Dear Sir

1. This is with reference to the tender for **Making of Cupboards, Electrical Wiring and Trunk Room at Ajaypal House** Mayo College, Ajmer.

2. The estimated cost of the project is **Rs 20.50 Lacs (Twenty Lacs and Fifty Thousands only)** the complete tender document is attached. GST will be paid separately

3. Time for completion of the project will be one and half months (45 Days) from the date of acceptance of tender.

4. Tender fees of **Rs 2,000**/-(Two Thousand only) (Non-refundable) in cash and earnest money **2%** of the estimated cost i.e. **Rs 41000/-(Rs Forty One Thousand only)** needs to be deposited in the form of DD /ONLINE at the time of submission of the tender failing which tender will not be considered for bid. Hard copy of the tender will be available at the office of Mr. Deenbandhu Bansal from **19.04.2025 – 25.04.2025** on cash payment of Rs 2,000/- between 1000H – 1700H.

5. In case of any query, you may contact office of Mr. Deenbandhu Bansal Mayo College on the number 9166799147 and email id bansaldeenbandhu@gmail.com between 1000H – 1700H.

6. Tender should be submitted by **1130H on 26.04.2025** through online and at the office of the Bursar Mayo College Ajmer. Delay in the submission of the tender would render the bid invalid.

7. Kindly forward your company's complete profile on the email id bansaldeenbandhu@gmail.com.

Thanking you

Warm Regards

Deenbandhu Bansal
Civil Supervisor
Mayo College Ajmer
M No 9166799147

TENDER DOCUMENT

FOR

MAKING OF CUPBOARDS, ELECTRICAL WIRING AND TRUNK ROOM AT AJAYPAL HOUSE MAYO COLLEGE, AJMER
F-Y 2025-26

INSTRUCTIONS, GENERAL & SPECIAL CONDITIONS OF CONTRACT AND BILL OF QUANTITIES TO TENDERERS

CLIENT

MAYO COLLEGE, AJMER

Project Architects

MAYO COLLEGE AJMER

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INSTRUCTIONS TO TENDER

1. Tenderers must obtain for themselves on their own responsibility and at their own expense, all the information that may be necessary for preparing a tender and entering into a Contract. They must examine the Form of Tender, Conditions of Contract, Specifications, Bills of Quantities, Drawings, Form of Agreement etc., and inspect and consider the Site and surroundings and must satisfy themselves as to access to the Site and means of executing the Contract. Persons, firms or companies proposing to tender, and any of their servants or agents, must contact the Architects for permission to enter upon the premise and lands of the Employer for the purpose of such inspection in connection with the proposed tender, but such permission will only be granted upon the express condition that such persons, firms or companies will release and indemnify the Employer and his servants and agents, from and against all liability in respect of, and will be responsible for, personal injury (whether fatal or otherwise), loss of or damage to property and any other loss, damage, costs and expenses however caused (whether by the act or neglect of the Employer, of his servants or agents or not), which, but for the exercise of such permission would not have arisen.

2. The Tender must be made out on the form of Tender attached hereto, and one complete set of these documents, including the Instructions to Tenderers, the Form of Tender, the Conditions of Contract and the Specification, must then be submitted with the Bills of Quantities fully priced, and totalled. The Form of Tender must be signed by a duly appointed Principal fully authorised to represent and bind the Tender. The Tender Bond shall be in accordance with the requirements of the attached Form of Tender Bond. The successful Tenderers will be notified of acceptance by letter and upon receipt of such letter will be required to sign the Contract.

3. Should there be any doubt or obscurity as to the meaning of any of the Tender Documents, or as to anything to be done or not to be done under the contract or as to these instructions or as to any other matter or thing, Tenderer must set forth in writing such doubt or obscurity and deliver the same to the offices of the Architects not later than three days before the date fixed for the delivery of the Tender. Any neglect or failure on the part of the Tender to obtain reliable information at the Site or elsewhere, or on any other matters affecting the execution, completion and maintenance of the Works of this Contract shall not relieve the accepted Tenderer from any risks or liabilities or from the re-responsibility of completing and handing over the works.

4. The offer of a bribe or other inducement to any person with a view to influencing the placing of the Contract will result in the instant rejection of the Tender.

5. No unauthorised alteration may be made in the Form of Tender or the accompanying documents and if any such alteration is made or if any incomplete Tender is submitted, then the Tender may be rejected.

