CO-OPERATIVE ACADEMY OF PROFESSIONAL EDUCATION (CAPE)
1st floor, COBANK Towers, Vikas Bhavan P.O.,Trivandrum – 695 033
Tel : 0471-2316236, 2317696

TENDER DOCUMENT

Construction of a multi storeyed Building for Ladies Hostel and allied works at College of Engineering, Pathanapuram.

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FORM OF TENDER

Name of work	:	**Construction of a multi storeyed building for ladies Hostel and allied work at College of Engineering, Pathanapuram**
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Name of Tenderer	:	----------
Address	:	----------

Class of Registration	:	**Class A**

RETENDER NOTICE INVITING TENDERS FOR PRE-QUALIFICATION AND EXECUTIION OF WORK

Tender No. W-PQ/01/2015-16/CAPE Dated 03.06.2015

Sealed pre-qualification cum competitive tenders are invited by the undersigned from financially sound and well experienced valid Registered 'A' class contractors/firms of KPWD/CPWD/Railway/Irrigation who have successfully completed at least one similar work costing more than 40% (Forty percent) of the estimate PAC during the last five years, for the construction work prescribed below up to **1.00 pm on 02.07.2015** The Pre-qualification details to be submitted in separate cover-A will be opened on the same day at 3.00pm. and financial bid (cover B) of the selected Pre-qualified contractors will be opened on09.07.2015.at3.00 pm. Bidders shall submit the tender document fees and EMD along with the Technical Bid in Cover A in the form of DD drawn in favour of Director, CAPE payable at Thiruvananthapuram.

1	Name of Work	:	Construction of a multi storied building for ladies hostel and allied work at College of Engineering, Pathanapuram
2	Estimate PAC	:	Rs6,41,68,723
3	Nature of work	:	Multi storeyed RCC framed structure with open foundation, including Electrical, water supply and sanitary works, septic tank, sump, security cabin, drain, compound wall,gate etc.
4	Time of completion	:	18 months
5	Cost of Tender Documents	:	Rs11,400/- (Inclusive of VAT)
6	EMD	:	Rs2,00,000/- (Rs. Two lakh only)
7	Issue of tender documents	:	To be downloaded from the website www.capekerala.org
8	Last date and time of submission of tender	:	02.07.2015 up to 1.00 PM –off line **(no online submission**)
9	Date and Time of opening of Technical bid	:	02.07.2015 at 3.00PM
10	Date and Time of opening of financial bid	:	09.07.2015 at 3.00 pm
11	Tools and plants required for the work	:	Concrete mixer(4nos), concrete vibrator(8nos), welding machine(2nos), scaffolding steel pipe(8000nos) and shuttering steel(2000m^2),pump set with motor(1no.), generator(1no.),concrete hoist with motor(2 nos),PVC portable water storage tank (3nos.), tipper lorry(2nos), earth excavator etc.

The details of the work, drawings, tender conditions and documents can be downloaded from the website www.capekerala.org from 11.07.2015 For any further details or clarification, the Assistant Engineer, CAPE Head Quarters may be contacted. The Director reserves the right to reject any or all the tenders without assigning any reason therefor and his decision is final and binding.

DIRECTOR

– GENERAL

Name of Work : **Construction of multi storeyed Building for Ladies Hostel and allied work at College of Engineering, Pathanapuram.**

Time of Completion : 18 months

All communications shall be addressed to the Director, CAPE in the following address by post/person

Co-operative Academy of Professional Education(CAPE)
Co-Bank Towers
VIKAS BHAVAN P.O
Thiruvananthapuram-695033
Tel No.0471-2316236
Fax No.0471-2310049

Director

Thiruvananthapuram
Date: 03.06.2015

II- DETAILS OF TENDER

Name of Work: Construction of a multi storeyed building for Ladies Hostel and allied work at College of Engineering, Pathanapuram.

Competitive tenders in two parts viz, Tender Bid and Financial Bid quoting percent rate are hereby invited by Co-operative Academy of Professional Education for the above-referred work.

1. The contract documents consisting of Technical specification, Bills of Quantities to be duly signed on every page by the bidder shall be submitted to the Director.
2. The time allowed for the work is **18(Eighteen) months** from the date of execution of agreement

3. The tender shall be accompanied by registration cost of **Rs11,400/-** (Rs. Eleven thousand four hundred only) and Earnest Money deposit for **Rs2,00,000/-** (Rs.Two Lakh only) in the form of Demand Draft drawn on any Nationalized Bank/ State Co-operative Bank in favour of Director, CAPE payable at Thiruvananthapuram

4. The successful tenderer shall furnish a security deposit (Performance Guarantee) calculated at 5 percent of the contract value. At least fifty percent (50%) of the Performance Guarantee will be in the form of DD drawn on any Nationalized Bank/State Co-operative Bank in favour of the Director, CAPE payable at Thiruvananthapuram and the rest in the form of Bank Guarantee Valid up to the expiry of the Guarantee period (ie, for a period of **42 (forty two).months** from the date of agreement).

5. The Tenderer shall submit his tender only after carefully examining the whole tender documents and the conditions thereof.

6. This notice, the conditions of tender and the duly completed form of tender will inter alia form part of the agreement to be executed by the tenderer with the Director

Director
Co-operative Academy of Professional Education

Note :
1. *Detailed notice inviting tender deemed as part of Contract and agreement.*
2. *Guarantee period of the work is **24 months** from the date of completion.*
3. *All defects noticed in the construction within the guarantee period from the date of completion should be rectified by the Contractor at his own cost.*

III- FORM OF COVERING LETTER

To
The Director, CAPE
Co-Bank Tower
VIKAS BHAVAN P.O
Thiruvananthapuram-695033
Tel No.0471-2316236

Sir,

Sub: **Construction of a multi storeyed Building for Ladies Hostel and allied works at College of Engineering, Pathanapuram.**

1. Having examined the above tender details along with the specifications relating to the above subject work and the general conditions therein referred to, we hereby offer to carry out the work described in the said specification and general conditions for the sums and percentage rates quoted in the tender submitted herewith.

2. I/We hereby undertake to complete the work envisaged in accordance with contract conditions within the time specified in the tender.

3. I/We hereby guarantee the accuracy and correctness of particulars entered into the tender submitted by me/us.

Signature of Tenderer

(Name, Title and Position)

Address:

Place:
Date:

A- TECHNICAL BID

I NOTICE INVITING TENDER

Name of work: Construction of a multi storeyed Building for Ladies Hostel at College of Engineering, Pathanapuram.

Sealed Percentage rate quoting tenders are invited on behalf of Co-operative Academy of Professional Education (CAPE) (THE OWNER) for the **Construction of a multi storeyed building for Ladies Hostel and allied works at College of Engineering, Pathanapuram** from eligible Contractors possessing 'A' class registration in Irrigation/CPWD/Kerala PWD or Railways having sufficient financial strength for executing this work. The details of contract together with the estimate cost are given under

1.01 Owner /Employer - Director, Co-operative Academy of Professional Education
Engineer - Project Director, CAPE
Consultant - KSHB, Thiruvananthapuram
Site Engineer Project Engineer, College of Engineering, Pathanapuram.

1.02 The Project contract mainly include the following

SL. No	Description of main construction	Approximate plinth area in m^2	Estimate cost
a)	Lower basement floor	584.94	6,13,59,404
b)	Upper basement floor	1017.684	
c)	Ground floor Terrace floor	1044.264 55.68	
d)	Water supply and sanitary work		
e)	Sump		
f)	Security cabin		
g	Drain,		
h	Compound wall with gate & Retaining wall		

i. Electrification works Rs..28,09,319/-
Total cost Rs.6,41,68,723/-

1.03 Location of work and site conditions

Tender No.	Location and Terrain	Rainfall season and annual Rainfall	Type of soil and nature of terrain
W-PQ/01/2015-2016/CAPE	College campus at College of Engineering, Pathanapuram	June, July, August, October, November	Hard laterite, sloppy terrain.

Broad scope and salient features of work

The project is for the construction of three storied buildings with two floors below ground level.

The estimate is prepared based mainly on CPWD specification with KPWD SOR 2012 and Electrical work mainly KPWD specification 2012 SOR

1.04 <u>Eligibility Criteria for applying prequalification</u>

1) The tenderer should submit copy of valid Registration Certificate mentioned in the tender notification

2) The tenderer should have executed at least one similar works of value not less than **40% of the estimate PAC** in single contract, during **last five years** as a prime contractor. (Completion Certificate from the client should be produced).

   "Similar works" under this clause means construction of Buildings in particular. In respect of similar works carried out for private persons, firms etc in addition to completion certificates, proof in the form of certificates of actual payment by the client or TDS certificates issued by the client is to be produced for accepting the cost of work. The date of completion of the work should be indicated in the completion certificate.

3) Should produce statement showing annual financial turnover for at least for 3 years or upto the last 5 years ending 31/03/2015 his should be certified by a chartered accountant.

4) The applicant should have own construction equipments as notified in the Notice Inviting Tenders, for proper and timely execution of the work. Else, he should certify that he would be able to manage the equipment by hiring etc and submit the list of firms from whom he proposes to hire.

5) The applicant should have sufficient number of Qualified Technical persons (copy of certificate to be attached) and Administrative employees for the proper execution of the contract. The applicant should submit a list of all employees stating clearly how they would be involved in this work.

6) The applicant's performance in respect of completed works and on going works should be certified by an officer not below the rank of Executive Engineer of KPWD or equivalent of the concerned department and should be obtained and enclosed along with the Technical bid.

7) The applicant should have sufficient financial strength to execute the work.

8) The applicant should associate a reputed and eligible Electrical Contractor for carrying out electrical works.

9) EVALUATION BY SCORING

(A) **<u>Structure</u>**

(a) Valid License - 70

(b) Financial Strength (Form A) - 80

(B) **Financial Status**

(a) Average Annual turn over (Form A) - 160
(b) Work in hand (Form B1) - 90

(C) **Resources**

(a) Project Management (key personnel) - 70
(b) labour force (skilled and unskilled) Form D1 - 30
(c) Plant and Equipments (Form E) - 160

(D) **Experience (Form B &C)** - 340

Total 1000 marks

NOTE: To qualify, the applicant must secure 65% (Sixty five percent) marks in aggregate.

1.05 The general information on the project may be found from the bidding document. The information is only indicative. The tenderers must visit the site and familiarize themselves with the site conditions, nature of substrata, availability of construction materials, etc., before quoting. The drawings, conditions of contract, schedule of quantities and the specifications may be carefully studied before they offer their prices. No claims for extra compensation over and above the quoted rates will be entertained by THE OWNER on the ground that the tenderer have misjudged site conditions, nature of substrata, tender conditions or any item of tender. The tender documents will be available from the website of Co-operative Academy of Professional Education ie www.capekerala.org from 11.06.2015

1.06 The priced tender documents signed and complete **in all respects** shall be forwarded so that it reaches the office of the Director, CAPE on or before 1.00 pm on …….. Any tender received after the due time on this date will be summarily rejected. It may be noted that separate Submission of details, explanatory notes, any relevant documents etc. will not be entrained.

1.07 Tender should be submitted in a single sealed cover enclosing two sealed separate cover noted as cover A and Cover B

Cover No. A: Superscribing the TENDER NO.**W-PQ/01/2015-16/CAPE** for the **Construction of Building for ……..**

Cover No. B: Superscribing the TENDER NO. **W-PQ/01/2015-16/CAPE** for the **Construction of Building for ……..**

Both covers should specifically mentioned as Technical bid and price bid so as to identify each one at the time of opening.

These two covers A & B shall then be put in another single cover superscribed the name of work with tender no. and sealed before submission.
Cover No. A shall contain:

1. **Registration cost in the form of DD as specified**
2. **Earnest Money Deposit in the form DD as specified**
3. **All documentary evidence to prove the specified eligibility criteria.**
4. **Tender documents – Technical Bid**
5. **Preliminary agreement duly filled in stamp paper worth Rs.500/-**

Cover No. B shall contain:

1. **Duly signed and stamped Price Bid only, without any conditions.**
2. **Schedule of Quantities with percentage quoted duly filled and signed on each page and stamped by the tenderer. ie quoted tender schedule.**
3. **Tender Drawings each signed and stamped by the Tenderer.**

1.08.

01 Pre-qualification cum technical bid cover A will be opened in the presence of tenderers or their authorized representatives who are present at 3.00 pm on 02.07.2015 at CAPE Headquarters.

THE OWNER will evaluate the pre-qualification bids and the price bids of those pre-qualified bidders only will be opened. The date of opening of price bid will be intimated to the pre-qualified bidders. THE OWNER reserves the right to reject any bid without assigning any reasons. Non-submission of documentary evidence to prove pre-qualification criteria will lead to rejection of tender.

.02 Subject to THE Owner's right to accept any tender and reject any or all tenders; the work will be awarded to the tenderer whose bid has been determined to be substantially responsive to the tender documents and who has offered the lowest Evaluated Tender Price provided further that the tenderer has the capability and resources to carry out the contract effectively.

.03 Prior to the expiry of the period of validity of the tender THE OWNER will notify the successful tenderers in writing their name the sum which THE OWNER will pay to the contractor in consideration of the execution, completion, operation, defect maintenance and guarantee of the work by the contractor as specified by the contract (hereinafter called the contract price). This letter of acceptance will constitute the formation of a contract.

.04 The tenderer shall make a security deposit as given in clause 1.11 of this notice and furnish the same for the proper fulfillment of the contract and shall execute an agreement for the work in required non-judicial stamp paper in the format given as "Articles of Agreement" within 20 days from the date of award of communication (selection notice). Further time of 10 days shall be allowed

to execute agreement on realizing a fine of 1% of the PAC subject to minimum of Rs.500/- and maximum of Rs.15,000/-. The tenders will be rejected if agreement is not executed with in 30 days and work will be awarded to the next lowest tenderer as per rules.

.05 If the tenderer fails to execute the agreement as stated above within the specified period, the earnest money deposit shall be forfeited to THE OWNER and the work will be arranged through the 2nd lowest tenderer or retendered.

06 Tenders not properly filled, mutilated with incorrect calculations or generally not complying with the conditions are susceptible shall be rejected.

07. The rate quoted as percentage rate will deemed to include the cost of all materials, labour, hire charges for all machinery, cost of fuel, power, all leads and lifts, taxes, levies, royalties incidental charges all overheads contingencies, profits, etc.

.08 If the tender is made by an individual, it shall be signed with his full name and his complete address shall be given. If it is made by partnership firm it shall be signed by the authorized signatory with name and seal of the firm. **No price preference will be allowed to any Corporation/Society/firm/individual for the finalization of financial bid due to paucity of funds since CAPE is executing projects by availing financial assistance. There will not be any allowance to any Corporation /Society/firm/individual for the exemption of the EMD and security deposit mentioned in the tender documents.**

1.09 <u>Instructions to applicant</u>

i. Pre qualification questionnaire completed in all respect shall be submitted on or before 02.07.2015 up to 1.00 pm to Director, CAPE .
ii. No costs incurred by bidders in making this offer in providing clarification on attending discussions or site visits will be reimbursed by the employer or Engineer
iii. Incomplete offers will be rejected
iv. The enclosed schedules should be filled in completely and all questions should be answered. If any particulars query is not relevant, it should be stated as not applicable.
v. If the offer is submitted by a bidder backed up by specialized sub contractors, the bidder and each of the sub contractors should fill in all the schedules completely. The responsibility of the contract is vested with the main bidder and the main bidder should be clearly identified and the extent of responsibility of each of the sub contractors should be defined.
vi. Financial rate, project value of work etc, should be given in equivalent Indian Rupees only.
vii. For any clarification the Assistant Engineer CAPE Head quarters may be contacted.
viii. If the application is made by a firm in partnership, it should be signed by all the partners of the firm, with their full name and current address or by a partner holding power of attorney for the firm by signing the application in

which case a certified copy of the power of attorney shall accompany the application.

ix. A certified copy of the partnership deed, current address of the firm and the full name and current address of the all the partners of the firm shall also accompany the application.

x. If the application is made by a limited company or a Ltd corporation, it shall be signed duly by authorized person holding the power of attorney for signing the application in which case a certified copy of the power of attorney shall accompany the application of such Ltd Company or Corporation will be required to furnish satisfactory evidence of its existences before the contract is awarded.

xi. The language for submission of bid should be English/Malayalam.

xii. To be eligible for award of contract, bidders shall provide evidence satisfactory to the employer not withstanding any previously conducted pre-qualification of potential bidders of their capability and adequacy of resource affectively to carry out the subject contract. To this and all bids submitted shall include the following information

a. Copies of original documents defining the constitution of legal status, place of registration and principal place of business of the company of firm or partnership there to constituting the bidder.

b. Details of the experience and past performance of the bidder of similar nature with in a past five years and details of current work in hand and other contractual commitment.

c. Major items of construction equipment proposed for use in carrying out contract in the form prescribed in schedule – E.

d. The qualification and experience of key personnel proposed for administration and execution of the contract in the form at prescribed in schedule- D1.

e. Proposal for subcontracting elements of the works amounting to more than 10% of the tender amount for each element may be furnished.

The applicant is expected to visit at the project site before submitting the per-qualification. While submitting the schedule duly filled up the applicant shall enclose latest copies of broachers and technical documentation giving more information about the firm. The owner reserves the right to reject any of all pre-qualification applications with out assigning any reason and the owner decision shall be hereinafter and binding.

1.10 EMD

.01 Earnest Money Deposit is **Rs.2,00,000**/- (Rs.Two lakh) It shall be drawn in the form of demand draft from any Nationalized Bank or State Cop-operative Bank in favour of Director, CAPE payable at Thiruvananthapuram

.02 E.M.D. of the unsuccessful tenders will be refunded by Cheque of District Co-operative Bank without any interest on finalization of the contract with the successful Tenderer or on the expiry of the validity period whichever is earlier.

.03 E.M.D. deposited with THE OWNER will be forfeited,

i) if a bidder withdraws his bid during the period of validity specified.

ii) if the successful bidder fails within the time limit to sign the contract document or fails to furnish the required security deposit.

1.11 <u>Performance Security Deposit</u> (Performance guarantee)

.01 The successful tenderer on receipt of the letter of acceptance will deposit an amount equal to 5% of the value of contract within 20 days from the date of award of work

.02 At least fifty percent (50%) of the Performance Guarantee will be in the form of demand draft drawn on any Nationalised/State Co-operative Bank in favour of Director, CAPE payable at Thiruvananthapuram and the rest in the form of Bank Guarantee for a period of not less than **42 (Forty two) months** from any nationalized bank and execute agreement.

