring the same to their original finish.
- 25.7 Supply and installation of all necessary angle / channel / flat iron supports and brackets etc. for installation of the Cabling / electric Panels / pumps / accessories on floor / wall / Shaft / terrace and at other places, as may be necessary including their installations in position.
- 25.8 Responsibility to ensure safety of all materials against pilferage and damage till the installation is handed over to the department.
- 25.9 All scaffolding as may be necessary for installation of Exhaust piping / Cabling / Electric Panels / Lightning arrestor/ exhaust pipe / wet riser and sprinkler pipes / ducts and all other equipment and their sub-assemblies / accessories on floor / wall / Shaft / terrace and at other places during erection work and subsequent removal.
- 25.10 Painting of all exposed metal surfaces of equipment's and components with appropriate / approved colour as required and as desired by the Engineer – in - charge.
- 25.11 All electrical works including cables / wires, earthing etc. as specified in Schedule of work.
- 25.12 Small wiring, inter-connection etc. inclusive of all materials and accessories necessary to comply with the regulations as well as proper and trouble free operation of the equipment.

- 25.13 Closing of the cable entry points in sub-station against seepage of water rodents etc.
- 25.14 Approval / clearance of the complete installation shall be obtained by the contractor from CPCB / State Pollution Control Board / Local Bodies / Central Electricity Authority (CEA) / other licensing authorities wherever required. However application shall be made by the Department and any statutory fee, as applicable, shall be paid by the department directly to the government authorities concerned.
- 26 Date of taking over of the installation and date of acceptance:
- 26.1 The date of taking over of the installations under any sub-head of E&M works shall be the date of taking over the complete building (s) after due completion of the entire composite work and after complete test and trial run of all the major equipment under all sub-heads of E&M works to the entire satisfaction of the engineer-in-charge.
- 26.2 Subject to the guarantee clause, date of taking over the installation after stipulated period of trouble free operation of all the E&M works shall be the date of acceptance.
- 26.3 The appointment of Arbitrator shall be governed by the relevant clause of CPWD General Condition of Contract. The condition of contracts shall be governed by GCC, CPWD.

ASSISTANT ENGINEER (E)
BCESD-IV, BCED, CPWD, CGO COMPLEX
SALT LAKE, KOLKATA.

ADDITIONAL CONDITIONS FOR INTERNAL EI ELECTRICAL WORKS

- 1.0 The Department shall not issue any T & P and nothing extra shall be paid on account of this.
- 1.1 The main contractor should engage an eligible agency having valid registration in CPWD in appropriate class under category internal & external electrical installations / appropriate class under composite category for execution of electrification work. The firm should possess valid electrical contractor license. In case the main contractor himself meets the above criteria, he shall be allowed to execute this sub-head of work after due verification by the Engineer-in-Charge of Electrical Works

Care shall be taken by the contractor while handling and installing the various equipment and components of the work to avoid damage to the building. He shall be responsible for repairing all damages and restoring the same to their original finish at his cost. He shall also remove at his cost all unwanted and waste materials arising out of the installation from the site of work.
- 1.2 The tenderer shall guarantee among other things, the following vis-à-vis specifications.
 - a.) Quality, strength and performance of the materials used.
 - b.) Satisfactory operation during the maintenance period.
- 1.3 **DEFECT LIABILITY PERIOD:**
All the equipment shall be guaranteed for a period of minimum 12 months from the date of taking over the installation by the department against unsatisfactory performance or break down due to defective design, workmanship of material. The equipment or components, or any part thereof, so found defective during guarantee period shall be forthwith repaired or replaced free of cost, to the satisfaction of the Engineer-in-Charge. In case it is felt by the department that undue delay is being caused by the contractor in doing this, the same will be got done by the department at the risk and cost of the contractor. The decision of the Engineer-in-Charge in this regard shall be final.
- 1.4 **EXTENT OF WORK:**
 - 1.4.1 The work shall comprise of entire labour including supervision and all materials necessary to make a complete installation and such tests and adjustments and commissioning as may be required by the department.
 - 1.4.2 Minor building works necessary like making of opening in walls or in floors and restoring to their original condition, finish and necessary grouting etc. as required to be undertaken.
 - 1.4.3 Maintenance (Routine & preventive) for one year from date of completion and handing over.
- 1.5 **Cooperation with other agencies:**
The successful tender shall co-ordinate with other contractors and agencies engaged in the construction of the building and exchange freely all technical information so as to make the execution of this works contract smooth. No remuneration should be claimed from the department for such technical cooperation. If any unreasonable hindrance is caused to other agencies and any existing portion of the building has to be dismantled and re-done for want of cooperation and coordination by the successful tenderer during the course