   Any alteration to a rate, cash extension or cost made by the Tenderer in the priced document must be initialled by the Tenderer prior to the submission of the Tender.

6. The set of documents containing the Tender must be enclosed in a sealed envelope or package endorsed **"MAKING OF CUPBOARDS, ELECTRICAL WIRING AND TRUNK ROOM AJAYPAL HOUSE" AT MAYO COLLEGE** and delivered as required in the letter

of invitation. The exterior of the sealed envelope or package must not reveal the identity of the sender. In case any recipient of the documents does not submit the Tender, he shall return the documents to the Employer under cover of a letter and obtain a receipt.

7. The Employer reserves the right to reject any Tender without giving a reason and does not bind himself to accept the lowest or any tender.

   The employer will not be responsible for, nor pay for, any expense or loss which may be incurred by any Tenderer in the preparation and submission of his Tender.

8. Any results of tests carried out on materials, reports on soil samples or any other information which may be made available for inspection by the Tenderers do not form part of the Contract and no guarantee is given as to their accuracy, nor is it to be inferred that the conditions indicated by this information are representative or may be encountered in carrying out the Contract and the Tenderer must satisfy himself as to the true conditions.

9. The Tenderer shall be responsible for developing his own sources of local materials except where a particular source is specified and no guarantee can be given as to the availability of materials of suitable quality or quantity. The Contractor in making his arrangements for obtaining materials will be expected to comply with the requirements of the local Govt. and will be deemed to have acquainted himself with these requirements.

10. Tenderers are required to submit with their Tenders the following particulars:
    (a) A copy of each "circular letter to Tenderers" if any, issued by the Architects appropriately endorsed by the Tenderer.
    (b) A memorandum of procedure giving an outline and detail his general scheme, programme and timetable for the execution of the works supported by Gant / Pert Chart. A list of the plant which the Tenderer proposes to use must accompany the memorandum of procedure.
    (c) Particulars of his proposed site organisation, particulars of the labour force he proposes to use, giving details of the number of workmen to be employed during the contract.
    (d) A list of the sub-contractors and suppliers including local firms which he proposes to use with particulars of the extent of the work which will be undertaken by them.
    (e) The sources from which he proposes to obtain his local materials and aggregates.
    (f) His forecast of certificate payments in the conditions of contract.
    (g) A certificate stating that the tenderer has visited the site and that he has no queries on any matter concerning the contract.
    (h) Full particulars of all management and supervisory site staff he proposes to use.
    (i) His proposals for providing storage, site offices and related facilities during construction period.

11. All recipients of the documents and drawings for the proposed contract (whether they submit a Tender or not) shall treat the details of the documents and drawings as Private and Confidential.

12. Tenderers attention is drawn to the fact that all facilities permissions, leases etc. required for starting, continuing, completing and handing over of the project shall be the contractor's sole responsibility and shall be at his risk and cost. Any reasonable assistance required by the Contractor in obtaining permissions or approvals will be given by the Architects and the Employer wherever possible.

13. It is a condition of Tender that offers must be submitted solely on the basis of the Tender Documents issued to Tenderers and must be free of any qualifications.

FORM OF TENDER

(Notes: The Appendix forms part of the Tender. Tenderers are required to fill up all the blank spaces in this Form of Tender and Appendix).

Gentlemen,

1. Having examined the Instructions to Tenderers, Drawings, Standard Conditions of Contract, Safety Codes, Specification and Bill of Quantities for the execution of the above- named works, we, the undersigned, offer to execute, complete and maintain the whole of the said works in conformity with the said Instructions, Drawings, Standard Conditions of Contract, Specification, and Bill of Quantities and Safety Codes for the sum of ..... (..... …….....) or
   such other sum as may be ascertained in accordance with the said conditions.

2. We undertake if our Tender is accepted to commence the Works within 7 day of receipt of the Project Manager's /J.E. Order to commence, and complete and deliver the whole the works comprised in the Contract within 45 (Forty five) days calculated from the last day of the aforesaid period in which the works are to be commenced.

3. We have deposited as Earnest Money of ---------- (----------only) by **Demand Draft/ ONLINE** in favour of Principal Mayo College which amount is not to bear any interest. We do hereby agree that this sum shall be forfeited by you in the event our tender is accepted and we fail to execute the contract when called upon to do so.

4. We agree to abide by this Tender for a period of 45 days from the date fixed for receiving the same and it shall remain binding upon us and may be accepted at any time before the expiration of that period.