03 E.M.D. of the successful tender will be refunded by Cheque of District Co-operative Bank or State Co-operative Bank with out any interest on execution of agreement.

.04 The SECURITY DEPOSIT will be released to the contractor after expiry of the defects liability period of 24 months from the date of completion.

1.12 SECURITY DEPOSIT (Retention amount)

.01 In addition to Performance Guarantee, Security Deposit for the work shall be collected by Deduction from the running/Final bill of the contractor @ 2.5% of the gross amount of each running and/or final claim till expiry of defect liability period.

02 Security Deposit (retention) will be released against bank guarantee on it accumulation to minimum of Rs. 5 lakhs. The minimum amount of Bank Guarantee shall not be less than Rs. 5 lakhs at a time

.03 All kinds of deposits of E.M.D/ SECURITY DEPOSIT will not bear any interest whatsoever.

1.13 Income-tax at the rate prevailing at the time of payment will be deducted from all kinds of bill payments.

1.14 All statutory payments in connection with the employment of the workmen for this work will be recovered from the bill

.02 The contractor is the employer of all the workers engaged for this work and should therefore take all required registrations and pay premium correctly to labour welfare funds constituted by the Union Government and State Governments from time to time.

1.15 All statutory deductions shall be made from the amount eligible to the contractor in each part bill at current rates. The deduction towards the work contract tax shall be as per the prevailing rates of State Government Sales

Tax Rules. Any tax omitted, to be deducted in any part bill shall be deducted in the subsequent bills/final bill. As per section 10 of the KVAT Act, 2003 every awarder shall deduct from every payment, including advance payment made by him to any contractor liable to pay tax under section 6 of the KVAT act, 2003 in relation to any works contracts awarded and hence the contract amount will be released to any contractor only on the basis of liability certificate **in From No. IEE** issued from the commercial taxes department. On deducting TDS @ 8% of the amount paid as per the works contract in the case of contractors registered under the KVAT Act, 2003 and @ 10% of the amount paid as per the works contract in case of contractor who have not registered under the KVAT Act, 2003. The above recovery will be altered based on subsequent government orders if any issued.

1.16 PERIOD OF VALIDITY

The tender shall remain valid for acceptance for a period of two months from the date of opening of the pre-qualification tenders. If any tenderer withdraws his tender before the said period or makes any modifications in terms and conditions of the tender, then *THE OWNER* has the liberty to forfeit the said Earnest Money Deposit.

1.17 INSPECTION OF SITE

Every tenderer must inspect the site of the proposed work and acquaint himself with the site conditions of substrata, approaches, availability of raw materials, geological and weather conditions, etc., before quoting his rates. He must go through all the drawings, specifications and other tender documents. Any further clarifications in the drawings and documents can be had from *THE OWNER* at the above-mentioned address.

1.18 QUANTUM OF WORK

.01 A schedule of approximate quantities for various items accompanies this tender. It shall be definitely understood that THE OWNER do not accept any responsibility for the correctness or completeness of this schedule in respect of items and quantities and this schedule is liable to alteration by deletions, deductions or additions at the discretion of *THE OWNER* without affecting the terms of the contract.

.02 *THE OWNER* reserves the right to increase or decrease the quantum of work at site without assigning any reason.

.03 Variations in the quantities put to tender will not be the basis of any claim or disputes. The rates agreed by the contractor shall hold good for any amount of variation in the quantities and no claims whatsoever will be entertained on this amount. The contractor shall carry out all works as directed by THE OWNER at the same agreed rates.

1.19 ALL INCLUSIVE RATES

The contractor's rate must be firm and include the cost of transportation of material to the site, royalties, all taxes and the fixing or placing in position for which the item of work is intended to be operated. **The rates quoted by the contractor shall be firm throughout the contract period and there shall**

be no upward revision of the rates quoted by the contractor for any reasons whatsoever. It should be clearly understood that any claims for extra Sales Tax, Excise duty, construction tax or any additional tax, escalation of rates, etc., shall not be entertained in any case whatsoever once the tenders are opened. No incidental charges will be paid other than the quoted rates for finished items. No interest will be paid to the contractor towards any delay occurred for releasing payments.

1.20 INTERPRETING SPECIFICATIONS

.01 In interpreting the specifications, the following order or decreasing importance shall be followed:

a. Specification mentioned in Schedule of Quantities
b. Special conditions of contract,
c. Unit Rate Specifications and Technical Specifications of CPWD
d. Drawings

.02 Matters not covered by the specifications given in the contract, as a whole shall be covered by the relevant Indian Standard Codes. If such codes on a particular subject have not been framed, the decision of THE OWNER shall be final.

1.21 No alterations shall be made by the tenderer in the Notice Inviting Tender, Instructions to the contractors, Contract form, conditions of the contract, special conditions, drawings and specifications and if any such alterations are made or any conditions attached, the tender is liable to be rejected.

1.22.

01 The acceptance of a tender rests with the owner/ Authorized Representative of THE OWNER who does not bind himself to accept the lowest tender and reserves to himself the authority to reject any or all the tenders received without assigning any reason(s) whatsoever.

.02 The owner /authorized representative of THE OWNER reserves the right of accepting the whole or any of the tenders received and the tenderer shall be bound to perform the same at the rates quoted.

1.23 The work shall be carried out under the direction and supervision of THE OWNER/CONSULTANT or their representative at site. On acceptance of the tender, the contractor shall intimate the name of his accredited representative who would be supervising the construction and would be responsible for taking instructions for carrying out the work.

1.24 THE OWNER/Consultant's decision with regard to the quality of the material and workmanship will be final and binding; any material rejected shall be immediately removed by the contractor and replaced by materials as per specifications and standards.

1.25 SUB-LETTING

No part or whole of the contract shall be sublet without the written permission of THE OWNER nor shall transfers be made by the Power of Attorney

authorizing others to carryout the work or received payment on behalf of the tenderer.

1.26 DEFECTS LIABILITY PERIOD

Any defect developed within 'Defect Liability Period' of 24 months from the date of completion of work will have to be rectified by the contractor at their own cost failing which the OWNER/CONSULTANT or their representative shall get the work done at the risk and cost of the contractor.

1.27 DELAYS IN COMMENCEMENT

The contractor 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.

1.28 OCCUPATION IN PART

If THE OWNER wants to occupy areas in part, the contractor shall complete the work of these areas in conjunction with THE OWNER and hand over the same to THE OWNER without affecting any of the clauses of contract agreement.

1.29 The contractor should inspect the source of materials, their quality, quantity and availability. All materials must strictly comply with the relevant B.I.S. specifications.

1.30 The contractor must co-operate and co-ordinate with other contractors involved in other works at the site.

The contractor should note that they shall have to clear the site of vegetation, debris, etc. before the commencement of the work. The contractor should also keep the premises clear during the execution for the inspection of the site

1.31 PERIOD OF CONSTRUCTION

Time is the essence of this contract. The construction period shall be ……. months. For the period of completion, the Commencement of the work shall be considered from the date of execution of agreement. The contractor shall draw a detailed schedule of programme in the form of PERT CHART/ BAR CHART on whole work, within one week of award of work and submit to THE OWNER for their approval. The work should be executed as per programme schedule and entire work should be completed with in the date of completion.

1.32 Handing over the Site

After executing the agreement the contractor or his authorized persons should take over the site from the College concerned authority within 10 days so as to commence the work.

1.33 LIQUIDATED DAMAGES

Liquidated Damages will be levied as per Kerala PWD rules.

1.34 CONTRACTOR'S STORE AND SITE OFFICE

Suitable area in the site of work shall be allowed to the contractor at free of cost for constructing temporary structures for storing his tools and plants,

materials, site office and cement Godown. However, the structure will be provided by him at his own expense and he will be solely responsible for guarding his property with requisite insurance against theft, fire, etc. The contractor however will have to dismantle the sheds and vacate the land of all debris, etc. at his own expense after completion of work. The responsibility for safe custody of materials at work site and during transit will be vested with the contractor.

1.35. Quality control of work

The contractor shall arrange the quality control test and the quality certificate shall be handover to the Assistant Engineer for confirmation. The Assistant Engineer and Project Engineer should certify the quality of the work done by the contractor while recommending the interim payment of the bills.

1.36 MEASUREMENT AND BILLING

.01 The contractor or his representative shall accompany THE OWNER /CONSULTANT or their representative in taking measurements and shall agree to the measurements taken on spot. All necessary tapes shall be of steel and shall be supplied by the contractor. The contractor shall then present his bill based upon the agreed and recorded measurements and as per the directions of THE OWNER /CONSULTANT. If the contractor fails to accompany THE OWNER /CONSULTANT's representatives for measurements, then he shall be bound by the measurements taken by THE OWNER /CONSULTANT or their representative.

.02. The contractor shall be allowed to raise bills only for more than 10% of contract amount in each bill.

.03 Payments towards all interim bills presented by the contractor will be made by THE OWNERafter auditing the bill

04 Period of taking final measurement shall be one months from the date of satisfactory completion of the project.

05. The interval between the submission of two consecutivebills shall be more than 30 days.

1.35 EXTRA ITEMS

.01 Any item of work that do not find a place in the schedule of quantities, in the original tender or in the accepted tender or contract as has been directed by THE OWNER /CONSULTANT to execute is deemed as an extra item of work. All such works that are necessary to be carried out under the direction of THE OWNER /CONSULTANT shall be carried out by the contractor. No such variation will violate the Contract.

.02 Extra items of work thus carried out by the contractor will be paid at the rates worked out by THE OWNER /CONSULTANT in the following manner.

.03 In the case of all extra items whether additional, altered or substituted, if accepted rates for identical items are provided for in the contract such rates shall be applicable.

.04 In the case of extra items whether altered or substituted, for which similar items exists in the contract, the rates shall be derived from the original item by appropriate adjustment of cost of affected components with reference to the departmental estimated rates applied in deriving the rates for such items.

.05 In the case of extra items, whether additional altered or substituted, for which the rates cannot be derived from similar items in the contract, and only partly from the schedules of rates, the rates for such part of items not covered in the

schedule of rates shall be determined by THE OWNER/CONSULTANT on the basis of the prevailing market rates giving due consideration to the analysis of the rate furnished by the contractor with supporting document including contractor's profit and over head. Tender Excess will not be admissible for market rate components.

.06 In the case of extra item whether additional, altered, substituted, for which the rates cannot be derived either from similar items of work in the contract or from the departmental schedule or rates, the contractor shall within 14 days of the receipt of order to carry out the said extra item of work, communicate to the Engineer the rate which he proposes to claim for the item, supported by analysis of the rate claimed and THE OWNER shall be within one month thereafter, determines, the rate on the basis of the market rate giving due consideration to the rate claimed by the Contractor. Tender excess will not be admissible in such cases.

1.36 The contractor shall make his own arrangement for water and electricity required for the work. THE OWNER has no responsibility for the supply of either electricity or water for the work.

1.37 INSURANCE

The contractor shall be responsible for the safety of the labour employed by him and he shall be liable to pay necessary compensation in case of accidents as per the workman's compensation Act.

1.38 This Notice Inviting Tender will form part of the tender document and the agreement executed by the successful tenderer.

DIRECTOR

Place: Thiruvananthapuram
Date: 03.06.2015

SUMMARY OF NOTICE INVITING TENDER

Sl. No	item	Description
1.	Date of Opening Technical bid	……..
2.	Firm period of the tender	2 months
3.	Cost of tender / Registration cost	Rs11,400/-including VAT)
4.	EMD of tender	Rs. 2,00,000./-
5.	Performance Security Deposit	5% of contract amount (while executing agreement)
6.	Date of Execution of agreement	Within 20 days from the date of acceptance of tender
7.	Period of completion	18 months
8.	Site handover	Within 10 days after execution of agreement
9.	Date of Completion of work	18 months from Date of executing agreement
10	Security Deposit (retention)	@ 2.5% of the gross amount of each running and /or final bill
11	Release of Security Deposit	On expiry of Defect Liability period
12	Final measurement	with in 1 months from the date of completion
13	Defect liability period	24 months from the date of completion
14	Escalation	Not applicable
15	Liquidated damages	A per PWD rules
16	Kerala workers welfare fund	1% of bill amount recovered during the payment of the bills
17	I.T	2% for firms and 1% for individuals
18	VAT	1. tax will be recovered based on the production of 1EE from commercial tax department 2. 8% for the VAT registered contractors 3. 10% for non VAT registered contractors

Director
Co-operative Academy of Professional Education
Co-Bank Tower
VIKAS BHAVAN P.O
Thiruvananthapuram-695033 Tel No.0471-2316236

II. PRE-QUALIFICATION APPLICATION

Name of work: Construction of Building for ……

To

……

……

Dear Sir,

Having examined the pre-qualification document indicating scope of works and time frame of the work I / We hereby submit all the necessary information for pre-qualifying me/us for bidding for the above-mentioned work. The relevant certificates are enclosed.

The application is made by me / us on behalf of…….. …… (Group firms) in the capacity of ……duly authorized to submit the offer.

The necessary evidence admissible in law in respect of authority to me/us on behalf of the group of firms for applying and for completion of the contract document is attached herewith.

I / We understand that the owner reserves the right to reject any application without assigning any reason.

Date

SIGNATURE OF THE APPLICANT
(Name in brackets, including title and capacity in which application is made)

Encl:

1. Form A- F duly filled in the prescribed form.
2. Evidence of authority to sign.
3. Latest brochures & relevant Certificates.
4. EMD and registration cost in separate cover to be attached along with Technical proposal.
5. Preliminary agreement in stamp paper worth Rs,500/-
6. Attested copy of valid registrations

Form A

FINANCIAL STATEMENT

1. Name of firm :

2. Capital (Rs. in lakhs) :

   a. Authorised :

   b. issued and paid up :

3. Attach audited balance sheets and profit and loss statements for the past five years :

4. Financial Position (exact amount in rupees to be stated) :

   a. Cash :

   b. Current Assets :

   c. Current Liabilities :

   d. Working Capital :

   e. Net worth :

5. Total Liabilities :

6. Current ratio (Current assets to current liabilities) :

7. Total Liabilities to Net worth :

8. Annual Value of Construction works undertaken for each of the last five years:

Details	One year before	Two year Before	Three year before	Four year before	Five year before
Gross annual turn over					
Profit(+)					
Loss(-)					

9. Income Tax Pan Details :

10. Applicants Financial arrangements for the proposed work (exact amount in Rs. to be mentioned) :

a. Own Resources : Rs……

b. Bank Credit : Rs……
(certificate to be attached specifying the amount financed by the bank for this work)

: Rs……

11. Certificate of Financial Soundness from Bankers of Applicants together with their full address :

12. Approximate value of work in hand :

Note 1. *Details of items 12 are to be given in schedule-B1.*

Note 2. *Details of item No. 8 to be furnished duly supported by figures in balance sheet/Profit and Loss account statement for the last five years duly certified by the Chartered Accountant as submitted by the applicant to the income tax department(copies to be attached).*

Note 3 *Information asked against each item to be carefully filled in, more reference to balance sheet in reply to above point is not accepted.*

Signature of Tenderer

Date

Signature of Chartered Accountant with seal

Date

FORM-B

Details of Projects Completed – During last five years.

Please fill in information about the relevant projects completed over the last five years					
Name of the Employer	Location	Name of Engineer responsible for supervision	Contract price & Date of completion (Rs.In lakhs)	Scope of works	completion certificate enclosed (Yes/No)

Signature of Tenderer

Date:

FORM-B1

Details of Projects in Progress

Give information about all projects in progress including those where the company has received the letter of intent but a formal contract has not yet been awarded							
Employer	Engineer responsible for supervision	Location and description of work	Scope of works	Value of contract	Value of works completed and certified project	% practical completion	Date of completion of the work
1	2	3	4	5	6	7	8

Signature of Tenderer

Date

FORM 'C'

PERFORMANCE REPORT FOR WORKS REFERRED TO IN FORM 'B'&'B1'

1. Name of the work :

2. Project & Location :

2. Scope of work. :

a. Number of floors in Basement. :

b. Number of floors in Superstructure.:

c. Type of foundation :

3. Agreement No.& Date :

4. Estimated Cost :

5. Contract Cost :

6. Value of work done :

7. Date of Start :

8. Date of completion :

a. Stipulated date of completion :

b. Actual date of completion :

9. Amount of compensation levied for delayed Completion if any :

10. Performance report based on Quality of Work, Time Management and Resourcefulness : Very Good / Good / Fair

Date:

Place:

EXECUTIVE ENGINEER /
AUTHORISED SIGNATORY

FORM 'D'

ORGANISATIONAL STRUCTURE

1. Name and address of the applicant :

2. Telephone No. /Fax No/E-Mail address :

3. Legal Status (attach copies of original document defining the legal status) :

   (a) Individual / Proprietary Firm :

   (b) A Firm of partnership :

   (c) A Limited Company :

4. Particulars of registration with various Government bodies (Attach attested photo copy)
   a) Registration Number. :
   b) Organization / Place of registration:

5. Names and Titles of Directors and officers with designation of those concerned with this work with Designation of individuals authorized to act for the organization.

6. Was the applicant ever required to suspend construction for a period of more than six months continuously after the construction was commenced?
   If so, give the name of the project and give reasons thereof.

7. Has the applicant or any constituent partner in case of partnership firm, ever abandoned the awarded work before its completion?
   If so, give the name of the project and give reasons thereof.

8. Has the applicant or any constituent partner in case of partnership firm, ever been debarred / black listed for tendering in any organization at any time? If so, give details:

9. Has the applicant or any constituent partner in case of partnership firm, ever been convicted by a court of law?
   If so, give details.

10. In which field of Civil Engineering Construction, specialization and interest is in and number of years of experience as a general bidder.