of work, such expenditure incurred will be recovered from the successful tenderer if the restoration work to the original condition or specification of the dismantled portion of the work was not undertaken by the successful tenderer himself. Water proofing of pits shall not be damaged under any circumstances.

- 1.6 Verification of correctness of material at Destination:
All materials and equipment supplied by the contractor shall be new. They shall be of such design, size and materials as to satisfactorily function under the rated conditions of operation and to withstand the environmental conditions at site. The contractor shall have to produce all the relevant records to certify that the genuine material from the manufacturers has been supplied and erected.
 - (a) Materials and equipment to be used in the work shall be inspected by the Departmental officers. Such inspection will be of following categories:
 - (i) Inspection of materials/equipment to be witnessed at the Manufacturer's premises in accordance with relevant BIS/Agreement Inspection Procedure.
 - (ii) To receive materials at site with Manufacturer's Test Certificate(s).
 - (iii) To inspect materials at the Authorized Dealer's Godowns to ensure delivery of genuine materials at site.
 - (iv) To receive materials after physical inspection at site.
 - (b) Similarly, for fabricated equipment, the contractor will first submit dimensional detailed drawings for approval before fabrication is taken up in the factory. Suitable stage inspection at factory also will be made to ensure proper use of materials, workmanship and quality control.
- 1.7 INTERPRETING SPECIFICATIONS / Order of Preference:
Should there be any difference or discrepancy between the description of items as given in the Schedule of Quantities, technical specifications for individual items of work (including additional and commercial conditions) and IS Codes etc., the following order of preference shall be followed:
 - a) Schedule of quantities
 - b) Commercial and Additional conditions, technical specifications for this work
 - c) General Conditions of Contract for CPWD Works
 - d) Drawings (if any approved by the Engineer-in-charge)
 - e) CPWD General Specifications for electrical works
 - f) Relevant IS or any other International code in case IS code is not available.
- 1.8 Executive Engineer (Elect.) shall be the Engineer-in-Charge as far as electrical works are concerned. Separate tender form for electrical component is appended with his tender. It will be obligatory on part of the main contractor to sign the tender documents for all the component.
- 1.9 The main agency shall be responsible for all acts of commissions and non-commissions of the electrical contractor or sub-contractor engaged by him, even with approval of department.
- 1.10 Approval of the Engineer-in-charge shall be taken well in advance for all the materials to be used in the work by the contractor.
- 1.11 Running payment for Electrical/Mechanical components shall be made by the EE (E) directly to the main Contractor. The main contractor shall make the payment to associated Contractor within 15 days of receipt of each running account payment.

- 1.12 **Payment terms:** On account payments for part work as assessed by the Engineer – in-charge for the applicable items in the Contract shall be payable at part rates not exceeding the percentage indicated against the stages of work mentioned below :

For Wiring

S. no.	Stage of work	Percentage allowed
<i>i</i>	After completion of conduiting, switch box fixing etc. on pro rata basis i/c submission of test report of materials wherever required.	40 %
<i>ii</i>	After drawing of wires on pro rata basis i/c submission of test report of wires wherever required. .	40%
<i>iii</i>	On completion of testing of wiring	10 %
<i>iv</i>	On Commissioning and handing over.	10 %

For MCBDB, MCB, MCCB etc.