5. In the event of our Tender being accepted and until a formal Agreement is prepared and executed this Tender, together with you written acceptance thereof, shall constitute a binding obligation upon us.

6. We understand that you are not bound to accept the lowest or any tender you may receive.

7. We agree to work at ……% (….....percent) extra rates over and above the **"Basic Schedule of Rates - 2022" issued by Public Works Department, Govt of Rajasthan(Ajmer Circle)** for specific items not covered by "Bill of quantities".

8. We acknowledge receipt of the following circular letters:- Reference number of letter

	Date
.....	.....
.....	.....
.....	.....

and confirm we have taken account thereof in our Tender.

APPENDIX A- SCHEDULE OF FISCAL ASPECTS

S No.	Description	Requirement
1	Type of contract	Item – Rate. Final payment to be made on quantities of work executed
2	Period of Commencement	
a	Date of Commencement of work	7 (Seven) day from the issue of Letter of Intent/ Award Letter
3	Time of Completion	
a	**Making of Cupboards, Electric Wiring and Trunk Room at Ajaypal House**	45 (Forty Five) days including mobilisation
4	Date of Virtual Completion	One month from the date of Completion Certificate
5	Defects Liability Period	365 days from date of Virtual Completion
6	Interim Payment	Running bills to be submitted by contractor at least one in three weeks
7	Payment on Virtual Completion	90% of the value of the works executed
8	Security Retention	10% of work done; 5% to be released with Final bill and balance 5% after completion of Defects Liability period. EMD is adjustable against security retention
9	Intermediate Liquidated Damages	Rs.1000/- per day of delay for non-compliance of Network. It will however be released if the overall work is completed within stipulated time.
10	Liquidated Damages	Rs. 2500/- per day subject to maximum of 10% of contract value
11	Time within which the Payment is to be made	Within 15 days after the Bill is Certified by the JE and one month for final bill
12	Estimated Cost	**20.50 LACS** (Twenty Lac Fifty Thousand only) **GST Extra**
13	Earnest Money	**41000/-** Forty-One Thousand only (In form of DD/ ONLINE in favour of Mayo College Ajmer
14	Tender Fees (Non-refundable)	**2000.00** (Two thousand Only.)
15	Date & Time of Issue of Document	19.04.2025
16	Date & Time of receipt of tender	26.04.2025, 11.30 AM

Tender Issues to M/s _____ on _____

Junior Engineer
Mayo College

Bursar
Mayo College

Principal
Mayo College

FORM OF AGREEMENT

THIS AGREEMENT made this.....day of.....2025 BETWEEN.....(Hereinafter called "The Employer") of the one part and ..... of..... ..... (hereinafter called "the Contractor") of the other part.

WHEREAS the Employer is desirous that certain works should be executed viz.....

and has accepted a Tender by the Contractor as summarised at Appendix B "Summary of Contract Value" for the execution, completion and maintenance of such Works NOW THIS AGREEMENT WITNESSETH as follows:

1. In this Agreement words and expressions shall have the same meanings as are respectively assigned to them in the Standard Conditions of Contract hereinafter referred to.

2. The following documents shall the deemed to form and be read and construed as part of this Agreement viz:
**
The said Tender
The Special conditions of the contract
The General Conditions of Contract
The Drawings
The Specification
The Bill of Quantities
The Schedule of Rates and Prices
The Letter of Acceptance

3. In consideration of the payments to be made by the Employer to the Contractor as hereinafter mentioned, the Contractor hereby covenants with the Employer to execute, complete the works and remedy any defects therein and maintain the works in conformity in all respects with the provisions of the Contract.

4. The Employer hereby covenants to pay the Contractor in consideration of the execution, completion and the remedying of defects and maintenance of the works, the contract price at the times and in the manner prescribed by the Contract.

IN WITNESS whereof the parties hereto have hereunder set their respective hands and seals on the day and year first above written.

Signed by a duly authorised signatory for and on behalf of Employer.....

Witness.....

Signed by a duly authorised Signatory for and on behalf of the Contractor.....

Witness.....**.....