11. Any other information considered relevant but not included above.

SIGNATURE OF THE TENDERER

Date:

FORM 'D1'

SCHEDULE -PERSONNEL

Details of personnel with the Applicant:

Name of Applicant:

Sl No	Description	Of the Applicant's Payroll
1.	Project Manager	
2.	Works Manger	
3.	Site Engineers: No. of Engineering Graduates (Civil) No. of Diploma holders:	
4.	No. of Administrative staff	
5.	No. of skilled employees	
6.	No. of Unskilled employees	
7.	In the case of personnel at Sl No 1,2&3 give Name, Qualification, Present Posting, Professional experience and linguistic ability to the project	

Signature of Tenderer

Date:

FORM- E

Plant and machineries proposed to be employed by the applicant for use on the work

Sl.No	Description with capacity, Age and Condition	Number	Remarks

Signature of Tenderer

Date:

FORM- F

Additional Information

(The applicant can add here any further information relevant to the valuation of their pre-qualification bid)

Signature of Tenderer

Date:

IV. CONDITIONS OF CONTRACT

1. The **Contract** means the documents forming the tender and acceptance thereof and the formal agreement executed between the competent authority on behalf of Director, Co-operative Academy of Professional Education, Co-Bank Tower, VIKAS BHAVAN P.O Thiruvananthapuram and the CONTRACTOR, together with the documents referred to therein including the conditions, the specifications, designs, drawings and instructions issued from time to time by the Engineer-in-charge and all these documents taken together, shall be deemed to form one contract and shall be complementary to one another.

2. In the contract, the following expressions shall, unless the context otherwise requires, have the meanings, hereby respectively assigned to them:-

i) The expression **works or work** shall, unless there be something either in the subject or context repugnant to such construction, be construed and taken to mean the works by or by virtue of the contract, contracted to be executed whether temporary or permanent, and whether original, altered, substituted or additional. The works under the scope is all works upto basement level and all works of superstructure including masonry, concrete, finishing, Electrification, plumbing and sanitary.

ii) The **Site** shall mean the land/or other places on, into or through which work is to be
executed under the contract or any adjacent land, path or street through which work is to be executed under the contract or any adjacent land, path or street which may be allotted or used for the purpose of carrying out the contract.

iii) The **CONTRACTOR** shall mean the individual, firm or company, whether incorporated or not, undertaking the works and shall include the legal personal representative of such individual or the persons composing such firm or company, or the successors of such firm or company and the permitted assignees of such individual, firm or company.

iv) The CONSULTANT shall mean the individual, firm or company, whether incorporated or not, undertaking the architectural consultancy and supervision and Management of the works and shall include the legal personal representative of such individual or the persons composing such firm or company, or the successors of such firm or company and the permitted assignees of such individual, firm or company

v) The **Engineer-in-charge** means the Project Engineer or any other Engineer of Co-operative Academy of Professional Education who will supervise and be in-charge of the work on behalf of CAPE.

vi) **Accepting Authority** shall mean Director, CAPE

vii) **Owner shall mean the Director CAPE,TVM**

viii) **Excluded Risk** are risks due to riots (other than those on account of CONTRACTOR's employees), war (whether declared or not) invasion, act of

foreign enemies, hostilities, civil war, rebellion revolution, insurrection, military or usurped power, damages from aircraft, acts of God, such as earthquake, lightening and unprecedented floods, and other causes over which the CONTRACTOR has no control.

ix) **Market Rate** shall be the rate as decided by the Engineer-in-charge on the basis of the cost of materials and labour at the site where the work is to be executed plus 15% to cover, all overheads and contractor's profits. Tender excess will not be allowed for Market rate Component

x) **Schedules(s)** referred to in these conditions shall mean mainly the relevant PWD (SOR 2012)schedule(s) with CPWD specifications.

xi) **Department** means Co-operative Academy of Professional Education which invites tenders.

xii) **Site Order book** is a book to be maintained by the Contractor at site and produced when demanded by the Engineer in-charge to record any instruction /comments by the Engineer in-charge).

xiii) Contract value means the value of entire work as stipulated in letter of award.

xiv) Estimate value means the value of entire work as stipulated in the tender schedule.

3. Where the context so requires, words imparting the singular only also include the plural and vice versa. Any reference to masculine gender shall whenever required include feminine gender and vice versa.

4. Headings and marginal notes to these General Conditions of contract shall not be deemed to form part thereof nor be taken into consideration in the interpretation or construction thereof or of the contract.

5. The work to be carried out under the contract shall, except as otherwise provided in these conditions, includes all labour, materials, tools, plants, equipments and transport which may be required in preparation of and for and in the full and entire execution and completion of the works. The descriptions given in the Schedule of quantities shall, unless otherwise stated, be held to include wastage of materials, carriage and cartage, carrying and return of empties, hoisting, setting, fitting and fixing in position and all other labours necessary in and for the full and entire execution and completion of the work as aforesaid in accordance with good practice and recognized principles.

6. The CONTRACTOR shall be deemed to have satisfied himself before tendering as to the correctness and sufficiency of his tender for the works and of the rates and prices quoted in the schedule of quantities, which rates and prices shall except as otherwise provided cover all his obligation under the contract and all matters and things necessary for the proper completion and maintenance of the works.

7. The several documents forming the part of contract are to be taken as mutually explanatory of one another; detailed drawings being preferred to small scale drawing, figured dimensions being preferred to scale, special conditions in preference to General conditions.

7.1 In the case of discrepancy between the schedule of Quantities, the specifications and/or the Drawings, the following order of preference shall be observed.

i) Description of Schedule of Quantities.
ii) Particular Specification and special condition, if any
iii) Drawings.
iv) C.P.W.D Specifications
v) Indian Standard specifications of B.I.S.

7.2 If there are varying or conflicting provisions made in any one document forming part of the contract, the Accepting Authority shall be the deciding authority with regard to the intention of the documents and his decision shall be final and binding on the CONTRACTOR.

7.3 Any error in description, quantity or rate in schedule of Quantities or any omission there from shall not vitiate the CONTRACT or release the CONTRACTOR from the execution of the whole or any part of the works comprised therein according to drawings and specifications or from any of his obligations under the contract.

7.4 **Commencement and completion of work-** The work shall commence within 10 days from the date of execute of agreement and complete the whole work within 12 months from the agreement date

8. **Agreement**- The contractor, on acceptance of his tender by the Accepting Authority, shall sign the agreement with in 20 days from the date of award of work and commence the work with in 10 days from the date of agreement.

a) The tender conditions, all the documents including drawings, if any, forming
the part of tender as issued at the time of invitation of tender and acceptance thereof together with any correspondence leading thereto.

b) Model Rules which are applicable to KPWD for the protection of health, sanitary arrangements for workers employed by CONTRACTOR at site

c) CONTRACTOR's Labour Regulations of the KPWD.

MEASUREMENT BOOKS:

Conventional measurement book shall be used for recording the measurements. The Assistant Engineer designated for the charge of site of **Construction of multi storied building for Ladies Hostel and allied works at College of Engineering, Pathanapuram,** will be the custodian of the M-Books. The pages of these measurements books shall be serially numbered and a record of these measurements book shall be maintained in a separate

register. The measurements shall be carried forward from the previous recorded measurement as per the existing procedure of Kerala PWD.

MODE OF MEASUREMENTS :

Measurement of works shall be made as per principles adopted in Kerala PWD and ISI codes for measurement of works. The measurements shall be jointly taken by the CONTRACTOR or his representative and the Engineer –in charge or his representative ie, Assistant Engineer of **Construction of multi storied building for Ladies Hostel and allied works at College of Engineering, Pathanapuram,**and recorded and entered in the M. Books by the Assistant Engineer. The Engineer-in-charge shall incorporate with signature changes or corrections, as may be done during the checks to the recorded measurements. Cuttings/over writing/insertions in the M.Books are not allowed after final checking.

EXTRA ITEMS:

If any extra item has to be executed at site which may be absolutely necessary for the work and which are not included in BOQ shall be executed on written orders from the Project Engineer of CAPE. The contractor shall bring to the notice of the concerned official in advance, the requirement of extra item to be executed. The rates shall be derived from parallel items or similar items if possible or shall be derived from the reasonable existing market price plus the cost of labour plus 15 percent for contractor's overheads and profits. The CONTRACTOR shall furnish the rate analysis which supporting statements to the Owner for approval. However the CONTRACTOR shall not delay the work for finalization of the rates of the concerned item. Supplemental agreement for the extra item has to the executed for the same

.

BILL TO BE SUBMITTED BY THE CONTRACTOR:

Based on the quantities worked out as per the joint measurements recorded the CONTRACTOR shall submit his running and final bill in the appropriate format as followed in PWD. The CONTRACTOR shall submit as many copies of the bills as may be required for the purpose of reference and record. The bill shall be carried forward from the previous running account bill as per the existing procedure.

CONTRACTOR's Superintendence, Supervision, Technical Staff & Employees :

The CONTRACTOR shall provide all necessary superintendence during execution of the work and as long thereafter as may be necessary for proper fulfilling of the obligations under the contract.

The CONTRACTOR shall immediately after receiving letter of acceptance of the tender and before commencement of the work, intimate in writing to the Engineer-in-Charge the name(s), qualifications, experience, age, address(s) and other particulars along with certificates, of the principal technical representative to be in charge of the work and other technical representative(s) who will be supervising the work. The Engineer-in-Charge shall within 3 days of receipt of such communication, intimate in writing his approval or otherwise of such representative(s) to the CONTRACTOR. Any

such approval may at any time be withdrawn and in case of such a withdrawal, the CONTRACTOR shall appoint another such representative(s) according to the provisions of this clause. Decision of the tender accepting authority shall be final and binding on the CONTRACTOR in this respect. Such a principal technical representative and other technical representative(s) shall be appointed by the CONTRACTOR soon after receipt of the approval from Engineer-in-Charge and shall be available at site before start of work.

All the provisions applicable to the principal technical representative under the Clause will also be applicable to other technical representative(s). The principal technical representative and other technical representative(s) shall be present at the site of work for supervision at all time when any contractual activity is in progress and also present himself /themselves, as required, to the Engineer-in-Charge and/or his designated representative to take instructions. Instructions given to the principal technical representative and other technical representative(s) shall deemed to have the same force as if these for have been given of the CONTRACTOR. The principal technical representative(s) and other representatives shall be actually available fully during all stages of execution of work recording/checking/ test checking of measurement of work and wherever so required by Engineer-in-Charge and shall also note instructions conveyed by the Engineer-in-Charge or his designated representative(s) in the order book and shall affix his/their signature in token of noting down the instructions and in of acceptance of measurements/ checked measurements/test checked measurements. The representative(s) shall not look after other work. Substitutes, duly approved by Engineer-in-Charge of the work in the manner as aforesaid shall be provided for absence of any of the representation for more than two days.

If the Engineer-in-Charge, whose decision in this respect is final and binding on the CONTRACTOR, is convinced that no such technical representation is/are effectively appointed or is/are effectively attending or fulfilling the provision of this clause, a recovery (non-refundable) shall be effected from the CONTRACTOR @ Rs.500/day of his absence and the decision of the Engineer-in-Charge as recorded in the “site order book” and measurements checked/test checked in Measurement books shall be final and binding on the CONTRACTOR. Further if the CONTRACTOR fails to appoint suitable Principal technical representative and other technical representative(s) or if such appointed persons are not effectively present or absent by more than two days without duly approved substitute or do not discharge their responsibility satisfactorily, the Engineer-in-Charge shall have powers to suspend the execution of the work until such date as suitable other representative(s) is/are appointed and the CONTRACTOR shall be held responsible for the delay so caused to the work. The CONTRACTOR should submit a certificate of employment of the technical representatives(s) and shall produce evidence if any time required by the Engineer-in-Charge.

ADDITIONAL CONDITIONS

1. The CONTRACTOR shall make arrangement for obtaining electric connections if required and make necessary payments for the same as per rules

2. Other agencies doing works related with this project will also simultaneously execute the works and the CONTRACTOR shall afford necessary facilities for the same. The CONTRACTOR shall leave such necessary holes, openings etc, for laying/burying in the work of pipes, cable, conduits, clamps, boxes and hooks for fan clamps etc. as may be required for other agencies. Conduits for electrical wiring/cables will be laid in a way that they leave enough space for concreting and do not adversely affect the structural members. Nothing extra over the agreement rates shall be paid for the same.

3. (a) The building work will be carried out in the manner complying in all respects with the requirements of relevant bye-laws of the authorities under the jurisdiction of which the work is to be executed or as directed by the Engineer-in-Charge and nothing extra will be paid of this account.

   (b) The work of water supply, internal sanitary installations and drainage work etc. shall be carried out as per the existing regulations and the CONTRACTOR shall produce necessary completion certificate from such authorities after completion of the work, if required.

   (c) Water tanks, taps sanitary, water supply and drainage pipes, fitting and accessories should conform to specifications. The CONTRACTOR should engage licensed plumbers for the work and get the materials (fixtures/fittings) tested if required, by the authorities wherever required at his own cost.

4. The CONTRACTOR shall give a performance test of the installation(s) as per standing specification, before the work is finally accepted and nothing extra whatsoever shall be payable to the CONTRACTOR for the test.

5. Any cement slurry added over base surface (or) for continuation of concreting for better bond is deemed to have been in built in the items and nothing extra shall be payable or extra cement considered in consumption on this account.
6. The CONTRACTOR shall furnish along with the tender his proposed methodology and programme of construction in comprehensive manner of executing and completing the work with in the stipulated period. The programme shall consist of the various components for each part of the work stipulated to be completed and a bar chart may be submitted in this connection.

7. The CONTRACTOR shall take instructions from the Engineer-in-Charge for stacking of materials in any place. No excavated earth or building materials shall be stacked on areas where other buildings, roads, services compound walls are to be constructed.

8. Construction labour shall not be permitted (except staff for watch and ward if permitted) to stay inside the campus. The CONTRACTOR has to arrange for necessary photo identity passes for the labour for entry in to the campus. The labour movement should be restricted to the areas where work is carried out.

9. Royalty at the prevalent rates shall have to be paid by the CONTRACTOR on all the metals, shingles, sand, earth etc., collected by him for the execution of

the work direct to the Revenue authority or authorized agent of the State Government concerned.

10. The CONTRACTOR should construct proper mortar bands of lean mix for flooding with water & proper curing. In case of columns wet gunny bags shall be used for a period of two weeks.

11. Tenderers are advised to study the drawing before tendering.

12. Sample of all materials, fixtures, fittings like flooring tiles, wall tiles, doors, windows, sanitary fittings, roofing sheets etc, shall be got approved in advance from the Engineer-in-Charge before taking up the work.

13. The contractor should engage at his own cost atleast a diploma holder (Civil Engineering) for the proper execution and supervision of work costing upto 20 Lakh and one Engineering graduate and one diploma holder (Civil) for works costing above 20 Lakh and one Engineering graduate and two diploma holder for Pre-Qualification works and sufficient no. of skilled and unskilled labour according to the tenure of contract.

TESTING OF MATERIAL

The CONTRACTOR shall produce all the materials in advance so that there is sufficient time for testing and approving the material and clearance of the same before use at works. The contractor should arrange for the mandatory tests and the cost of the same has to be borne by him

Pre-cast concrete cobbles for floor: Concrete cobbles to be used in flooring shall be of hard, made out of 1:2:4 mix.

Progress Reports to be submitted by the CONTRACTOR

The CONTRACTOR shall submit weekly progress report of the work in a computerized form. The progress report shall contain the following.

1. Project information giving the broad features of the contract.
2. Introduction, giving a brief scope of the work under the contract and the broad structural or other details.
3. Construction schedule of the various components of the work through bar chart, showing the milestone targeted tasks and up to date progress.
4. Progress chart of the various components of the work through that are planned and achieved for the week as well as cumulative up to month with reasons for deviations, if any, in a tabular format.
5. Plant and machinery statement, indicating those deployed in the work , and their working status.
6. Man power statement, indicating individually the names of all the staff deployed in the work along with their designations.
7. Financial statement, indicating the broad details of all the running account payments received up to date, such as gross value of work done. Advances

taken, recoveries affected, amounts withheld, net payments, details of Cheque payments received, etc.

8. A statement showing the extra and substituted items submitted by the CONTRACTOR and the payments received against them, items pending for sanctions /decisions by the Owner, broad details of the bank guarantees, indicating their validity period, board details of the insurance policies taken by the CONTRACTOR, if any, advances received and adjusted from the department etc.

9. Progress photographs in colour of the various items / components of the work done up to date to indicate visually the actual progress of the work.

10. Quality assurance and quality control tests conducted during the week with results thereof.

11. Other details asked for by the engineer in charge.

The CONTRACTOR has to furnish weekly progress report, both physical and financial, as per proforma given below;

PHYSICAL

	Name of Item	Quantity as per Agreement	Quantity executed during the week	Total up to date quantity executed	Anticipated balance quantity

FINANCIAL

Total tendered amount	Amount of work done during the week	Total amount of work done up to date	Anticipated amount of balance work

The CONTRACTOR has to submit the progress report to the Engineer in-charge in triplicate by the first working day of every week as per the above proforma along with photographs of the work done during that week.

SPECIAL CONDITIONS

1. No plot rent shall be charged for materials stocked in the specified land during the course of construction with the prior approval the engineer provided all such materials are removed after the works are completed.
2. Royalty or charges due for use of private quarries and private land shall be paid by the CONTRACTOR.
3. No labour camps shall be permitted in side the Site. Workers should be made to confine themselves to the work areas and should not wander in to the near by areas / buildings/ forests.
4. If night work is required to be carried out to fulfill the agreed rate of progress, all arrangement shall be made by the CONTRACTOR inclusive of lighting the area, necessary charges has to be paid to the concerned authority for power utilization and necessary safety measures are taken.
5. The works shall be carried as per specifications and as per best Engineering practice.
6. No variations from, additions to and omissions from in the items of work shall vitiate the contract. All such variations, additions, substitutions etc shall be decided as per the terms of the contract agreement.
7. Child Labour is strictly prohibited in the work.
8. **Water and Electricity:**

   The Contractor shall have to make his own arrangement at his own cost for adequate supply of water and for electric power that may be required for in connection with the works.
9. The work shall be carried out with least hindrance to the adjoining building and offices and the CONTRACTORs will be responsible for any damages, caused to the existing fixtures, electric fitting, etc. in the course of execution and the CONTRACTOR shall make good any such, damages without any claim for extra.
10. The debris / construction waste and other waste generated from the work spot should not be thrown inside the site. All waste material should be taken out of the site or should be dumped at a place earmarked by the Engineer in charge.
11. All construction material should be stored only at places earmarked by the engineer in charge. Material like cement, aggregate, steel etc should not be stored in buildings that are in use. If any material stored in un-authorized location the same shall got removed at the cost of CONTRACTOR.
12. Preparation of concrete, mortars in the roads, pavements etc is strictly prohibited.
13. The useful vegetation inside the campus should not be damaged.