S. no.	Stage of work	Percentage allowed
<i>i</i>	After initial inspection (wherever specified) and delivery at site in good condition on pro-rata basis. i/c submission of test report of materials wherever required.	65 %
<i>ii</i>	On completion of pro-rata installation	25%
<i>iii</i>	On testing, Commissioning and handing over.	10 %

For Light Fitting, Fans, Air Conditioning Unit etc.

S. no.	Stage of work	Percentage allowed
<i>i</i>	After initial inspection (wherever specified) and delivery at site in good condition on pro-rata basis i/c submission of test report of materials wherever required.	70 %
<i>ii</i>	On completion of pro-rata installation	20%
<i>iii</i>	On testing, Commissioning and handing over.	10 %

For Earthing etc.

S. no.	Stage of work	Percentage allowed
<i>i</i>	On completion of pro-rata installation	70%
<i>ii</i>	On testing, Commissioning, submission of earth resistance report and handing over.	20 %
<i>iii</i>	On successful handing over.	10 %

For other items, the part rates will be decided by the Engineer-In-Charge of the work and shall be binding on the contractor.

The agency shall have to submit warranty certificate for electrical equipment as per list below along with LM 79/LM 80 report for LED light fittings from the OEM.

Sl.No	Description of item	Warranty/Guarantee after handing over to Department/Client
1	LED luminaries	5 years
2.	PCB and compressor of Air condition unit	5 years
3.	All other item	1 year

Security Deposit shall be released after one year except LED light fittings, Split Type Air Conditioner which shall be released after completion of warranty period:

Sl. No	Description of item	Condition of Withheld
1	LED luminaries	5% of tendered value for total used LED luminaries to be withheld as security till completion of warranty period.
2	PCB and compressor of Air condition unit	Additional 5% (Other than normal security deposit 2.5%) of tendered value for total used Split Type Air Conditioner to be withheld as security till completion of warranty period.

- 1.13 The main contractor shall be responsible for coordinating the activities of all works and will ensure progress of works as per laid down programme.
- 1.14 The Associated electrical Contractor or his representative is bound to sign the site order book as and when required by the Engineer-in-charge and will comply with the remarks therein.
- 1.15 The contractor shall make his own arrangement at his own cost for electrical / General Tools and plants required for the work.
- 1.16 The connections, inter-connections, earthing and inter-earthing shall be done by the contractor wherever required to be done for energization of the installation and nothing extra shall be paid on this account.
- 1.17 The contractor must be able to work on concrete slabs / walls as and when required and in complete co-ordination with the civil works. Cutting of chases in the plastered wall shall in no case be allowed. The contractor shall fix conduits and boxes in the walls soon after the brick work is completed and finish the chase to rough surface with proper cement sand mixture. Only in exceptional cases e.g. where cutting of plastered surface cannot be avoided it will be contractor's responsibility to ensure that plastering is done to match the original finish at no extra cost.
- 1.18 The contractor shall remove all the debris due to the electrical works from the site as soon as the work is completed
- 1.19 The rupturing capacity of the MCB's shall be 10 KA. The MCB's shall have ISI marked.
- 1.20 All the MCCBs shall be rated for $I_{cs}=I_{cu}$
- 1.21 The copper wire to be used on this work shall be FRLS type.
- 1.22 Make of MCB/MCCB shall be the same as the make of MCB DB.
- 1.23 The cooling capacity of 1.5 TR split type AC machine shall be minimum 5220 to 5250 watt.
- 1.24 The Electrical works shall be carried out by the contractor, side by side with the progress of the civil works.
- 1.25 The Contractor shall on demand by the Engineer-in-charge, furnish the proof to the satisfaction of Engineer-in-charge regarding purchase of Wires, MCBs, MCBDB, Fittings, accessories and other items, from the manufacturers authorized outlets.
- 1.26 Cutting of brick walls shall be with chase cutting machine only. All repairs and patch works shall be neatly carried out to match the original finish and to the entire satisfaction of the Engineer in Charge.
- 1.27 All the sub main and circuit wiring includes loose wire for connections inside switch boxes and MCB DB s. No payment for these loose wires shall be made.