Other additional documents as required

APPENDIX B- LIST OF DRAWINGS

Sr.	Drawing Number	Drawing Title
1	01	Ground Floor
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		

GENERAL CONDITI0NS OF THE CONTRACT

1. **DEFINITION**

a) **Owner**: MAYO COLLEGE, Ajmer

b) **Architects**: Mayo College Ajmer.

c) **Contract** : The contract means the documents forming the tender and acceptance there of and the formal agreement executed between the owner the contractor together with the documents consisting of the invitation to tender, the agreement, the conditions of the Contract, specification, the drawings and the Bill of quantities and all these documents as per contents all modifications instruction issued time to time by the Architect before execution shall be deemed to form contract and shall be complementary to one another.

d) **Contractor**: Contractor shall mean the bidder whose tender has been accepted and who is authorized to carry out and execute the work tendered for by him.

e) **Sub-Contractor**: The term 'Sub-Contractor' as employed herein, includes those having a direct contract with the contractor and it includes one who furnishes material worked to a special design according to the plans or specifications of this work, but does not include one who merely furnishes material not so worked upon. Anyone doing work on a piece rate basis shall be deemed as a sub-contractor.

f) **Provisional Sum**: Provisional sum or Provisional lump sum shall mean a lump sum included in the tender documents and shall represent the approximate value of work for which details are not available at the time of issue of the tender.

g) **Written notice**: Written notice shall he deemed to have been duly served or delivered in person to the individual or to a member of the firm or to an officer of the corporation to whom it is intended or if delivered and written delivery receipt obtained or sent by registered mail to the last business address known to him who gives the notice.

h) **The Works**: It shall mean the works in respect of which tender by the contractor has been accepted and which are set out in the conditions of contract, specifications, Bill of quantities, and including all additions, substitutions, and variations or ordered by the Architect.

i) **Virtual Completion**: Virtual completion shall mean that the works are completed in all respects and for use in every respect including installation of all services complete in working order to the full satisfaction of the Architect and the Owner.

j) **Working Day**: Working day shall mean any day from Monday to Sunday, both inclusive, excluding National Holidays.

k) **Normal Working Hours**: Normal working hours shall mean eight (8) hours per working day. The specific timings would vary depending upon the time frame as per project programme for each activity. Contractor shall make arrangements for all additional time to complete the job within the time allocated for the activity.

l) **The Site**: The Site shall mean the building at Mayo College, Ajmer.

m) **Project Engineer & Staff**: His responsibility extends to verifying of measurements, verification of contractors bills, issuance of Owner purchase materials and issuance of certification of payments jointly with the Architect / Jr. Engineer. Supervise the constructions of day-to-day work; ensure the implementation of correct specifications, quality of workmanship, compliance of Architect's instruction.

2. **OWNER, ARCHITECT AND THE CONTRACTOR**

The Owner, Architect and the Contractor are those mentioned as such in the Agreement and shall Indulge their legal representative/s, assign/s or successor/s. They are treated throughout the contract documents as if each were of singular number and masculine gender.

3. **SCOPE OF WORK**

a. **Scope**: The general character and the scope of work is illustrated and defined by the Bill of Quantity, drawings and specifications herewith attached.

b. **Extent**: The contractor shall carry out and complete the said work in every respect in accordance with the contract and with the directions of and to the satisfaction of the Architect.

c. **Intent**: The Contract documents are Complementary, and what is called for by any one shall be binding as if called by all. The intention of the documents is to include all labour and materials, equipment and transportation necessary for the proper execution of the work

d) **Architect's Instructions**: The Architect may, from time to time, issue further supplementary drawings and / or written instructions, details and directions and explanations which are collectively referred to as Architect's instructions. The Contractor shall forthwith comply with and duly Execute works comprised in such Architect's instruction provided always that verbal instructions, directions and explanations given to the Contractor or his representatives by the Architect shall if involving a variation be confirmed in writing.

4. **OWNER'S STAFF**

The Owner shall maintain such, staff at the site of works as may be necessary from time to time who shall oversee the construction and certify the bills of the Contractor, jointly with the Architect or his representatives, as called for in Clause 1, so as to fulfil the requirements of various rules, regulations and procedures laid down.

5. **SITE**

Contractor has to satisfy himself about site conditions before tendering, The contractor shall visit and examine the site and satisfy himself as to the site conditions, the correct dimensions of the of the work and the facilities for obtaining the special articles called in the Contract Documents. No extra charge in consequence of any points or on the grounds of insufficient description or otherwise shall be allowed **Possession**: The possession of the site shall be given on the date specified. The Contractor shall thereupon commence with the works regularly and diligently proceed with the same and complete the same on or before the completion date of the contract.