14. Drinking water requirement of the labour should be arranged by the CONTRACTOR.

15. The labours should be instructed not to misuse any facilities available in the various buildings.

16. While transporting the materials along the road, spillage of material should be avoided. If any spillage occurs the same should be got cleaned immediately without waiting for any notice from the department.

    Any violation of above will attract levy of compensation on the CONTRACTOR.

    Sub-Contractor's conditions:

    Subcontracting:

    It is preferred for the contractor not to engage in sub-contracting or subletting the work to others. In any case or so subcontracting may be allowed prior to the condition that the profile as well as the credibility of the contractor should be approved by the Architect, the Client and the project in-charge.

    The client will have no direct financial dealings or commitments with the subcontractor. Moreover the sub-contractor should abide with the technical instructions issued by the Architect/Consultant/Engineer-in-charge. The Principal contractor will be completely be responsible for any technical anomalies or deviations in the work executed.

Special conditions for Safety at the Site

1. No workmen below 18 years and above 70 years of age shall be engaged for a job at the site. sick and unhealthy persons should be avoided.
2. All the workmen shall undergo Safety Induction, screening before engaging them on the job. Physical fitness of the person to certain critical jobs like working at height or other dangerous locations to be ensured before engaging the person on work.
3. Smoking is strictly prohibited at the workplace.
4. Sub-contractors shall ensure adequate supervision at workplace. They shall ensure that all persons working under them shall not create any hazard to self or to co-workers. Details of Sub –Contractors engaged shall be intimated to the Project Director/Engineer-in-charge in writing.
5. Nobody is allowed to work without wearing safety helmet. Chinstrap of safety helmet shall be always on.
6. No one is allowed to work at or more than three meters height without wearing safety belt and anchoring the lanyard of safety belt to firm support preferably at shoulder level.

7. No one is allowed to enter into workplace and work at site without adequate foot protection.
8. Usage of eye protection equipment shall be ensured when workmen are engaged for grinding, chipping, welding and gas-cutting. For other jobs as and when site safety co-coordinator insists eye protection has to be provided.
9. All excavated pits shall be barricaded & barricading to be maintained till the backfilling is done. Safe approach to be ensured into every excavation.
10. Adequate illumination at workplace shall be ensured before starting the job at night.
11. All the dangerous moving parts of the portable / fixed machinery being used shall be adequately guarded.
12. Ladders being used at site shall be adequately secured at bottom and top. Ladders shall not be used as work platforms.
13. Erection zone and dismantling zone shall be barricaded and nobody will be allowed to stand under suspended loads.
14. Contractor should spray water using Water sprayer periodically in the site to reduce the dust arising due to wind.
15. Horseplay is completely prohibited at workplace. Running at the site is completely prohibited, except in the case of emergency.
16. Material shall not be thrown from the height. The area shall be barricaded if required and one person shall be posted outside the barricading for preventing the tress-passers from entering the area.
17. Other than electricians with red helmet no one is allowed to carry out electrical connections, repairs on electrical equipment or other jobs related thereto.
18. All electrical connections shall be made using 3 or 4 core cables, having a earth wire.
19. Proper Earthling pits at site to be constructed. And the sensitivity must be maintained less than 1 ohm.
20. Main panel boards should have MCB’s and RCCB / ELCB’s (30 mA sensitivity).
21. Inserting of bare wires for tapping the power from electrical sockets is completely prohibited.
22. All major, minor accidents in the premises and to be recorded and reported to the Engineer- in- charge.
23. Scaffoldings used should be of proper construction. No inferior quality Casuarinas pole / bamboo scaffolding is permitted. It should be inspected by competent person(s) before use/concreting.

24. All tools and tackles shall be inspected before use. Defects to be rectified immediately. No lifting tackle to be used unless it is certified by the competent authority.

25. Good housekeeping to be maintained. Passages shall not be blocked with materials. Materials like bricks shall not be stacked to the dangerous height at workplace.

26. Debris, scrap and other materials to be cleared from time to time from the workplace and at the time of closing of work everyday.

27. Adequate fire fighting equipment shall be made available at workplace and persons are to be trained in fire fighting techniques with the co-ordination of site safety coordinator.

28. All the unsafe conditions, unsafe acts identified by CONTRACTOR, reported by site supervisors and / or safety personnel to be corrected on priority basis.

29. No children shall be allowed to enter the workplace.

30. All the lifting tools and tackles shall be stored properly when not in use.

31. Clamps shall be used on Return cables to ensure proper earthing for welding works.

32. Return cables shall be used for earthing.
33. All the pressure gauges used in gas cutting apparatus shall be in good working condition.

34. Connectors and hose clamps are used for making welding hose connections.

35. Proper warning boards and caution notices to be displayed at required areas inside the site.

36. All underground cables for supplying construction power shall be routed using conduit pipes.

37. Tapping of power by cutting electric cables in between must be avoided. Proper junction boxes must be used.

Workmen's Insurance

Owner shall not be liable for any payment in respect of any damages or compensation payable according to law in respect or in consequence of any accident or injury or loss of life to any workman or other person in the employment of the CONTRACTOR or any sub-contractor. The CONTRACTOR shall insure against such liability with an insurer for sum of the established norms during the entire period till completion of work.

Recovery from the CONTRACTOR

Without prejudice to the other rights of THE OWNER against the CONTRACTOR in respect of such default, HE OWNER shall be entitled to deduct from any sums payable to the CONTRACTOR the amount of any damages, compensation costs, charges and other expenses paid by the Owner and which are payable by the CONTRACTOR under this clause.

Delay, Compensation for Delay and Extension of Time

Time is the essence of this contract and CONTRACTOR shall complete the Work in all respects as per the contract within the date/period of completion specified. Should the CONTRACTOR feel that he will not be able to complete the work in time, he may apply for extension of Time to the Owner along with reasons and justifications there to for delays, if any.

If the contractor fails to execute the work within agreed /extended period as per the specification agreed,THE OWNER will arrange the balance through other agencies at risk and cost of the contractor.

If in the opinion and absolute discretion of THE OWNER. whose decision shall be final, conclusive and binding, the work is delayed on account of valid reasons not within the control of the CONTRACTOR; THE OWNER shall make a fair and reasonable Extension of Time for completion of the Contract subject to agreement condition and supplemental agreement for the same to be executed. The CONTRACTOR shall not make any claim for compensation or damage in relation thereto.

Defect Liability Period
The defect liability period shall be **24 months** after the date of issue of virtual completion certificate to the CONTRACTOR.

The CONTRACTOR shall be responsible to make good and remedy at his own expense any defects which may appear within the Defects Liability Period arising in the opinion of THE OWNER who shall be the final authority.

In case of default, THE OWNER may employ and pay other persons to amend and make good such defects and expenses consequent thereon or incidental thereto and shall be made good and borne by the CONTRACTOR and shall be recoverable from him.

Arbitration

No arbitration of any disputes on contracts will be allowed under any circumstances.

Law Governing the Contract
The Indian laws shall govern this contract for the time being in force.

ADDITIONAL CONDITIONS
ADDITIONAL & PARTICULAR SPECIFICATIONS

GENERAL

The quoted rates for various items in the tender shall be inclusive of all the additional conditions and particular specifications and for adherence to all these conditions and specifications, no extra payment shall be made to the contractor. Any infringement and/or breach of these specification and condition(s) etc. shall render the contractor liable to action(s) under various clauses of the contract and such action stipulated in conditions therein.

"A" ADDITIONAL CONDITIONS

1. The Contractor shall maintain safe custody of materials brought to the site. The Contractor shall also employ necessary watch and ward establishment for the work and other purposes as required at his own cost.

2. For Cement and Steel and other materials, as prescribed, the quantities brought at site shall be entered in the respective material accounts at site and shall be treated as issued for maintenance of daily consumption.

3. The procurement of Cement and Reinforcement Steel, and, their issue and consumption shall be governed as per conditions laid down hereunder.

3.1. Cement

3.1.1. The contractor shall procure 43 grade (Conforming to IS: 8112) Ordinary Portland Cement, as required in the work, from reputed manufactures of cement, having a production-capacity of one million tonnes per annum or more, such as A.C.C. L&T, India Cements, Malabar Cement, and Cement Corporation of India etc. as approved by Ministry of Industry. Government of India, and holding license to use ISI certification mark for their product whose name shall be got approved from Engineer-in-Charge. Supply of cement shall be taken in 50 kg bags bearing manufacture's name and ISI marking. Samples of cement arranged by the contractor shall be taken by the Engineer-in-Charge and got tested in accordance with provisions of the relevant BIS codes. In case test results indicate that the cement arranged by the contractor does not conform to the relevant BIS codes, the same shall stand rejected and shall be removed from the site by the contractor at his own cost within a week's time of written order from the Engineer-in-Charge to do so.

3.1.2. The Cement shall be brought at site in bulk supply of approximately 20 tonnes or as decided by the Engineer-in-Charge.

3.1.3. The cement godown of the capacity to store about 500 bags of cement or as decided by the Engineer-in-Charge shall be constructed by the contractor at site of work for which no extra payment shall be made. The contractor shall facilitate the inspection of the cement godown by the Engineer-in-Charge or his authorised subordinate at any time.

3.1.4. The contractor shall supply free of charge the cement required for testing. The cost of tests shall be borne by the contractor/ Department in the manner indicated below:

i. By the contractor, if the results show that the cement does not conform to relevant BIS codes.
ii. By the Department, if the results show that the cement conforms to relevant BIS codes.

2.1.5 The cement should be stored safely without getting damaged. The owner is not responsible for any damaged clotting of cement.

3.2. Steel

3.2.1. The contractor shall procure steel reinforcement bars conforming to relevant BIS codes from main producers like SAIL, TISCO, VSP, IISCO etc. as approved by the Ministry of Steel. In cases when the contractor is required to procure steel reinforcement bars conforming to relevant BIS codes from other than main producers such as secondary producers or having BIS License, can be done with prior approval of the Engineer-in-Charge. The procurement of TMT Bars conforming to relevant BIS codes shall be made from main producers and secondary producers having BIS License with prior approval of the Engineer-in-Charge. The contractor shall have to obtain and furnish test certificates to the Engineer-in-Charge. The contractor shall have to obtain and furnish test certificates to the Engineer-in-Charge in respect of all supplies of steel brought by him to the site of work. Samples shall also be taken and got tested by the Engineer-in-Charge as per the provisions in this regard in the relevant BIS codes. In case the test results indicate that the steel arranged by the contractor does not conform to BIS codes, the same shall stand rejected and shall be removed from the site of work within a weeks' time of written order from the Engineer-in-Charge to do so.

3.2.2. The steel reinforcement shall be brought to the site in quantity of lots as approved by the Engineer-In-Charge.

3.2.3. The steel reinforcements shall be stored by the contractor at site of work in such a way as to prevent distortion and corrosion and nothing extra shall be paid on this account. Bars of different sizes (diameters) and lengths shall be stored separately to facilitate easy counting and checking.

3.2.4. For steel procured from main producers, for checking nominal mass, tensile strength, bend test, etc. specimen of sufficient length shall be cut from each diameter of the bar at random at frequency not less than that specified below. In case of works costing more that 2 Crores and when the steel is procured from other than main producers, additional tests such as, retest, re-bend test, elongation test, proof stress may also be conducted

Size (Diameter) of bar	For consignment	
	Below 100 tonnes	Over 100 tonnes
Under 10mm dia	One sample for each 25 tonnes or part thereof	One sample for each 40 Tonnes or part thereof
10mm to 16mm dia	One sample for each 35 tonnes or part thereof	One sample for each 45 Tonnes or part thereof.
Over 16mm dia	One sample for each 45 tonnes or part thereof.	One sample for each 50 Tonnes or part thereof.

3.2.5. The contractor shall supply free of charge the steel bars required for testing. The cost of tests shall be borne by the contractor/ Department in the manner indicated below:

1. By the contractor, if the results show that the steel does not conform to relevant BIS codes.

2. By the Department, if the results show that the steel conforms to relevant BIS codes.

3.2.6. Coefficient of weight i.e. the weight per unit length of the steel procured by the contractor shall be ascertained at site before using it and certified by the Engineer-In-Charge. In case weight per unit length is beyond the rolling margin as laid down in the BIS: 1786, the steel will be rejected and shall be removed from the site of work within; a weeks' time from the date of written order from the Engineer-in-Charge to do so. In case weight per unit length is more than the standard coefficient of weight for the diameter, but is within the rolling margin, then the payment shall be made as per the standard weight per unit length, and, where the weight per unit length is lesser than the standard coefficient of weight for the diameter, but is within the rolling margin, the payment shall be restricted with respect to the actual weight per unit length of the diameter.

3.3. The standard sectional weights referred to in standard table in KPWD Data Book for Cement Mortar, Cement Concrete and RCC works, are to be considered for conversion of length of various sizes of Steel Reinforcement bars into weight.

3.4. The actual issue and consumption of steel and Cement on the work shall be regulated and proper accounts maintained.

3.5. Steel and Cement brought to site and remaining unused shall not be removed from site without the written permission of the Engineer-In-Charge.

4. No payment shall be made to the contractor for any damage caused during the execution of work because of cause(s) not covered. The damage to work will be made good by the contractor at his own cost, and no claim on this account shall be entertained.

5. Some restrictions may be imposed by the security staff etc. on the working and/ or movement of labour, materials etc. and the contractor shall be bound to follow all such restrictions/ instructions and nothing extra shall be payable on this account.

6. The contractor shall comply with proper and legal orders and directions of the local or public authority or municipality and abide by their rules and regulations and pay all fees and charges which he may be liable and nothing extra shall be payable on this account. The work shall be carried out without infringing on any of the local Municipal Bye-Laws.

7. The contractors shall given a performance test of the entire installations as per standard specifications before the work is finally accepted and nothing extra what so ever shall be payable to the contractor for the tests.

8. The contractor shall engage licensed plumber for sanitary, water supply, drainage work and also get all the materials and system (including the materials supplied if any, by the department) tested by the Municipal Authority, Whenever required at his own cost including all testing fees, transport etc. according to Municipal by Laws. The contractor shall produce necessary certificate from the Municipal Authorities after completion of work. Nothing extra will be paid on this account. The Contractor shall execute the guarantee for removal of defects after completion in respect of water supply and sanitary installation.

9. The water supply sanitary installation and drainage work shall be carried out in a manner complying in all respects with the requirement of relevant by laws of the local municipal authority of the place at no extra cost of the department.

10. The rate for every item of work to be done under this contract shall be for all heights, depths, lengths and widths of the structure (except where specially mentioned in the item) and nothing extra will be paid on this account.

11. The contractor shall take all precautions to avoid all accidents by exhibiting necessary caution boards such as day and night boards, speed limit boards and flags, red lights and providing barriers etc. He shall be responsible for all damages and accidents caused due to negligence on his part. No hindrance shall be caused to traffic during the execution of work. No extra payment shall be paid on this account.

12. The contractor will work in close liaison, during the works, with other contractors of water supply, sanitary, drainage arrangements, electrical installation and any other works and adjust his work plan accordingly.

B. ADDITIONAL SPECIFICATIONS

1. GENERAL

1.1.1. Should there be any difference between the specifications mentioned above and the specifications given in the schedule of quantities, the later shall prevail.

1.1.2. If the specifications for any item are not available in the CPWD Specifications cited above, relevant BIS Specifications should be followed.

1.1.3. In case BIS Specifications are also not available, the decision of Engineer-in-Charge given in writing based on acceptable good engineering practice and local usage shall be final and binding on the contractor.

1.1.4 Articles classified as first quality by the manufacturer shall be used unless otherwise specified.

1.1 The work will be carried out in accordance with the architectural drawings and structural drawings to be issued by the Engineer-in-Charge. The structural and architectural drawings shall have to be properly correlated before executing the work.

12.1 Incase of any difference noticed between Architectural and Structural drawings, the contractor shall obtain final decision in writing of the Engineer-in-Charge.

12.2 In case of any discrepancy in the item given in the schedule of quantities appended with the tender and architectural drawings relating to the relevant item, former shall prevail unless otherwise given in writing by the Engineer-in-Charge

1.2 For items where so desired, samples shall be prepared before starting the particular items of work for prior approval of the Engineer-in-Charge and no extra payment shall be made on this account.

1.3 Materials brought at site of work shall not be used in the work before getting satisfactory Mandatory test results. For details, relevant provisions in CPWD specification shall be referred to.

1.3.1 Wherever it is desired to procure factory-made materials, such factory-made materials shall be procured from reputed and approved manufacturers or through their authorized dealers. The contractor shall obtain the approval from the

Engineer-in-Charge of such firms prior to procurement of such factory-made materials. The Engineer-in-charge may, at any stage, inspect such factories/ manufacturing units. The contractor shall have no claim if the factory made materials brought to the site are rejected by the Engineer-in-charge in part or in full due to bad workmanship/ quality etc. even after the inspection of the manufacturing units.

1.3.2 The manufactured materials brought at site of work shall, in general, conform to the relevant specifications. The source for supply of the manufactured materials shall be approved by the Engineer-in-charge. The contractor shall have no claim if the manufactured materials brought to the site are rejected by the Engineer-in-charge in part or in full due to bad workmanship/ quality etc.

1.3.3 The preference amongst the various alternative materials available shall be as follows.

(a) The materials shall be as per the Brand specified to be used in the work.
(b) If the Brand specified material is not available then the material shall be ISI marked.
(c) If ISI marked item is not available then it should be from ISO certified Company.
(d) If the ISI marked or ISO certified items are not available then the best available items in the market to be procured.

1.3.4 Equivalents for the various materials and the materials of approved make shall be got approved from the Engineer-in-Charge of work in writing before using them on the work.

1.3.5 The contractor shall maintain register for cement, paint and other registers as required by the Engineer-in –charge and those should be signed by the contractor or his authorised agents and the Asst. Engineer in charge of the work.

2. The following modifications to the above specifications shall, however, apply.

2.1 Earth Work

2.1.1 During excavation and trenching work etc., the contractors shall ensure compliance to the guidelines in such matters laid down by the local body / bodies to ensure that there is minimum hazard to the operating personnels and users, minimum inconvenience to the users, minimized damage to the underground plant/services of other utilities in a coordinated way, in the interest of public convenience and overall safety.