However, wires/Cables within the cubicle panel will be measured and paid under relevant item of work.

- 1.28 The connection between incoming switch / isolator and bus bar shall be made with suitable size of thimble and cable at no extra cost.
- 1.29 Copper conductor of insulated cables of size 1.5 Sq.mm and above shall be stranded and terminals shall be provided with crimped lugs
- 1.30 All MS pulling box cover should be of phenolic laminated sheet of thickness not less than 3mm and for which nothing extra shall be paid on the account.
- 1.31 All sub-main shall be terminated in the main board with suitable copper lugs and thimbles for which nothing extra will be paid on this account.
- 1.32 All hardware items such as screws, thimbles, GI wire etc. which are essentially required for completing an item as per specifications will be deemed to be included in the item even when the same have not been specifically mentioned.
- 1.33 All hardware items such as nuts/ bolts/ screws/ washers etc. to be used in work shall be zinc/ cadmium plated iron.
- 1.34 Any conduit which is not be wired by the contractor shall be provided with GI fish wire for wiring by some other agency subsequently. Nothing extra shall be paid for the same.
- 1.34 While laying conduit, suitable size junction boxes shall be provided for pulling the wire as per the decision of the E-in-C.
- 1.35 Materials to be used in work are to be ISI marked wherever applicable. The make of the materials have been indicated in the list of acceptable makes. No other makes will be acceptable. For items for which acceptable makes are not mentioned in the tender document, Engineer-In-Charge shall decide the make before bringing the material to the site by the contractor. The materials to be used in the work shall be got approved by the Engineer in Charge / his representative before its use at site. The E-in-C shall reserve the right to instruct the contractor to remove the material which, in his opinion, is not acceptable.
- 1.36 Quantity of various items as specified in tender document may changes during construction stage as per site condition / clients requirement, the successful bidder is advised to verify the actual requirement of items including fittings, fixtures before bringing the material to the site.
- 1.37 In case the same item(s) appear more than once in the schedule of work / BOQ under the same sub head or among the different subhead of works, the lowest rate quoted for that item (s) shall be considered for the particular item(s) wherever appeared in any part of BOQ/ Schedule of works for the purpose of tender evaluation although web generated e-price bid may incorporate different quoted rate for same item(s) as per the quoting pattern of the tenderer. The tendered amount thus worked out shall be final & shall be binding on the contractor.
- 1.38 All statutory deductions like WCT, Labour welfare cess etc. shall be made from the bills.
- 1.39 Testing: All testes prescribed in these General Specifications, to be done before, during and after installation, shall be carried out, and the test results shall be submitted to the Engineer-in-charge in prescribed Performa, forming part of the Completion Certificate.
- 1.40 Commissioning on Completion: After Completion of the work, it shall be ensured that the installation is tested and commissioned.

2 Completion Plan and Completion Certificate:

(i) For all works completion certificate after completion of work shall be submitted to the Engineer-in-charge. (ii) Completion plan drawn to a suitable scale in tracing cloth with ink indicating the following, along with three blue print copies of the same shall also be submitted.

a) General layout of the building. (b) Locations of main switchboard and distribution boards, indicating the circuit numbers controlled by them. (c) Position of all points and their controls. (d) Types of fittings, viz. fluorescent, T5, LED based, pendants, brackets, bulk head, fans and exhaust fans etc. (e) Name of work, job number, accepted tender reference, actual date of completion, names of Division/Sub-Division, and name of the firm who executed the work with their signature.

3 **Wiring System**

(i) Wiring shall be done only by the looping system. Phase/live conductors shall be looped at the switch box. For point wiring, neutral wire/earth wire looping for the 1st point shall be done in the switch box; and neutral/earth looping of subsequent points will be made from point outlets.

(ii) In wiring, no joints in wiring will be permitted anywhere, except in switch box or point outlets, where jointing of wires will be allowed with use of suitable connector.