6. **TYPE OF CONTRACT**

a) The contract shall be an item rate and the contractor shall be paid at the accepted rates for the

b) actual quantity of work carried out by him in accordance with the contract documents as authorized and measured.
c) **Bill of Quantities**: The Quantities given in the Bill of quantities are provisional and are meant to indicate the Intent of the work and provide a uniform basis for tendering. The Contractor shall be paid for the actual quantity of work executed by him in accordance with Contract documents at the accepted rates. The Owner reserves the right to executed by him in accordance with the contract documents at the accepted rates. The Owner reserves the right to increase or decrease any of the quantities or totally omit any items of work. The contractor shall not claim extras or damages on account of any reason or reasons direct or indirect.

7. **CONTRACT AGREEMENT**:

The owner will issue the Work order to the successful bidder as contract agreement duly signed by both parties

8. **SEPARATE CONTRACTS**

The Owner reserves the right to let other contracts in connection with this work. The Contractor shall afford other Contractors reasonable opportunity for the introduction and storage of their materials and execution of their work, and shall properly co-ordinate his work. If any part of the contractor's work depends for proper execution or results of the other contractor, the contractor shall inspect and promptly report to the Architect any defects in such work that renders it unsuitable for such proper execution and results. . His failure to inspect and report shall constitute an acceptance of the other Contractor's work as fit and proper for the reception of his work, except as to defects which may develop in the other contractor’s work after the execution of the works.

9. **TAXES**

All quoted rate shall include cost of transportation of materials to the site.**GST will be paid separately**. The contractor has to submit the copy of the challan.

10. **POWER FOR AND WATER FOR CONSTRUCTION**

The Owner shall provide power for construction at one point at site of work at **0.75%** of total final bill cost. The Contractor shall provide all temporary service lines, boards, switches, cut outs, etc. as required for his use on the works; and remove the same on completion at his own cost. If the State Electricity supply is not available, then the contractor will have to make his own arrangements to carry out the work uninterrupted. The contractor shall arrange sweet water on his own cost.

11. **TIME OF COMPLETION**

a) All time limits stated in the contract documents shall be the essence of the contract. The contractor obligated himself to complete the work in all respects within the time schedule stipulated in the Special Conditions subject to any adjustment that may be granted by the Owner on recommendation of the Architect in writing under the conditions of the contract. He shall submit to the Architect and Owner’s a detailed PROGRESS REPORT fortnightly.

b) Should the Contractor be delayed or impeded on the execution of works by reason of:

i) Force Majeure or

ii) By the works or delays of other Contractors or tradesmen, engaged or nominated by the Owner and not referred to in the Contract Documents.

Or
iii) The non-delivery or delay in delivery to contractor of any materials and equipment or drawing which under the contract, the Owner or the Architect has to supply

Or

iv) Any cause whatsoever, arising out of the acts or defaults of the Owner or the Architect Or

v) Any accident happening to the works, during their progress, not arising from the neglect, or default of the Contractor or his workmen or sub-Contractors

Or

vi) Extras or variation being ordered by the Architect, on recommendation of the Architect,

Or

vii) Any other cause which in the opinion of the contractor has caused the delay, the Contractor may from time to time within fourteen working days of the happening of any of the aforesaid, apply in writing to the architect for an extension of the time the time on account delay thereof, giving details above the delay.

c) Unless and until the Owner on recommendation of the architect shall extend the time as aforesaid, the contractor shall not by reason of any delay arising from cause aforesaid, be relieved in any way or to any unless the contractor shall apply for an extension of time, within the period and manner aforesaid, and extent from his obligations to proceed with, his works, within the time specified in the contract for the completion of the work.

d) In granting extensions of time in this clause as aforesaid, it is an express condition that there shall not be any claims whatsoever by the Contractor.

12. **LIQUIDATED DAMAGES**

The works shall throughout the stipulated period of the contract, should proceed with expedition and diligence and the Contractor shall pay to the Owner to such sums as stipulated in "Appendix-A" curtained and liquidated damages for the total amount payable by way of damages under this Clause shall not exceed 10% (Ten percent) of the total value of the contract. Further to ensure good progress the contractor will be bound to execute.

- 1/6th of the work before 1/4 of whole time has elapsed
- 3/8th of the work before 1/2 of whole time have elapsed.
- And 3/4th of the work before 3/4 of the whole time have elapsed.

b) Intermediate Liquidated damages at the fixed amount (as stipulated in “Appendix A”) per day of delay in case of achievement of intermediate target fixed as per the Network agreed. This amount shall be released if total work is completed in given time frame.