2.1.2 Any trenching and digging for laying sewer lines/ water lines/ cables etc. shall be commenced by the contractor only when all men, machinery's and materials have been arranged and closing of the trench(s) thereafter shall be ensured within the least possible time.

2.1.3 Surplus excavated earth which is beyond the requirement of the CAPE shall have to be disposed of by the contractor beyond the municipal limits or at places identified by the local bodies or as directed by the Engineer-in-Charge after obtaining written permission of the Engineer-in-Charge for such disposal of this surplus excavated earth.

2.1.4 The contractor shall, at his own expense and without extra charges, make provision for all shoring, pumping, dredging or bailing out water, if necessary, irrespective of the source of water. The foundation trenches shall be kept free from water while all the works below Ground Level are in progress.

2.2 Reinforced Cement Concrete Work & Plain Cement Concrete- General

2.2.1 **Stone Aggregate**. Stone aggregate to be used in the work shall be of hard broken stone to be obtained from source approved by Engineer-In-Charge and shall conform to the relevant provisions in the CPWD Specifications.

2.2.2 **Fine Sand / Coarse Sand**: Fine sand / Coarse sand to be used in the work shall be obtained from sources approved by Engineer-In-Charge and shall conform to the relevant provisions in the CPWD Specifications.

2.2.2.1 Where only one variety of sand is available, the sand will be sieved for use in finishing work to achieve the required particle size distribution as per CPWD Specifications in order to obtain smooth surface and nothing extra shall be paid to the contractor on this account.

2.2.3 Water: - It shall conform to requirements laid down in IS: 456-2000

2.3 **R. C. C. work (Design Mix Concrete) -** Wherever the RCC work is specified to be done with Design Mix Concrete, the particular specifications, as applicable, shall apply.

2.4 **R.C.C.Work (Nominal mix concrete)- Water-Cement Ratio: -** For RCC Works, wherever nominal mix of concrete is stipulated in the items for work, for maintaining proper quality and durability requirements of the structure, maximum water-cement ratio shall be restricted to 0.55. If in normal course of work, the required workability is not achieved; suitable plasticizers/ admixtures may be used for improving the workability of concrete with the approval of Engineer-in-Charge for which nothing extra shall be paid.

2.5 **Centering and Shuttering for R.C.C Work: -** The concrete surface shall be free from honey combing, offsets, superfluous mortar, cement slurry and foreign matter. The formwork shall be assembled in such a way as to facilitate removal of their parts in proper sequence without any damage to the exposed cement concrete surfaces and corners etc. The contractor shall keep skilled staff for special care and supervision to check the formwork and concreting so that every member is made true to its size, shape, level and alignment so that it does not result in any deformation, snug, bulges etc. The contractor shall also take suitable precautionary measure to prevent breaking and chipping of corners and edges of completed work until the building is handed over. The size of shuttering plates for slabs shall not be less than 0.6mx0.9m in general. However, contractor has to provide tape or wooden fillets or rubber gaskets to seal the joint properly to get smooth surface. Further shuttering shall be of such quality that there are no undulations and surfaces will be fairly even and no extra thick ceiling plaster shall be permitted to make the surface even. Any honey-combed or poorly formed concrete shall be repaired with polymer concrete of any suitable design by the Contractor at his own cost.

2.6 **BRICK WORK**: - Bricks used in the work shall be of class designation specified to be obtained from kilns approved by Engineer-In-Charge. In all other respects they shall conform to the provisions in CPWD specifications.

2.7 **STONE WORK**: Stone used for stone masonry work shall be hard granite/ basalt/ quartz stone/sand stone to be obtained from quarries approved by Engineer-In-Charge and shall conform to the relevant provision in the CPWD specifications.

2.8 All above materials like stone aggregates, coarse sand, fine sand, Bricks, Surkhi, Stone etc. confirming to the CPWD specifications to be brought from the sources approved by Engineer-In-Charge. In case, at any stage during execution of work, the material from the approved source being not available or otherwise, and, is required to be arranged from other sources conforming to relevant CPWD specifications and duly approved of Engineer-in-charge, involving extra lead etc. no extra payment made shall be on this account.

2.9 **WOOD WORK: -** Timber required for manufacture of chowkhats and shutters for doors, windows, ventilators, and partitions etc. in the work shall be kiln seasoned and preservative treated. The Timber shall be kiln seasoned before applying preservative treatment. The rate quoted for various items shall be inclusive of kiln-seasoning and preservative treatment of wood. The wood used in the work shall conform to the provisions in the CPWD Specifications

2.10 **STEEL WORK:-** All steel doors, steel windows, steel ventilators, wire gauge, steel glazing, steel grill shall be according to the Architect's detailed drawings and factory made and obtained from approved suppliers.

2.10.1 In the case of composite steel windows the rates shall include the cost of coupling mullion and transom etc. Where windows with inside open able shutters are fixed along-with windows with shutters openable outside, such inside openable windows shall be fitted with suitable friction hinges and openable outside with box type hinges, lever handles or otherwise as approved by the Engineer-in-Charge of the work. For such windows, cement concrete blocks of size 15cmx 10cmx 10cm shall be provided.

2.10.2 In the case of steel windows and doors, steel glazing, wire gauge steel ventilators, rolling shutters, grills etc. an approved quality-priming coat of zinc chromate shall be applied over and above shop coat of primer. No extra payment shall be made for providing shop-coat primer.

2.11 Sanitary and Water supply installations

The contractor shall engage licensed plumber for sanitary, water supply, drainage work and shall be carried out in a manner complying in all respects with the requirement of relevant by rules of the local municipal authority. The Contractor shall give a guarantee to the effect that the work shall remain structurally stable and shall guarantee against faulty workmanship, finishing, manufacturing defects of materials and leakages etc.

2.12 **Approval of sample work** of repetitive/ typical nature prior to general execution of work shall be as enumerated hereafter.

2.12.1.1 Samples of typical portion of the works of repetitive nature such as typical room, toilet room, or any other work shall be prepared by the contractor under the directions and to the satisfaction of Engineer-in-Charge and got approved from him in writing before the commencement of these items for the entire work.

2.12.1.2 The work shall be so arranged to be carried out that the requirement for preparation of samples are observed and fulfilled without any detriment to the general progress of work. In other words, this will not be allowed to have any effect on the general progress of work or on any of the terms and conditions of the contract. No claims of any kind whatsoever including the claim of extension of time will be entertained due to the incorporation of this requirement.

2.13. Measurement:- As per KPWD norms.

2.14. Tolerance:- As per KPWD norms

2.15. Rate:- The rate includes the cost of materials and labour involved in all the operations described above including the cost of centering, shuttering curing, placing and fixing in position which are not specially mentioned

TECHNICAL SPECIFICATIONS (Electrical)

INDEX

SECTION I

General Requirements

1. Scope of Work:

1 General:

The scope of work shall be generally as given in the Tender Schedule and in the drawings for the electrification work. The intention of the specification, Tender Schedule and the drawings is to give finished work of approved and standard quality and all duly tested and commissioned. All minor items of details usually not shown or indicated but necessary for the completion of the system, including testing, commissioning and handing over shall deem to have been included in the work and in the rates quoted by the contractor.

2. The work is divided under following main groups:

a. The entire internal electrification work shall be with Cu wires in concealed/in open PVC conduits with necessary accessories and switch boxes, light/fan points, power points, etc.
b. The Supply and Erection of lighting luminaries, ceiling fans, exhaust fans etc.
c. The complete earthing system including earthing stations, earth conductors, earth bus and their connections.
d. Providing power supply from sub-station to the sub panels in different locations as indicated in the drawings. The complete installation, testing and commissioning of external lighting within the plot area including lighting poles, their earthing, cabling, control unit and DB, pole terminal boxes, lighting luminaries and lamps etc.

2 Liaison and Co-ordination work:

2.1 All liaison and co-ordination work with KSEB, Electrical Inspectorate or any other statutory body and agency will be contractor's responsibility and statuatory expenses towards the same will be met by the owner. This liaison work will include all activities in all stages starting from making application to KSEB and/ or other agencies and up to and including release of required permanent electric connections for this project. The owners will pay the official fees, deposits and such other payments, which are to be paid in the name of the owners.

2.2 After connection of regular supply by KSEB, the installation shall be again checked by the contractor.

2.3 The contractor shall carry out all minor civil works connected with the electrical job. The contractor shall repair and make good the damages caused by him to the civil structure while executing the electrification work. The foundations for the panel board,

and distribution pillars, grouting of frames in the wall, erection of D.B./switchboards on the wall etc. are all to be carried out by the contractor.

3. Abbreviations:

The following abbreviations have been used in the specifications, drawings and bill of quantities.

BIS : Bureau of Indian Standards.
ISS : Indian Standard Specifications.
HRC : High Rupturing Capacity.
GI : Galvanized Iron.
MV : Medium Voltage.
LV : Low Voltage.
AMP : Amperes.
KV : Kilo Volts.
CI : Cast Iron.
MCB : Miniature Circuit Breaker.
MCCB: Moulded case circuit breaker.

ACB : Air circuit breaker.
DB : Distribution board.

SFU : Switch fuse unit.
E : Earth conductor.
Cu : Copper conductor.
AL : Aluminium conductor.
MSB : Main Switch board.
MS : Mild Steel
V : Volts.
KVA : Kilo Volt Ampere
SDF : Switch disconnector fuse
TPN : Triple pole and Neutral.
SP : Single Pole.

CT : Current transformer.
DG : Diesel generator.

4. Regulations and standards:

The installation shall conform in all respects to Indian Standard code of Practice for Electrical Wiring installation IS 732-1963 and IS 2214-1963. It shall also be in conformity with the current Indian Electricity Rules, Indian Electricity Act. National Electric Code and Regulations of the Local Electrical Supply Authority is so far as these become applicable to the installation. Wherever this specification calls for a higher standard of material and/or workmanship than those required by any of the above regulations then this specification shall take precedence over the said regulations and standard. In general, the materials equipment and workmanship not covered by the above shall conform to the relevant Indian Standards.

5. Approvals and tests:

The contractor shall get approval for the work from KSEB and Electrical Inspectorate. On completion of the work the contractor shall obtain and deliver to the Consultant certificates of final inspection and approval by the local electric supply authority and electrical inspector. The consultant/client have full powers to test the materials or work or arrange to be tested by an independent agency at the electrical contractor's expense in order to prove their soundness and adequacy.

6. Actual route of cables / Conduits etc:

The locations of the DB's, light/fan points, power points and routing of the conduits, wires and cables as shown on the drawings are only indicative. Therefore the actual route and locations may differ from the plans according to the working drawings for civil construction and site conditions.

7. Drilling and cutting:

The contractor shall supply and install at his expense all secondary materials and special fittings found necessary to overcome the interference and to supply the modifications on the route of mains and conduits that are found necessary during the work, to the complete satisfaction of the owner's representative.

Cutting of walls or other parts of the building for the complete and proper installation of the electrical equipments shall be the responsibility of the electrical contractor. However Beams, girders and other principal structural members shall not be cut or drilled. Any damage to finished surfaces shall be made good by repair or replacement at the contractor's expense. The contractor shall possess and make use of necessary tools and equipment for cutting grooves on walls.

8. Material and equipment:

All material and equipment shall conform to the relevant standards and shall be of the approved make and design. Unless otherwise called for, only the best quality materials and equipment shall be used. The materials and equipment shall conform to relevant Indian Standards. The Contractor shall be responsible for the safe custody of all the materials and shall insure them against theft, damage by fire, earthquake etc. A list of items of materials and equipment, together with sample of each shall be submitted to the consultant.
All materials of the same kind of service shall be identical and made by the same manufacturer. The Consultant shall approve any deviation to this rule.

9. Voltage:

Except for supplies to specialist equipment, the normal utilization voltages shall be 3 phase, 4 wire, 50 Hz, 415 volt between phases, 240 volt between any phase and neutral, with a solidly earthed neutral.

10. Manufacturers:

Where manufacturers have furnished specific instructions relating to the materials proposed to be used in this job, covering points not specifically mentioned in these documents, these instructions are to be followed.
Where manufacturer's names and/or catalogue numbers are given, this is an indication of the quality, standards and performance required.

11. Rating:

Rating of all items shall be appropriate for the conditions on the particular site on which the item will be used. All the equipment shall be fit for continuous work under the heaviest conditions of site and shall be rated for the following condition.

- Outdoor temperature 45^0C
- Temperature under shade 40^0 C

12. Inspection and testing:

The owner's representative reserves the right to request inspection and testing at manufacturer's works at all reasonable times during manufacture of items for this contract. Tests on site of complete works shall demonstrate, among other things.

1. That the equipment installed complies with specification in all particulars and is of the correct rating for the duty and site conditions.
2. That all item operate efficiently and quietly to meet the specified requirements.
3. That all circuits are correctly fused and protected and that protective devices are properly coordinated.
4. That all non-current carrying metal work is properly and safely grounded in accordance with the specifications.

The contractor shall provide all necessary instruments and labour for testing shall make adequate records of test procedures and readings, shall repeat any tests requested by the Consultant/client and shall provide test certificates signed by a properly authorized person. Such test certificates shall cover all works. If tests fail to demonstrate the satisfactory nature of the installation or any part thereof then no claims for the extra cost of modifications, replacements or retesting will be considered. The Consultant/client's decision as to what constitutes a satisfactory test shall be final. The above general requirements as to testing shall be read in conjunction with any particular requirements specified for testing and commissioning.

13. Allowance for future growth:

To allow for future increases in electric load it is desirable that all mains and DB shall be provided with spare capacity / ways. The no. of spare ways shall be discussed and finalized with the clients before placing order these materials.

14. Test certificates:

The contractor shall submit test certificates for all the electrical material/system. These shall be issued by a government recognized inspection office certifying that all equipment, materials, construction and functions are in agreement with the requirements of these specifications and accepted standards.

15. Samples and catalogues:

Before ordering the material necessary for these installations, the contractor shall submit to the Consultant/client for approval a sample of every kind of material such as cables, conductors, conduits, switches, socket outlets, boxes etc. along with the catalogues.

For big items such as switchboards the submission of shop drawings and catalogues shall be enough. After the selection by the Consultant/client the contractor shall arrange inspection and testing at the manufacturers factory or assembly shop for final approval. No material shall be procured prior to the approval of the Consultant.

16. Vendor and shop drawings:

The contractor shall prepare and submit to the consultant/client for his approval two sets of detailed drawings of all distribution boards, switch boards, outlet boxes, special pull boxes, and other like wise materials and equipments to be fabricated by the contractor or other vendor.

Before starting the work, the contractor shall submit to the Consultant for his approval in the prescribed manner, the shop/execution drawings for the entire installation, specially the main connection and junctions, the route of Conduits and cables, no and size of wires to be drawn through the conduits, location of all the outlet points and switch boards and distribution boards and any other information required by the Consultant/client. The Consultant/client reserves the right to alter or modify these drawings if they are found to be insufficient or not complying with the established technical standards or if they don not offer the most satisfactory performance or accessibility for maintenance.

17. As built drawings:

At the completion of work and before issuance of certificate of virtual completion the contractor shall submit to the consultant/client layout drawing drawn at appropriate scale indicating the complete system "as installed". These drawings must provide.

1. Run, location and size of conduits and inspection, junction, and pull boxes, along with the location of sockets and switches containing the light and power outlets.
2. Location and details of DB's, main switches, switchgears and other particulars.
3. A complete wiring diagram as installed and scheduled drawings showing all connection in the complete electrical system.
4. Location of all earthing stations, route and size of all earthing conductors, Route and particulars of all cables, cable chambers, RCC pipes etc.

18. Safety of materials:

The contractor shall provide proper and adequate facilities to protect all the materials and equipment including those issued by the owner against damage from any cause whatsoever.

19. Completion certificate by Contractor.

On completion of the electrical installation (or extension to an installation) the contractor countersigned by the supervisor shall furnish a certificate, under whose direct supervision the installation was carried out. This certificate shall be in the prescribed form as required by the local supply authority. The contractor shall be responsible for getting the electrical installation inspected and approved by the local concerned authorities, including electrical inspector.

20. Staff:

The contractor shall employ a competent fully licensed, qualified full time electrical Engineer to direct the work at site, to receive instructions from

Consultant/client and to correlate the progress of work in conjunction with all relevant requirements of the supply authority.

SECTION - II
Medium Voltage Distribution System

1. Wiring for lighting and power:

This specification covers, system and method of wiring, definition of point wiring, and supply, installation, connection, testing and commissioning of point wiring for light points, fan points, convenience socket outlet points, power socket outlet points, bell outlet points, etc. Wiring shall be with copper conductor PVC insulated wires drawn in rigid PVC conduits on walls, ceiling, etc Wiring shall be from meter rooms to distribution boards, from DB to switch boards and from switchboard to outlet points. The method of wiring for this particular work shall be as mentioned under tender schedule.

2. System of wiring:

Medium voltage distribution system shall be applicable for wiring three phase, 4 wire, 415V, 50Hz, AC supply and single phase, 2 wire, 230V, 50Hz, AC supply. Light circuits shall be limited in any one of the three phases.

3 Applicable standards:

1	IS: 732	Code of Practice for Electrical wiring installation (system voltage not exceeding 650 V).
2	IS: 1646	Code of Practice for fire safety of buildings (General) Electrical Installation.
3	IS: 9537 (Part II)	Rigid steel conduits for electrical wiring.
4	IS: 694	PVC insulated cables
5	IS: 1293	3 pin plugs and sockets.
6	IS: 8130	Conductors for insulated electric cables and flexible cord
7	IE: Rules	Indian Electricity Act and Rules
8	IS: 5133	Boxes for enclosure of electrical accessories Part 1: Steel& CI boxes.
9	IS: 371	Ceiling roses (Second revision)
10	IS: 4615	Switch socket outlets (non interlocking type)
11	IS: 3854	Switches for domestic and similar purposes.

4. General Requirements:

1 Before the conducts are installed the exact route shall be marked at the site for approval and the actual work shall be undertaken only after approval.

2 Load balancing of circuits in three-phase installation shall be planned before the commencement of wiring and shall be strictly adhered to.