(iii) The wiring throughout the installation shall be such that there is no break in the neutral wire except in the form of linked switchgear.

(iv) Light, fans and call bells shall be wired in the 'lighting' circuits. 15A/16A socket outlets and other power outlets shall be wired in the 'power' circuits. 5A/6A socket outlets shall also be wired in the 'power' circuit

(v) Colour Coding Following colour coding shall be followed in wiring:

Phase: Red/Yellow/Blue. (Three phase wiring)

Live: Red (Single phase wiring) Neutral: Black

Earth: Yellow/Green.

(vi) For Power wiring 3x4 sq. mm shall be drawn in 25 sq. mm conduit and 6x4 sq. mm shall be drawn in 32/40 mm conduit.

4 The work shall in general be carried out as per:

GENERAL SPECIFICATIONS FOR ELECTRICAL WORKS PART-I INTERNAL
2023 amended up to date.

GENERAL SPECIFICATIONS FOR ELECTRICAL WORKS PART-II EXTERNAL
2023

5 **Release of Performance Guarantee and Security Deposit:**

Security deposit shall be released as per above referred table and Labour Clearance issued by the Competent Authority and Performance Guarantee shall be released after successful completion of work.

ASSISTANT ENGINEER (E)
BCESD-IV, BCED, CPWD, CGO COMPLEX
SALT LAKE, KOLKATA.

LIST OF PREFERRED MAKES

Name of Work: Renovation/Replacement of existing cup board & Tables of Administration Section (Room Nos. 215 & 217) at ICAR CRIJAF Barrackpore Kolkata. (SH: Electrical Works)

Preferred makes of materials to be used in the work are as under. In case of non-availability of these makes, the Engineer-in-charge may allow use of alternative BIS makes of materials in the work. Non-BIS marked materials may be permitted by the Engineer-in-charge.

Sl. No	Description of item	Make
1	FRLS / HFFR PVC insulated Copper wire	Finolex / RR Kable / KEI / Havells / Polycab
2	PVC conduit (Medium Class) ISI marked	KONSTRUCT / BEC/Precession/Anchor/AKG / Anchor
3	MCB/MCBDB/Isolator/Loose wire box	Scheider Electric / Legrand / Hager / Lauritz Knudsen / ABB / Havells
4	Switch Socket GI Box	Crabtree / Legrand / Havells / Panasonic (Anchor) / Honeywell (MK)/LK/ABB
5	Moulded Case Circuit Breaker (MCCB) Thermal release / Microprocessor based (Ics=Icu=100%)	Scheider Electric / Legrand / Hager / Lauritz Knudsen / ABB / Havells
6	Modular Switches & Sockets, RJ-11 outlets, TV socket, Fan Regulator, USB socket, blanking plate, A. C. Starter / Motor Starter including modular boxes (1.2mm thick) with cover plate.	MK /Legrand/Schinder/ABB/Havells/Crabtree/ Panasonic
7	1.1 KV grade XLPE Aluminium armoured UG cable	KEI / Gloster / Havells / Finolex / Polycab/Forte Gloster
8	LED Luminaire	Havells / Phillips / Crompton / Bajaj / Mazik/Orient
9	DWC Pipe ISI Marked	Alom / Supreme / Tirupati / REX / Prince
10	GI Pipe	Jindal / TATA / Utkarsh / Sail
11	400 mm sweep wall fan	USHA/ Khaitan/ Crompton/Havells
12	Any Other Item not mentioned in Make List	As approved by Engineer-In-Charge

All fitting shall have ISI marked on its body wherever applicable.

Note: ~~NIT authority reserves the right to add or delete any materials and Brands in the list of approved materials/brands.~~ Unless otherwise specified in the tender document, all the materials which are ISI marked shall be used in the work and if the ISI marked materials are not available, materials conforming to ISI shall be used, and for materials which are neither BIS marked nor confirm to BIS, the manufacturers specification shall be used with prior approval of Engineer-in-charge.

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