13. **CONTRACTORS LIABILITY REGARDING DAMAGE TO PROPERTY, INJURY TO PERSONS**.
a) The Owner shall not be liable or responsible for any accident, loss, injury resulting in death or otherwise or damage of kind whatsoever happening or accruing during the term of performance of the worked herein referred to and in connection therewith to persons and/or property, materials and equipment, and the contractor shall fully indemnify and protect the Owner from and against the same.

b) In addition to the liability imposed by law upon the Contractor for injury (including death) or otherwise to persons or damage to property by reason of the negligence of the Contractor or his agents, which liability is not impaired or otherwise affected hereby, the contractor hereby assumes liability for and agrees to save the Owner harmless and indemnify him from every expense, liability or payment by reason of any injury, (including death) to persons or damage to property suffered through and act of omission of the Contractor or any of his sub-Contractors, or any person directly, or indirectly employed by any of them or from the conditions of the premises or any part of the premises which is in control of the Contractor or anyone directly or indirectly employed by either of them, or arising in any way from the work called for, by this contract.

c) Further, the Contractor hereby agrees and undertakes to indemnify the Owner from any loss or damage or death arising out of Architect's instructions by ensuring that the insurance policy taken out under this clause covers this contingency CAR Policy (Contractor All risk Policy)

d) The Contractor shall submit certificates to the Owner giving evidence that he is fully insured against claims for death, bodily injury and property damage in connection with his operations under this contract for any reasons whatsoever including acts of nature.

e) The Contractor shall obtain a written certificate of similar insurance from all his sub-Contractors and hereby assumes responsibility for any claims or losses to the Owner resulting from the failure of any of the Sub-Contractors and hereby assumes responsibility for any claims or losses to the Owner

resulting from the failure of any of the Sub-Contractors to obtain adequate insurance protection in connection with their work in this project.

f) The Contractor shall not proceed with the work until he has received in writing from the owner, approval of the certificates of insurance required by the preceding paragraph. Advance payment to the contractor shall only be released once the contractor provides the premium paid receipt from the Insurance Company.

g) These certificates shall be fully executed and shall state that policies cannot be cancelled until 10 (ten) days after written notification of such intent of cancellation has been given to the owner. All policies shall be with insurance companies acceptable to the owner.

h) The Contractor shall be responsible for anything which may be excluded from the insurance policies above referred to and also for all other damages to any property arising out of and Incidental to his carrying out the contract in a negligent and defective manner. He shall also indemnify the Owner in respect of any costs, charges of expenses arising out of any claims or proceedings and also in respect of any award of / or compensation of damage arising there from.

i) The Owner shall be at liberty to and is hereby empowered to deduct any costs, charges, and expenses arising or accruing from or in respect of any such claim or damage from any sum or sums due to or becoming due to the Contractor.

j) The Contractor shall continuously maintain adequate protection of all his work, materials and equipment from damages, destruction or loss and shall protect the Owners properly from injury arising in connections with his contract.

k) The Contractor shall cover up and protect the works from the weather and suspend all operations during adverse weather conditions, which in Architect opinion will be detrimental to the works. In default the contractor shall make any such damage, destruction, loss or injury.

l) When so ordered by the Architect, the Contractor shall suspend any work that may be subjected to damage by climatic conditions.

m) As per clause-14 labour regulations (1) the Contractor shall provide toilet facility to the labours, staffs by constructing temporary bathrooms, after consulting with Architect at his own cost and same to be cleaned daily by appointing a sweeper, which shall be removed after completion of the contract.

n) Keeping in view of security, no extra person will be entertained and allowed to the construction site, and without identity card, certified by Architect. Contractor has to issue these cards for labours, staffs, and visitors, at his own (contractor) expenses and should appoint day and night guards as per labour regulations-14. .

o) Temporary fence is to be constructed if necessary as per direction and instruction of the Architect and to be removed after completion of contract and site should be cleared.