3 Definition of point wiring:

A point shall consist of the branch wiring from the switchboard together with a switch and point control boxes as required, as far as and including the wiring accessories such as ceiling fan box of socket outlet point or suitable termination. A point shall include, in addition, the earth continuity conductor/wire from the switchboard to the earth pin/stud of the outlet/switch box.

5. Scope of work:

The medium voltage distribution system wiring shall be carried out in the under mentioned manner:

a) Supply, installation, fixing of conduits and necessary accessories, switch boxes, outlet boxes and pull / junction boxes.
b) Supplying and drawing of wires of required size including earth continuity wire.
c) Supply, installation and connection of switches, sockets, cover plates, switch plates, concealed fan hook boxes / fan hooks as specified etc.
d) The point shall be complete with the branch wiring from the switchboards to the outlet point, conduits and casing capping with accessories, control switch, socket outlet boxes, ceiling roses, batten/angle holder, connector etc.

6. Boxes:

6.1 Junction boxes:

All the boxes for junction boxes, pull boxes used in conduit wiring system shall be fabricated from 1.5 mm thick mild sheet steel with two coats of enamel paint of approved shade or powder coated as specified. The boxes shall have smooth external and internal finished surface. Separate screwed earth terminal shall be provided in the box for earthing purpose. All boxes shall have adequate no of knock out holes of required diameter for conduit entry. All PVC junction boxes shall be deep boxes.

The boxes shall be provided with a minimum of four fixing lugs located at the corners for fixing the covers. All fixing lugs shall have tapped holes to take machined brass screws. The boxes shall be sufficiently strong to resist mechanical damage under normal service conditions. Wherever different phase conductors are brought into the same enclosure, phase barriers shall be provided. The boxes shall have removable covers at top and bottom if specified.

6.2 Switch boxes and Outlet boxes:

Switch boxes to receive switches, socket outlets, power outlets, Telephone outlets and fan regulators etc. shall be 16 SWG cadmium plated GI/MS boxes as

manufactured by the switch manufacturer for erection of plate of modular type switches.

The depth of the switchboard boxes shall be 50 mm and the size shall be selected so as to accommodate required number of switches, sockets and fan regulators without overcrowding the box.

6.3 Fan Regulator:

Fan regulators shall be incorporated in the front plate of switchboard and shall from a single unit under one front plate for switches erected on GI boxes.

7 Cables

7.1 All cables / wires used for internal wiring shall be PVC insulated single core stranded conductor (FRLS) as specified and of 1100 volts grade and with copper conductors.

7.2 The conductors shall be plain annealed circular copper conductors. The minimum number and diameter of wires for circular stranded conductor shall be as per relevant IS specifications. The insulation shall be PVC compound complying with the requirements of IS specifications and the thickness of PVC insulation shall be as set out in the relevant standards.

7.3 All wires shall be colour coded as follows.

Single phase	:	Red
Three phase	:	Red, Yellow and Blue
Neutral	:	Black
Earth	:	Green on Green/Yellow (insulated)
Control (if any)	:	Grey

7.4 The wires shall be supplied in sealed coils of 100 Mts length and bear the manufacturers name, trademark, ISI mark, voltage grade etc.

7.5 Bunching of cables:

a Wires carrying current shall be so bunched in the conduit that the outgoing and return wires are drawn into the same conduit. Wires originating from two different phases shall not be run in the same conduit.

b. The number of insulated wires/cables that may be drawn into the conduits shall be as per the following table. In any case conduits having less than 20 mm dia shall not be used.

c. Bunching of cables in conduits:

Max permissible no. of 1 core cables that may be drawn through different conduits:

Cable size (sq.mm)	Size of conduits (in mm)			
	20	25	32	40
1.5 (stranding)(22/. 3)	7	15	24	-

2.5 (36/. 3)	5	11	17	-
4.0 (56/. 3)	4	8	13	-
6.0 (	2	4	6	7
16.0	-	3	4	6

8. Drawing of conductors:

8.1 No wire shall be drawn into any conduit, until all work of any nature that may cause injury to wire is completed. Care shall be taken in pulling the wires so that no damage occurs to the insulation of the wire. Before the wires are drawn into the conduits the conduits shall be thoroughly cleaned of moisture dust and dirt or any other obstruction by forcing compressed air through the conduits. The drawing and joining of copper conductor or wires shall be executed with due regard to the following precautions.

8.2 While drawing insulated wires into the conduits, care shall be taken to avoid scratches and kinks, which may cause breakage of conductors. There shall be no sharp bends in the conduit system.

8.3 Insulation shall be shaved off for a length of 15 mm at the end of wire like sharpening of a pencil and it shall not be removed by cutting it square or ringing.

8.4 Strands of wires shall not be cut for connecting to the terminals. The terminals shall have adequate cross section to take all the strands.

8.5 All looped joints shall be soldered and connected through terminal block/connectors. The pressure applied to tighten terminal screws shall be just adequate, neither too much nor too less.

8.6 Conductors having nominal cross-section area exceeding 2.5sq. mm shall be provided with crimping type cable sockets.

8.7 At all bolted terminals, brass flat washer of large area and approved steel spring washers shall be used. Brass Nuts & Bolts shall be used for all connections.

8.8 Only certified wiremen and cable jointers shall be employed to do jointing work.

8.9 For all internal wiring PVC insulated wires of 1100 volts grade shall be used. The sub-circuit wiring for point shall be carried out in looping system and no joint shall be allowed in the length of the conductors.

8.10 General wiring installation shall be as under.

a. Sub-main wiring
Wiring from meter room or main panel board to the distribution boards.

b. Circuit wiring
Wiring from DB's to point control boxes for lighting fan 6A sockets call bells etc. and from DB to the power sockets in the case of power wiring.

8.11 The sub-main wiring shall be either three phase, four wire or single phase, two-wire system. Each sub-main wiring circuit shall also have its own earth

continuity wire. The no and size of earth continuity wire shall be as per detailed drawings or as specified.

8.12 The circuit wiring shall generally be in single-phase system. However a maximum of 3 to 4 single-phase circuits belonging to the same pole/phase could be installed in the same conduit or raceway Each circuit wiring shall be provided with suitable earth continuity conductor as per standard specifications.

8.13 Not more that 10 light points/fan points shall be grouped on the one lighting circuit. The load per circuit shall not exceed 800 watts. The minimum size of conductor for wiring of lighting circuit shall not be less than 1.0 Sq.mm. Power circuit wiring shall not have more than two sockets connected to one circuit.

9. Joints in wiring:

The wiring shall be by looping system, and hence all joints shall be made at main switches, distribution boards, socket outlets, lighting outlets and switch boxes only. No joints shall be made inside conduits and junction boxes. Conductors shall be continuous from outlet. For unavoidable joints due to any reason prior permission shall be obtained before making such connection. Joints by twisting conductors are prohibited.

10. Switches, sockets and accessories:

10.1 Switches(Modular):

a. Switches shall confirm to IS 3854, IS 1293, IS 6538 and IS 4615. Switches shall be single pole, single or two-way as shown on the drawings.
b. The switches shall be rocker operated with a quite operating mechanism with bounce free snap action mechanism enclosed in an arc resistant chamber. .
c. Switches at the same location shall be ganged to form a single unit under one cover plate. Where fan regulators are to be provided with the switchboards the same shall be incorporated.

10.2 Sockets(Modular):

a. The sockets shall conform to IS 1293. Each socket shall be provided with control switch of appropriate rating. The sockets shall be molded type, rated for 250 volts, and either of full 6 Amp or 16 Amp, capacity, as mentioned.
b. Sockets shall be of three-pin type, the third pin being connected to earth continuity conductor. The socket shall be flush type. The sockets installed in machine room plant room or wet/damp area shall be metal clad weatherproof type. The socket shall have fully sprung socket contacts and solid brass shrouded terminals to ensure positive electrical connections.
c. If specified, the sockets shall be provided with automatic shutters, which open only when earth pin of the plug inserts in the socket and provided with three pin plug top suitable to the socket and of the same make as socket.
d. All 6A sockets, 16A switched sockets, DP switches, connector boxes etc. shall be as specified and with the finishing and make same as lighting switches. These shall be erected on the boxes as specified in drawings.

10.3 Lamp holders, Ceiling roses etc.:

Accessories for light outlets such as lamp holders, ceiling roses, etc. shall be white in colour and in conformity with requirements of relevant IS specification. Ceiling roses shall be 3-plate type wherever specified. Angle and batten holder shall be erected on the junction boxes erected on wall/ceiling.

10.4 Installation of switch, socket and accessories:

a. Connection to be made only after testing the wires for continuity /cross phase etc with the help of a megger.
b. The switch controlling the light point or fan shall be connected on to the phase wire of the circuit and neutral shall be continuous, having no fuse or switch installed in the line except at the D.B. the third pin of the socket shall be connected to the earth continuity conductor of the circuit.

c. Outlets shall be terminated into ceiling rose for ceiling mounted points. For other wall light points the outlets shall be connected into an angle holder. For wall plug sockets the conductors may be terminated directly into the switches and sockets.

11. Earthing:

All earthing systems shall be in accordance with IS 3043 code of practice for earthing the type and size of earthing wire shall be as specified separately and in BOQ and drawings.

12. Testing and commissioning of installation:

Before a completed installation is put into service, the testing of the installation shall be done as per IS 732.

12.1 Insulation Resistance:

a. The insulation resistance shall be measured by applying 500 volt. megger with all fuses in places, circuit breaker and all switches closed.
b. The insulation resistance of an installation shall be required to have a value greater than one-mega ohms.
c. The insulation resistance shall be measured between.
   1 Earth to phase
   2 Earth to Neutral
   3 Phase to Neutral

12.2 Earth continuity conductors shall be tested for electrical continuity and the electrical resistance of the same along with the earthing lead but excluding any added resistance or earth leakage circuit-breaker, measured from the connection, with the earth electrode to any point in the earth continuity conductor in the completed installation and shall not exceed one ohm.

12.3 Polarity or single pole switches:

a. A test shall be made to verify that every non-linked, single pole switch is connected to one of the phase of the supply system.

b. In, a two-wire installation a test shall be made to verify that all non-linked single pole switches have been fitted in the same conductor throughout and such conductor shall be labeled or marked for connection to an outer or phase conductor or to the non-earthed conductor of the supply.

c. In a three wire or four wire installation a test shall be made to verify that every non-linked single pole switch is fitted in a conductor and which shall be labeled or marked for connection to one of the outer or phase conductor of the supply.

SECTION -III

MCB DB, MCB and RCCB

1. Miniature Circuit Breaker Distribution boards:

1.1 Miniature circuit breaker distribution boards shall conform to IS 2675, IS 8623 and shall be suitable for operation on three phase, 4 wire, 415 V, 50 Hz, AC supply or single phase 2 wire 230 V 50 Hz, AC supply.

1.2 The MCB distribution board shall be in sheet steel enclosures with removable type cover with additional door for protecting accidental operation.

1.3 Enclosure and door shall be made out of CRCA sheet steel and powder coated and of approved shade. The interior shall be off white finish. The DB shall be totally enclosed with dust and vermin proof construction and shall be of domestic pattern. The DB boxes shall be as supplied by the original manufacturer.

1.4 Where distribution boards are specified to be complete with an isolator as incomer, the isolator shall be double pole for SP and N distribution boards and 4 pole for TP and N distribution boards.

1.5 Where distribution boards are specified to be complete with MCB + ELCB as incomer, the MCB + ELCB shall be double pole for SP and N distribution boards and 4 pole for TP and N distribution boards.

1.6 Bus bars shall be tinned copper. The internal connections in the DB shall be by using stranded copper conductor, PVC insulated wire with copper lugs crimped at both ends. Neutral busbar and earth busbars shall also be provided in the enclosure. Neutral busbar shall have equal rating of phase busbars.

1.7 Distribution boards shall be provided with circuit identification by means of directory on the from cover. Upon completion of the works, the contractor shall provide and fix accurate framed circuit lists for all distribution boards. These shall consist of Perspex envelopes, fixed securely by an approved method on the inside face of each distribution board front cover into which shall be inserted a

neatly typed list of circuits, indicating the number of circuits, phase, cable, size, number of points connected, circuit rating and the loading.
The contractor, shall also provide and fix by means of brass screws tapped into the D.B. cover, labels, with black letter on a white background for all distribution boards, MCB + ELCB, Isolator etc. The engraving on the labels and the inscription on the circuit lists shall be approved by the Consultants before the work is carried out.

1.8 All incoming terminals shall be fully shrouded.

1.9 The conduit entry plates shall be removable type and shall be provided at top and bottom. All the conduits shall be properly terminated using glands, grips, check nuts, female adapters with bush etc.

1.10 Wiring shall be terminated properly using crimping type copper plugs/sockets. Identification ferrules shall be provided on all wires.

1.11 Two No. earth terminals shall be provided on each Distribution Board.

Recessed mounted DB shall be erected in the chase/cut portion of the wall. The cutting or the walls shall be done while constructing the wall and shall be of adequate size to comfortably accommodate the DB. The cut portion shall be smoothened and made plain and shall be fine finished. The DB shall be fixed in this chased portion with suitable clamps and bolts. The top cover of the DB cabinet shall be projecting out of the wall surface and free from any obstruction so as to open the same smoothly.

2. Miniature Circuit Breakers:

2.1 MCBs shall be manufactured in accordance with IS 8828 having a short circuit breaking capacity category 10000 Amps at both 240 volts 50Hz. and 240/415 V, 50 Hz and complying with the test requirements for both reference calibration temperatures of 20 degree C and 40 degree C. (10kA as per IS/IEC 60898-1-2002(0.5-63A))

2.2 All miniature circuit breakers shall be rated to withstand the fault currents of the circuits they protect without causing any interference in any other protective device associated with the distribution system. At the same time the design of the circuit breakers shall be such that, it will protect the circuit for which it is intended and not cause or allow other protective devices to operate when fault conditions apply.

2.3 Miniature circuit breakers shall be capable of carrying its full rated current continuously without tripping out.

2.4 All the miniature circuit breakers shall be fitted with a magnetic undelayed tripping mechanism.

3. Residual Current Operated Circuit Breakers (RCCB)

3.1 RCCBs shall be manufactured in accordance with IS 12640 and IS 8828 having a short circuit breaking and earth fault protection up to 10 KA at both 240 Volts 50 Hz and 240/415 V, 50 Hz and complying with the test requirements as per IS 2640.

3.2 All RCCB shall be high sensitive and calibrated rating. This means that a 30 mA sensitivity RCCB should trip when the residual current is in the range of 15 to 30 mA and a 300 mA RCCB should trip when the residual current is in the range of 150 to 300mA.

3.3 The RCCBs shall be truly current operated, which means that it shall be totally independent of the main voltage for tripping. RCCB must operate for nominal voltage well below the maximum safe value of 10 volts. RCCB shall interrupt the circuit within 30 millisecond at a leakage current of 30 mA.

3.4 RCCB shall be provided with a neutral advance mechanism. RCCB shall be functioning even in the event of failure of neutral and/or any one or two of phase supply conductor. RCCB shall be provided with trip free mechanism ensuring that the device cannot be reclosed / resent if the fault persists. RCCB shall be functioning even in the case of interchange of load and supply side connections.

3.5 Test button shall be provided to check he correct operation of the unit.

3.6 RCCB shall be designed for a very long life of a minimum of 20,000 operations and shall be capable of withstanding inrush current of 4to 8 times the rated current. For the proper functioning the RCCB should not require any connection of earthing on the device.

3.7 The device should have high tripping accuracy of less than 5% of rated tripping current. The RCCB shall be provided with clear indication to show whether the tripping is due current leakage or overload/short circuit.

SECTION - IV

Earthing

1. Scope:

This specification covers supply of necessary materials, and erection at site, of complete earthing system including earth pits at the locations indicated, earth conductors from earth pit to the respective equipments, switchgears, pillars etc. and making connections, testing at site, commissioning and handing over.

2. Applicable Standards:

The entire work of earthing system, shall confirm to IS 3043, Indian Electricity Act and Rules and relevant regulations.

3. General requirements:

3.1 The earthing shall generally be carried out in accordance with the requirements of Indian Electricity Rules 1956 as amended from time to time and relevant regulations. Following IE rules are particularly applicable. IE Rule Nos. 32, 51, 61, 62, 67, 69, 88(2) & 90.

3.2 All earth connections shall be carefully made, visible for inspection, and the testing of individual earth electrode shall be possible.

3.3 All materials, fittings etc. used in earthing shall conform to IS specifications and in the absence of which the approval of competent authority shall be obtained.

3.4 The earthing electrode shall be at a minimum distance of 1.5 metres away from the outer face of the building wall. A minimum clearance of twice the depth of the electrode shall be maintained between two earthing stations.

3.5 A brick masonry chamber to facilitate easy identification and for carrying out periodical tests and inspection shall be constructed on top of the earth pit.

3.6 All metal conduits, trunkings, cable sheaths, HT and MV switchgears, Transformers, distribution boards, meters, light fixtures, fans, and all other metal parts forming part of the work shall be bonded together and connected to earthing network as specified.

3.7 Earthing system shall be mechanically robust and the joints shall be capable of retaining low resistance even after passage of fault currents.

3.8 Joints shall be soldered, tinned and double rivet. All the joints shall be mechanically, electrically continuous and effective. Joints shall be provided against corrosion.

4. Earth Electrodes:

4.1 The materials of earth electrode and earth conductors shall be galvanized iron unless specified otherwise in Bill of Quantities, specifications or drawings.

4.2 The earth electrodes shall be free from paint, enamel, grease etc.

4.3 The earth electrode shall be embedded as far as practicable in a moist soil and below permanent moist level.

4.4 The earth electrode shall not be installed in the proximity of a metal fence.

5. Types of earth electrodes:

The earth electrodes shall be either a pipe electrode or plate electrode, the details of which are as given in the following sections of specifications, drawings and BOQ.

6. Pipe electrode:

6.1 Pipe electrode shall consist of 2.5 meter long single piece G.I. pipe of min. 40 mm dia, as specified and shall be cut tapered at the bottom. 12mm dia. holes shall be drilled with 75 mm spacing between the holes and in a staggered manner as indicated in IS 3043.

6.2 The electrode shall be buried vertically in a specially prepared earth pit of size 35 cm x 35 cm and the earth pit shall be filled with alternate layers of charcoal, salt and fine washed sand for a minimum thickness of 150 mm. A funnel with wire mesh inside shall be fixed to the top of the GI pipe for watering purpose.

6.3 A masonry chamber with a cast iron cover hinged to the cast iron frame embedded in the top portion of the masonry shall be constructed on top of the GI pipe to house the funnel and the earth connection. The approximate size of the chamber shall be 300 mm x 300 mm and 300 mm deep.

6.4 The earth conductor from electrode shall be taken out of the masonry chamber through a protecting pipe embedded in the masonry.

6.5 The top of the masonry chamber shall be 50 mm above the finished ground level.

6.a Plate electrode:

6.a1 Plate electrode shall consist of GI or CI Plate of size 1200X1200X12mm as specified.

6.a2 The electrode shall be buried vertically in a specially prepared earth pit of size 1500x1500x600mm, earth pit shall be filled with alternate layers of charcoal, and fine washed sand for a minimum thickness of 150 mm upto 150mm above the plate. A funnel with wire mesh inside shall be fixed to the top of the GI pipe for watering purpose.

6.a3 A masonry chamber with a cast iron cover hinged to the cast iron frame embedded in the top portion of the masonry shall be constructed on top of the GI pipe to house the funnel and the earth connection. The approximate size of the chamber shall be 450mm x 450 mm and 450 mm deep.

6.a4 A test joint shall be provided mounted on the watering pipe below the funnel(the size of strip as per standards in IS 3043) with drilled holes for connecting earth leads, earth interconnection and lead from electrode.

6.a5 The earth lead and interconnection shall be based on the fault level calculation and all electrodes shall be interconnected.

7. Earth conductor:

All earthing conductors shall be or high conductivity copper and or GI as specified and shall be protected against mechanical injury or corrosion. The connection of earth continuity conductors or earth bus and earth electrode shall be strong and sound and shall be rigidly fixed to the walls, cable trenches, cable trays or conduits and cables by using suitable clamps made of non-ferrous metals.

8. Testing:

On completion of the entire installation, the earthing network shall be tested for their resistance to earth in accordance with IS 3043. All meters, instruments & about required for the test shall be provided by the contractor. The test results shall be submitted in triplicate to the owners for approval. The following tests shall be conducted.

a. Earth resistance of electrodes
b. Impedance of earth continuity conductors.
c. Effectiveness of earthing.

SECTION - V

HT & LT (1.1 KV Grade) Cables

1. Scope:

This specification covers supply, testing at works, supply at site, installation, termination, jointing, connection, testing at site, commissioning and handing over of11KV and 1.1 KV grade Cables.

2. System:

The 1.1 KV grade cables are to be used in underground distribution system with normal system voltage of 415 V, 50 Hz, 3 phase, 4 wire system.

3. Applicable standards:

Cables to be supplied under this specifications shall be with Copper or Aluminium conductor as specified in drawing or Bill of Quantities, PVC insulated and PVC sheathed, armored and with an outer PVC protective sheath, heavy duty type and shall confirm to.

IS 1554 (Part 1) 1976.	PVC insulated electric cables.
IS 1753:	Aluminium conductors for insulated cables
IS 3961:	Recommended current ratings for cables.
IS 7098(Part 2) 1985:	11kV XLPE cables

4. General requirements:

4.1 All cables shall be new without any kinks or visible damage. The manufacturers name, insulating material, conductor size and voltage class shall be marked on surface of the cable at distance not exceeding 1M.

4.2 Procurement of cables shall be on the basis of the actual site measurements and the quantities given shall be regarded as a guide. Before procurement of the cables, the contractor shall submit the cable lengths and after approval of the same place orders for the cables.

4.3 Cables shall be tested at factory as per IS requirement. The tests shall incorporate routine tests, type tests and acceptance test. The certificate for type test shall be produced by the Contractor.

4.4 The cables shall be one of the makes mentioned in the list of approved materials and with ISI mark.

4.5 The cables shall be supplied and delivered at site in original cable drums with manufacturer's name, cable size, type and length all clearly indicated on each drum.

4.6 The unit rate shall include loading, unloading, transport, storage, handling, unwinding the cable from cable drums and laying in the cable trench or erected on cable trays etc.

4.7 The cables shall be laid by skilled and experienced labour.

4.8 Where the cable route intersects roads, streets or pathways, RCC spun pipes shall be laid in the trenches to serve as cable ducts. The pipes shall be joined by RCC spun collars. The RCC pipes shall project at least 150 mm on either side of road crossing.

4.9 The cable loops shall be kept at both ends of the cable length Minimum 3 metres long loop shall be provided.

4.10 The contractor shall take care to see that the cables received at site are apportioned to various locations to ensure maximum utilization and cable joints are avoided. This apportioning shall be got approved before the cables are cut to lengths. Straight joints are permitted only under exceptional circumstances.

5 Storage and loading, unloading of cables:

5.1 Cable drums shall not be stored one above the other. Sufficient space between cable drums shall be left for air circulation and the drums shall stand on battens placed directly under the flanges.

5.2 Cable drums shall be stored preferably on a plain ground without having any hard stones or any other sharp materials projecting above the ground surface. The drums shall be stored preferably in the shed or otherwise they shall be covered by tarpaulin.

5.3 Drums shall be stored and kept in such a way that bottom cable end does not get damaged.

5.4 Drums shall be rotated only in the direction marked on the drum.

5.5 Loading and unloading shall be done with material handling equipments only.

6 Cable trenches (excavated):

6.1 The cable trenches shall be excavated 75 cms below the finished ground level and shall have a minimum width of 350 mm for laying of single cable. When more than one cable are laid in the same trench, the width of the trench shall be increased such that the spacing between the cables is 200 mm and the end cables are at minimum 100 mm from the side of the trench. At the turning of the cable route the trench shall be dug with radius equal to 15 times the cable diameter. For 11kV cables, the trench depth is 1.2mtr.

6.2 The trenches shall be cut square with vertical side walls and with uniform depth. Suitable shoring and propping may be done to avoid caving in of trench walls. The floor of the trench shall be rammed and leveled. The bottom of the cable trench shall be prepared with 100 mm sand bed for laying the cables.

6.3 The cables shall be laid in trenches over the rollers. After the cable is laid and straightened it shall be covered with sand, and bricks shall be placed on top and at the side of the cable.

6.4 Wherever specified, half round RCC pipes shall be placed above the cables.

6.5 The cable trench then shall be refilled with excavated materials after removing the stones and other sharp materials and the refilled materials shall be compacted with light ramming.

6.6 Approved Cable markers made of Aluminium or CI with 15 cms crown shall be provided along the route of cables at a spacing 0f 25 - 30 meters and also at both ends of crossings or at the cable turning point. The class, type, No. of cables shall be indicated on markers.

6.7 Cable shall be laid in Hume pipes at all road crossings and in GI pipes at the wall entries or at the crossing of the drains/gutters.

7 Cable Termination. :

7.1 All cable terminations shall have tinned copper/aluminium compression lugs.

7.2 Cable termination shall be done in cable end box or in terminal box or in pillars etc. The end terminations shall be insulated with a minimum of six half lapped layers of PVC tape.

7.3 Cable terminations are to be made with flange type brass cable glands so as to grip inner and outer PVC sheaths and also the cable armour. Cable gland shall be bonded to the earth.

7.4 The cable conductor ends are to be connected by crimping tinned heavy duty copper lugs. Hydraulic crimping tool shall be used.

7.5 Every connection at a cable termination shall be mechanically and electrically sound and protected against mechanical damage and any vibration liable to occur shall not impose any harmful mechanical damage to the cable conductor.

SECTION - VI

Medium Voltage Distribution Panel Boards

1 Scope:

This section shall cover supply, assembly, installation, connection, testing and commissioning of medium voltage distribution panel boards as described in this specifications, drawings and schedule of quantities.

2 System:

All the medium voltage distribution panel boards shall be suitable for operation on three phase, 4 wire or single phase, 2 wire with normal system voltage of 415.240 volts, 50 Hz, A.C. supply with solidly grounded neutral system.

3 Weather condition at site:

The panel boards shall be suitable for continuous operation and designed to withstand heaviest conditions at site, which is a coastal area.

a) Temperature range: 40 to 45^{o} C
b) Relative humidity : 50 to 100%
c) Weather: Dusty

4 Applicable IS Standards:

The panel boards to be supplied under this specification shall confirm to latest editions of relevant Indian Standards and Indian Electricity rules and regulations. The following Indian Standards shall be complied with.

IS 4237 : General requirements for switch gear and control gear for voltage not exceeding 1000 V.

IS 2208 : HRC cartridge fuse links upto 610 V.

IS 2705 : Current transformers

IS 1248 : Electrical Indicating Instruments.

IS 375 : Switch gear bus-bars, main connection and auxiliary wiring, marking and arrangement for.

IS 2147 : Degree of protection provided by enclosures for low voltage switch gear and control gear.

IS 2675 : Enclosed distribution fuse boards and cutouts.

IS 2557 : Danger notice plates.

5 General

5.1 Shop drawing:

Prior to fabrication of the panel boards, the contractor shall submit for the approval of the Engineer in charge the shop /vendor drawing and design calculations indicating type, size, short circuit rating of all the electrical components used, busbar size, internal wiring size, panel board dimension, colour, mounting detail etc. The contractor shall submit manufacturer's catalogues of the electrical components installed in the panel boards.

5.2 Inspection:

At all reasonable times during production and prior to transport of the panel boards to site, the contractor shall arrange and provide all the facilities at manufacturer's plant for inspection and testing and any state inspection agreed upon.

5.3 Test certificates:

Testing of panel boards shall be carried out at factory or at site as specified in Indian Standards in the presence of Engineer in charge. The test results shall be recorded on prescribed forms. The test certificates for the test carried out at factory or at site shall be submitted in duplicate to the Engineer in charge for approval.

6 Cubicle type panel boards:

6.1 Construction:

6.1.1 Structure:

The panel boards shall be metal enclosed sheet cubical, compartmentalized suitable for indoor or outdoor installation having dead front, floor mounting type. All M.S. sheets used in the construction of panel boards shall be 14 SWG thick for main panel and 16SWG for other panels unless specified otherwise in the item 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 ground off and welding pits wiped smooth with plumber metal.

The panel boards shall be totally enclosed, completely dust and warm proof Gaskets between all adjacent units and beneath all covers shall be provided to render the joints dust proof. All doors and covers shall be lockable and fully gasketed with foam rubber or neoprene rubber strips.

All panel and covers shall be properly fitted and secured with the frame, and holes in the panel correctly positioned. Fixing screws shall enter into holes tapped into an adequate thickness of metal or provided with bolt and nuts. Self-threading screws shall not be used in the construction of panel boards. Suitable base channels (min size 75 mm x 75 mm x 5 mm thick) shall be provided at the bottom. A

Clearance of 300 mm between the floor of the panel board and the bottom of the lower most units shall be provided. Panel boards, if necessary shall be preferable arranged in multitier formation. The panel boards shall be of adequate size with a provision of spare space (as jointly decided with EIC) to accommodate possible future additional switchgear. The size of the panel boards shall be designed in such a way that the internal space is sufficient for hot air movement, and the electrical component does not attain temperature more than 40 degree Celsius. Opening for natural ventilation shall be provided and shall have screens or grills made of brass or stainless steel wire mesh. Silica gel bags shall be placed at the bottom of every compartment. This requirement is in addition to space heater.

The panel boards shall be provided with removable sheet steel plates at top and bottom with knockout holes of appropriate size and number in conformity with the number, and size of incoming and outgoing conduits /cables.

The panel boards shall be designed to ensure maximum safety during operation, inspection, connection of cables, maintenance and repairs etc. with busbar system energised. Means shall be provided to prevent shorting of power and /or control terminals due to accidental drop of maintenance tools etc. inside the panel board. Partitions between feeder compartments, busbar chamber, cable alleys, vertical panels etc. shall be provided to take care of this aspect. The panel boards shall be sufficiently rigid to support the equipment without distortion under normal and short circuit condition; they shall be suitably braced for short circuit duty.

For buses and cables, access shall be limited from front and top only. All other equipment shall be mounted on the front side, (unless specified otherwise for any specific panel) and shall be accessible from the front. All joints and connections shall be made by cadmium plated high tensile steel bolts nuts and washers secured against loosening. The erection switchboards shall be in conformity with IE 51 (1) c

It shall be possible to insert any new cable and to connect all load side wiring with the busbar energised, without any special precautions. Opening of the busbar chamber shall be possible with special tools only. Indication lamps and meters shall not be fitted on the door of the switches or busbar chamber cover.

6.1.2 Protection class:

All the outdoor panel boards shall have protection class of IP 55 The complete board shall be double jacketed with insulation material to withstand outdoor temperature. All the indoor panel boards shall have protection class IP 52

6.1.3 Circuit compartments:

Each switch fuse units and meters shall be housed in a separate compartment and shall be enclosed on all sides. Sheet steel hinged lockable door shall be duly inter locked with breaker/switch fuse units in “ON” and “OFF” position. However it shall be possible to bypass this interlock for inspection purpose.

6.1.4 Instrument compartment:

Separate and adequate compartment shall be provided for accommodating instruments, indicating lamps, control contactors /relays, and control fuses etc. These components shall be accessible for testing and maintenance without any danger of accidental contact with live parts of the circuit breaker/switch fuse units, busbar and connections.

6.1.5 Busbar:

The busbars shall be of three-phase four wire system with separate neutral and earth bar. The busbar and interconnection between busbars and various components shall be with high conductivity, hard drawn, electrolytic copper strips.

The busbars shall be of rectangular cross section designed to withstand full load current for phase busbars and half rated current for neutral busbars and shall be extensible on either side. The busbar shall have uniform cross-section through out the length. The rating of the busbars shall be as specified in BOQ and/or drawings.

The busbars and interconnections shall be insulated with color-coded insulation tapes/covers. The busbars shall be supported on unbreakable, non-hygroscopic insulated supports at sufficiently close intervals to prevent sagging and shall effectively withstand electromagnetic stresses in the event of short circuit. The busbars shall be housed in a separate compartment. The busbar shall be isolated with 3 mm thick hylam sheet to avoid any accidental contact. All bus bar connection shall be done by drilling holes in busbars & connecting by chromium plated brass bolt and nuts. Additional cross section of bus bars shall be provided in all distribution boards to cover up the holes drilled in the busbars. Spring and flat washers shall be used for tightening the bolts. All interconnections between busbars and circuit breakers/switches and between circuit breakers/switches and cable terminals shall be through solid copper strips of proper size to carry full rated current. These strips shall be insulated with insulating tapes/covers.

6.1.6 Terminals:

The outgoing terminals and neutral link shall be brought out to a cable alley suitably located and accessible from the panel front. The current transformers for instruments metering shall be mounted on the terminal blocks. No direct connection of incoming or outgoing cables to internal components of the panel board is permitted. Only one conductor may be connected in one terminal. Adequate no of spare terminals of required size shall be left in each compartment.

6.1.7 Wireways:

A horizontal wire way with screwed covers shall be provided at the top to take interconnecting control wiring between different vertical sections.

6.1.8 Cable compartments:

Cable compartments of adequate size shall be provided for easy termination of all incoming and outgoing cables entering from bottom or top. Adequate proper supports shall be provided in the cable compartments to support cables. All outgoing and incoming feeder terminals shall be brought out to terminal blocks in the cable compartment.

6.1.9 Earthing:

Copper earth bars shall be provided for the entire length of the panel. Size of the earth busbars, unless specified otherwise in BOQ, shall be 25mm x 3mm horizontally and 25 mm x 3mm vertically in cable alleys etc. Provision shall be made for connection from this horizontal earth bar to the earth pit on both side of panel board. The earth continuity conductor of each incoming and outgoing feeder shall be connected to the vertical earth bar.

All non-current carrying parts and the framework of panel board shall be connected to this earth bar. All doors and movable parts shall be connected to earth bus with flexible copper connections. Armour of the cable shall be properly connected with earthing clamp, and the clamp shall be bonded with the earth bar.

6.1.10 Danger notice plates:
Danger notice plates with symbol as per IS shall be provided on panel boards.

6.1.11 Fuse puller etc:
One set of fuse puller (for various amps of fuses), panel keys and special tools etc. shall be supplied with each panel board.

6.2 Indicating lamps

Panel mounting type low power consumption solid state lamps suitable for specified voltage shall be used Lamps shall be provided with suitable current limiting resistors. Lamps shall be provided with translucent lamp covers to diffuse light Lamps shall be provided with bayonet cap bulbs.

6.3 Measuring instruments:

All measuring instruments shall be square pattern moving from 90 deg. scale, 96mm x 96mm, flush mounting type. Instrument shall be of accuracy class 1 as per IS 1248 Ammeters for motor and other feeders shall be graduated for full load current of motor with a compressed scale at the end for at least 6 times full load current. The KW meter and PF meter shall be suitable to measure unbalance loads on 3-phase 4 wire system PF meter shall be in 0.5-1- 0.5 range.

6.4 Installation:

The panel boards shall be installed at the location as indicated in the drawings. The contractor shall submit for approval a shop drawing indicating room size, panel size and method of installation prior to installation.
The cubicle type panel board shall be installed on suitable foundation. Foundation shall be as per the dimensions supplied by the panel manufacturer. The foundation shall be flat and level. Suitable grouting holes shall be provided in the foundation. Suitable MS base channel shall be embedded in foundation on which the panel can be directly installed. If the panel is provided with an angle iron pedestal or base plate the same shall be grouted firmly in the floor. The panel boards shall be properly aligned and erected in plumb and bolted to the foundation by bolt parallel to the walls.

After installation of the panel boards, various components of the boards shall be checked and be put in working order. The cables laid through cable trench or on cable trays/racks etc shall be terminated on the bottom plate or top plate as the case may be by using Siemens type brass compression glands. The individual cables shall then be led through the panels to the required feeder compartments for necessary terminations. The cables shall be clamped to the supporting arrangement. The switchboard earth bus shall be connected to the local earth grid. Connection of cables shall be by crimping type Cu /Al lugs using hand operated or hydraulic crimping tool as per cable sizes.

6.5 Testing:

1) Testing at factory:
   Panel boards shall be inspected at factory at pre-assembly stage and any modifications or changes as suggested shall be incorporated. The panel boards shall be again inspected and tested at the factory after assembly of all components and completion of all inter-connections and wiring. The tests shall include all routine and type tests as per relevant ISS.

2) Testing and pre-commissioning checks at site:
   Panels shall be commissioned only after the successful completion of the following tests. The tests shall be carried out in the presence of Engineer in charge.

6.6 Precommissioning checks

1) Check all panels are aligned in line and property erected in plumb.
2) All withdrawable portions shall be capable of smooth extraction and isolation
3) All main and auxiliary bus bar connections shall be checked and tightened.
4) All wiring terminations and bus bar joints shall be checked and tightened.
5) Wiring shall be checked to ensure that it is according to the drawing.
6) Before fitting the covers, all chambers, compartments, cable alleys etc. shall be checked for complete cleanliness and removal of foreign matter if any, particularly the tools used for erection, cut pieces of cable armour etc. Covers shall be properly fixed with all fixing screws in places.
7) All mechanical interlocks shall be checked and all fuses and links shall be inserted.
8) Earthing connections shall be checked.
9) Operational checks on all circuit breakers or switchgear shall be carried out, both mechanically and electrically to check that correct indications are provided for closed and open positions.
10) The panel boards will be, if required, subjected to Inspectorate inspection, checking and testing at the site and the contractor shall arrange to provide Inspectorate seals wherever required.
11) The panels shall be checked to ensure that moisture ingress has not taken place during transit and storage.

SECTION – VII

SPECIFICATIONS FOR INSTALLATION TESTING AND COMMISSIONING OF UNITISED SUB STATION

01. SCOPE OF CONTRACTOR'S WORK

The unitised substation will be directly procured by the Client and supplied to the Contractor scope of Contractor's work will include.

a Receiving the Unitised substation at site from the carriers and unloading(but less unloading).
b All transporting and handling of the board at site
c Safe storage at site.

d Inspection of the board immediately on commencement of work at site/receipt of board at site whichever is earlier and reporting of any defect/damage/discrepancy/shortage to the Client within seven days week thereafter for necessary action.

e Repacking of the Unitised substation and components after inspection provided and as per the manufacturer's instruction and in conformity with the relevant codes, rules and regulations.

f Assembly and Installation of the Unitised substation at the location provided and as per the manufacturer's instructions and in conformity with the relevant codes, rules and regulations.

g Supply of accessories required for erection such as bolts, nuts, washers, consumables, etc Pre-commissioning and trial running of the board.

h Commissioning and trial running of the board.

i Contractor shall be responsible for the safety of all the equipment received by him till these are tested, commissioned and handed over by Contractor to the client. Contractor shall also be responsible for any defect/damage that may be caused to the equipment due to defective handling/storage/erection/testing /commissioning. For transporting and handling of the transformers and accessories at site proper tools, tackles and transporting vehicles shall be used so that the equipment do not suffer any damage during the transporting and handling.

02. DATA FOR UNITISED SUB STATION

Details of the Unitised substation are furnished under 'SECTION 7: Data for Unitised Substation.

03. INSPECTION ON RECEIPT

Immediately on receipt of the switchboard at site, it shall be unpacked and examined for any defect/damage/discrepancy/shortage.

It is found that the equipment has suffered any defect/damage/discrepancy/shortage; the details shall be reported in writing to the client so that the client can initiate necessary action. It is highly imperative that such a report is given within seven days of receipt of the equipment at site so that timely action can be taken to lodge the necessary insurance claim. If the client is not able to arrange for the necessary insurance due to non-receipt of timely report from the contractor, the Contractor shall be liable to reimburse the expenditure incurred by the Client for the necessary repair/replacement/supply.

04. ASSEMBLY AND ERECTION

The Contractor shall ensure that he receives the complete documentation including the following relating to the switch board:

a General arrangement drawing
b Schematic wiring diagrams
c Manufacturer's instruction for installation and operation of the switchboard.

The corrections of construction of the foundation and cable duct shall be checked before commencing the erection of the Unitised substation. The level of the foundation shall be checked and corrected as required

The erection of the Uunitised substation shall be carried out in accordance with the manufacturers instructions. All the different parts of the switchboard shall be assembled and installed in the sequence recommended therein.

All the meters, relays, indicators, control devices and other accessories shall be mounted in position and internal wiring and connections carried out as per drawings furnished by the nanufacturer.

Wherever manufacturer's instructions are not available, the work shall be carried out conforming to the best engineering practice. The entire erection work shall be carried out in a manner approved by Client.

EARTHING

Earthing of the Unitised substation shall be carried out in accordance with the "Specifications for earthing" attached hereto.

After completing the assembly and erection all the non-current carrying metal part of the Unitised substation shall be connected to an earth bus of adequate size installed at the rear or bottom of the unitised substation. This earth bus will be connected at its ends to the main earth bus installed in the cable duct.

05. PRE-COMMISSIONING CHECKS AND TESTS

The following pre-commissioning preparation, checks and tests shall be carried out by contractor in addition to the checks and tests which may be prescribed in the manufacturers instruction:

a. Visual inspection of board for complete and correct assembly internal wiring and connections and erection.
b. Checking of mechanical operations of the breakers such as closing, opening, drawing out plugging in, etc.
c. Checking of the functioning of safety interlocks, safety shutter and others safety features
d. Operational and accuracy tests on the meters by injecting suitable voltage /current into the circuits.
e. Setting of protective devices such as relays
f. Insulation resistance measurements of power circuits Insulation resistance measurements of control circuits Earth resistance of the body of the switchboard.

All tests and commissioning procedures shall be carried out in the presence of Client and the results of all the tests shall be recorded and furnished to Client.

06.ASSISTANCE BY MANUFACTURES ENGINEER

The manufacturer of the equipment will provide the assistance of their engineer to the contractor in testing and commissioning of the equipment. It shall be the responsibility of the Contractor to ensure that problems. If any, are got rectified by the manufacturer's engineer during this period. Only one visit of one or two days will be arranged for this purpose. If additional visits or increased duration is required by the Contractor, the relative expenses shall be borne by the Contractor.

To facilities expeditious commissioning of the Unitised substation the contractor shall take the following precautions.

a. The Contractor shall ensure that all the defects/damages/shortages/discrepancies are

promptly reported immediately on receipts of the equipment at site and that these are promptly attended to by the manufacturer.

b. The Contractor shall carry out pre-commissioning checks and tests on the equipment and furnish a list of all points which require repairs-'supplies/replacements to the Client at least 30 days before the anticipated date of commissioning.

SECTION 7: DATA SHEET FOR UNITISED SUBSTATION			
I. GENERAL			
01.	Short description 1 No.11 KV unitised substation with the following:		
			a – LB Switch 11 KV/630A 250MVA
02.	Line up from LHS	:	To be confirmed at the time of placement of order
03.	Approximate dimensions in mm		
	Length	:	2060mm
	Height	:	2000mm
	Depth	:	1500mm
The weight of USS is approximately 3,000kG.			
04.	Location of installation	:	Ground floor
II .SERVICE CONDITIONS			
01.	Altitude	:	Less than 1000M
02.	Ambient temperature	:	
	Maximum	:	45 degrees C
	Minimum	:	20 degrees C
03.	Relative humidity	:	95%
04.	Environment	:	tropical
05.	Installation	:	Indoor, electrically non-exposed
06.	Service voltage	:	11kV + /-12.5%
07.	Number of phases	:	Three
08.	Rated current	:	
09.	System fault level	:	13.6kAat11kV
10.	System natural	:	Solidly grounded
Ill BREAKER SPECIFICATIONS			
01.	Type	:	Air break
02,	Execution	:	Fixed
03.	Frequency of operation	:	Normal
04	Current rating	:	630A
05.	Maximum continuous voltage	:	12kV
06.	Breaking capacity	:	
	Symmetrical in kA	:	25
	Symmetrical in MVA	:	250
	At rated voltage	:	
	Asymmetrical in kA	:	As per IEC
07.	Making current capacity in kA	:	65 •
08.	Short circuit withstand capacity		
	kA at rated voltage for one second	:	25
09.	Power frequency withstand voltage (one minute) in kV	:	28
10.	Impulse withstand voltage (102/50	:	75
	micro second) in kV peak	:	

11.	Duty cycle for breaking capacity	:	O-3min-CO-3min-CO
12.	Total interruption time measured	:	55-75
	from trip coil energisation in millisecond	:	
13.	Operating mechanism Opening	:	Mechanical charged, electrical closing and electrical tripping/opening
	Closing	:	Mechanical charged, electrical dosing and electrical
14.	Trip-free feature	:	To be provided
15.	Manual trip for emergency operation	:	To be provided
16.	Type of trip	:	Shunt
17.	Auxiliary supply Trip coil	:	230V AC
18.	Range of percentage of rated voltage over which the trip coil will operate satisfactorily		50% to 110%
19. 20. 21.	Auxiliary contacts Mechanical ON/OFF indicators Mechanical spring charged/ discharged indication	: :	1 NO + 1 NC To be provided To be provided

III(a)	**SREAKER PANEL SPECIFICATIONS**		
01.	Type	:	Cubicle type
02.	Enclosure	:	3mm thick, folded, cold rolled sheet steel, dust-proof, damp-proof and vermin-proof, floor-mounting, free-standing enclosure with degree of protection IP-H6
03.	Manual trip button	:	To be provided
04.	Minimum clearance in air in mm	:	As per- IS/IEC standards to suit the impulse withstand voltage
05.	Painting and finish	:	Corrosion-proof, Epoxy painting suitable to withstand sea cost environment to pebble grey RAL 7032
06.	Spring charge indication	:	To be provided
07.	Bus bars	:	High conductivity electrical grade aluminium
	Current rating	:	400A
	Support	:	Epoxy
08.	Earthing		The panel shall have a 25x6mm copper earth bus fixed to it at the rear/bottom to which all the non-current -carrying metal parts of the switchboard shall be effectively Connected
09.	Labels		Anodised aluminium labels with engraved inscriptions shall be provided for identification of the board, panels and various components such as push buttons, lamps, etc. Separate label! giving name-plate details of potential and current transformers on the doors /covers of the respective compartment

IV METERING			
01.	Electricity department metering		
			1 - Solid state tri-vector meter with TOD facility as per Electricity Department
02.	department metering		1 - Test terminal block Fully segregated enclosures with sealing arrangement for KSEB metering equipment and wiring to prevent unauthorized access
03.	Current transformers for Electricity Department metering		
	Ratio Quantity required Class VA burden	: : :	25/5A 3Nos. 0.5 15 VA
04.	Potential transformer		
	Quantity	:	3Nos
	Ratio		11000 110 …… …….. $\sqrt{3}$ $\sqrt{3}$
	Burden		100VA
	Accuracy		Class 0.5
	Fuses		HT and LT Separate set of fuses shall be provided on LT side of PT for KSEB and consumer circuits
	Connection		Star/Star
05.	Cable termination facility	:	One run of 3 core, 11 kV, 150sqmm XLPE cable on incoming side.
06.	Bus bars		400A TPN electrical grade aluminum bus bars to connect the incoming cable terminals to the breaker.
Incoming			
07	Meters		1 No. 0-12kV, 144mm square, wide view flushes type voltmeter operating off the potential transformer provided on the switchboard.
08.	Selector switch	:	1 No. 3 position and off selector switch for the voltmeter

V CAST RESIN TRANSFOMERS			
A.	Service conditions		
01. 02.	Altitude Ambient temperature	:	Less than 1000M
	Maximum	:	45 degrees C
	Minimum	:	20 degrees C
03.	Relative humidity	:	95%
04	Environment	:	Tropical
05.	Installation	:	Inside USS
06.	System fault level	:	250MVAaM1kV
07.	System voltage	:	11kV+/-12.5%
08.	System natural	:	Solidly earthed
01.	No-load voltage		
	HV	:	11,000V
	LV	:	433V
02.	Number of phases	:	
	HV	:	3
	LV	:	3
03	Winding connection		
	HV	:	Delta
	LV	:	Star with natural brought out
04.	Rated frequency	:	50Hz
05.	Vector group	:	Dyn11
06.	Type of cooling	:	Air
07.	Direction of power flow	:	From HV to LV
08.	Impulse voltage withstand (1.2/50 microsecond wave) in kV peak	:	75
09.	Power frequency voltage withstand for one minute in kV rms		
	HV	:	28
	LV	:	3
10.	Tapping on	:	HV winding
11.	Tapping range	:	+5%, -5%
12.	Tapping step	:	2.5%
13.	Tap changing method	:	Off-circuit, bolted tap links
14.	Accessories	:	Rating and diagram plate 2 Nos. Earthing terminals with lugs

01.	Rating			400kVA
02.	Terminals	HV		Terminals to accept bus connection from 1kV breaker
		LV		Terminals to accept 2run 3.5 core 185 sq.mm

NOTE:

The entire work has to be carried out as per specification and direction of the client. For not complying the specification/instruction of the consultant , if any accident occurs due to negligence on part of the contractor/ owner , the consultant will not be responsible for any losses.

APPROVED MAKE OF MATERIAL

Sl.no	Items	Makes preferred
1.	LT Switches/SDF and contactors	L&T / C&S /Legrand /Seimens
2.	PVC Wires	Havells/RR Kabel/Finolex/V guard
3.	Distribution Boards	Legrand/Havells/Seimens
4.	MCCB	L&T/LEGRAND /C&S/Seimens
5.	MCB & ELCB	L&T/ LEGRAND/ Gold Plus/Havells/Seimens
6.	PVC Conduits	Precision/Circle Arc/Balco/Konceal
7.	MS Conduits and accessories	BEC or Other ISI branded Products.
8.	Switches/ Modular type	Crabtree/MK/Legrand Arteor/Krest/Kraze
9.	Metal Clad sockets	Crompton/ Hensel/ Legrand/Mennekes
10.	Crimping Sockets	Dowells/Jainson
11.	Ceiling Fan	Crompton/Bajaj/Havells(star rated)
12.	Exhaust fan	Crompton/Bajaj/Kaithan/Almonard.
13.	Light Fittings	Philips/Bajaj/Wipro/Crompton.
14	LT Armoured Cables	Finolex/Vguard/Gloster/ Havells
15	Transformer	Intrans/Resitech/Unipower
16	Generator	Cummins/Kirloskar/Mahindra/Cooper/Perkins/FG Wilson
17	APFC Panel	Sprague capacitor with Beleauk relay
18	LED light fittings	Definity,Inventor,Aei,Crompton,Philips,Stan LED,Unirans,Lighting science

TO BE TYPED IN RS. 500/- KERALA STAMP PAPER

FORM OF PRELIMINARY AGREEMENT

Preliminary agreement entered into on this..... day of.....Two thousand and Thirteen between Director, Co-operative Academy of professional Education (CAPE), 1st floor, Co-Bank Towers, Vikas Bhavan P.O. Thiruvananthapuram (Hereinafter called the Client) and M/s.....

(Hereinafter called the 'Contractor') of the other part for the execution of the agreement as well as for the execution of the work of "Construction of a multi storeyed building for ladies hostel and allied works at College of Engineering, Pathanapuram" WHEREAS, The Director, CAPE invited tenders for work of "Construction of a multi storeyed building for ladies hostel and allied works at College of Engineering, Pathanapuram " vide notification No.W-PQ/01//2015-16/CAPE dated .03.06.2015

Before commencing work or within 20 days after the date when the acceptance of the tender has been intimated to him, the tenderer shall furnish a sum calculated at 5 percent of the contract value as security deposit (Performance Guarantee) for the proper fulfillment of the same and shall execute an agreement for the work. If he fails to do this or in the case of contracts maintain a specified rate of progress to be specified in each case in the tender schedule, the earnest money and security deposit shall be forfeited to CAPE and fresh tenders shall be called for or the matter otherwise deposed off. It, as a result of such measures due to the default of the tenderer pay the requisite deposit, sign contracts or take possession of the work, any loss to the client, results the same will be recovered from him as arrears of revenue, but should it be a saving to CAPE, the original Contractor shall have no claim whatever to the difference. Recoveries on this or any other account will be made from the sum that may be due to the contractor on this or any other subsisting contracts or under the Revenue Recovery Act, or otherwise the client may decide.

NOW THEREFORE THESE PRESENTS WITNESS and it is mutually agrees as follows: -

1. The terms and conditions for the said contract having been stipulated in the said tender form to which the contractor agreed a copy of which is hereto appended which

forms part of this agreement, it is agreed that the terms and conditions stipulated therein shall bind the parties to this agreement except to the extent to which they are abrogated or altered by express terms and conditions herein agreed to and in which respect the express provisions herein shall supersede those of the said tender form.

2. The contractor hereby agreed and undertake to perform and fulfill all the operations and obligations connected with the execution of the said contract work viz. - work of "Construction of a multi storeyed building for ladies hostel and allied works at College of Engineering, Pathanapuram " if awarded, in favour of the contractor.
3. If the contractor does not come forward to execute the original agreement after the said work is awarded and selection notice issued in his favour or commits breach of any of the conditions of the contract as stipulated in the tender as quoted above within the period stipulated therein, the client may re-arrange the work otherwise or get it done by the Company at the risk and cost of the Contractor and the loss so sustained by the client can be realized from the Contractor under the Revenue Recovery Act as if arrears of land revenue as assessed, quantified and fixed by an adjudicating authority authorized by client in this behalf taking into consideration the prevailing rates and after giving arrears due not to the contractor. The decisions taken by such authority, Officer, or officers shall be final and conclusive and shall be binding. on the contractor
3. The contractor further agrees that any amount found due to the client under or by virtue of this agreement shall be recoverable from the contractor from his EMD and his properties, movable or immovable as arrears of land revenue under the provisions of the Revenue Recovery Act for the time being in force or in any other manner as the client may deem fit in this regard.

IN WITNESS WHEREOF Sri....., Director, CAPE for and
on behalf of CAPE and
Sri .....
the contractor has set their hands on the day and year first above written.

Contractor

Signed by..... ( ) in the presence of witnesses:-

1.

2.

Signed and delivered by Sri. .....
..... the Contractor in the presence of witnesses:-

1.

2.

Contractor

TENDER SCHEDULE

Contractor

Name of work: Construction of a multi storeyed building for ladies hostel and allied works at College of Engineering, pathnapuram

QUOTED RATE OF THE CONTRACTOR

I/We agree to undertake to execute the work

1. At Estimate rate
2. _____% below estimate rates
3. _____% above estimate rates

Note: Score out which is not applicable

The rates may be quoted in words and figures

Signature of Tenderer

Date

(Name, Title and position)
Address