14 **LABOUR REGULATIONS**

a) The Contractor shall pay to the labour engaged by him the wages, not less than the minimum wages fixed under the law of the place.

b) The Contractor shall have no claim whatsoever on account or his paying wages higher than the minimum wages for any reason whatsoever.

c) The Contractor shall be wholly and solely responsible for full compliance with the provisions under all labour laws and/or regulations such as payment of wages Act 1936, Minimum Wages Act 1948, Employees Liability Act 1938, Workmen's Compensation Act 1923. Industrial Dispute ACL 1947 and Maternity Benefit Act 1961, or any modifications thereof or any other law relating thereto and rules made there under from time to time.
d) Contractor should get labour licence issued from the local authority.

e) Safety Code: The Contractor shall at his own cost arrange for the safety provisions stipulated by Government or the authorities or as required by the Architect owner in respect of all Labour directly or indirectly employed for performance of the works and shall provide all facilities in connection therewith. In case the Contractor fails to make arrangements and provide necessary facilities as aforesaid, the Owner shall be entitled to do so and recover the cost there of from the contractor. The

f) contractor should ensure that all workers will wear helmets and safety hooks during the execution of works and stay at site premises.

g)The Contractor shall not employ any child as per the provisions of the Government of India. If female is engaged, the Contractor shall make necessary provision at his own expense for safeguarding

shelter and care of small children and keeping them clear of the site. No Labour shall reside within the site except authorized guards.

h) Contractor should furnish documents relating to payments made to the labourers /sub-contractors if asked by the owner/Architect.

15. **ASSIGNMENT AND SUB-LETTING**

The Contractor shall not without the written consent of the Owner assign this contract or sub-let the work. Any permission to sublet the work shall not absolve the Contractor from any liability under this contract.

16. **CO-ORDINATION OF WORK**

At the commencement of work and from time to time, the Contractor shall confer with other contractors, sub-contractors, and persons engaged with the Architect for the purpose of the co-ordination, and execution of the various phases of work. The Contractor shall ascertain from the other Contractors, sub-Contractors and persons
engaged in separate contracts, in connection with the works the extent of all chasing, cutting and forming of all openings holes grooves etc, as may be required to accommodate the various services. The Contractor shall ascertain the routes of all services and the positions of all floor and wall outlets, traps etc., in connection with the installation of plan, services and arrange for the construction of work accordingly. The breaking and cutting of completed work broken or patched work without first ascertaining that the broken surface is adequately reinforced to receive and hold the future work. Work broken without authorization will be subject to replacement at the direction of the Architect.

17. **PROGRESS PAYMENTS**

a) Unless otherwise provided in the contract, and subject to these conditions, the Contractor shall from time to time, be entitled to receive payment on the basis of actual work executed, approved and certified by the J.E. compliance with specifications and acceptability, subject to deductions hereinafter mentioned. The Contractor shall submit bills (three copies), prepared in accordance with acceptable norms duly supported by actual measurements and duly verified jointly by the J.E. provided that the value of the bill is not less than the minimum value stipulated in Appendix A. If the bill value is less than the value specified in Appendix A, such bills will not be considered. From every intermediate bill, the Owner shall retain a sum of ten percent (10%) of the value of the work done and any other statutory deduction. Out of the total retention money half the amount shall be released after six month of virtual completion and balance after completion of defects liability period. This amount may also he released one month after virtual completion if the contractor with validity period of defect liability period submits Bank Guarantee of equivalent sum. No interest shall be due to the Contractor for sums retained have the Owner. All intermediate payments do not imply acceptance and final payment being subject to all clauses of this contract. The final bill shall be submitted by the contractor within two weeks of the date of virtual completion of work , failing which the measurements of work taken by the Architect shall be considered final and binding on the contractor unless objected within one month of their being recorded in the measurement books.

18. **VARIATION IN MATERIALS COST AND WAGE RATES**

The Contract rates shall be deemed to fully cover for all fluctuations in prices of materials, duties, taxes, Labour wages etc, and any claim for extras on such account by the contractor shall be entertained.

19. **EXTRAS AND VARIATIONS**

If at any time whilst the works are in hand it shall be deemed expedient by the Owner, on the advice of the Architects, to order materials or work of different description from that specified or to alter their situation or vary of form or dimensions of the works, or of any part thereof or to make variation or to substitute one class of work from another, the Architects shall have full power to do so. The work involved in any such variations and additions shall be executed by the Contractor; and no such variations or additions shall in any way annul this contract, or extend the completion time but paid for, or deducted upon approval by the Architects, from the account of the Contractor, as the case may require according to the rates set out in the Bill of Quantities.

a) If any portion of the work so ordered to be done shall not be in the opinion of the Architect of the same value or class of work provided for in the Bill of Quantities, the same shall be executed by the Contractor at rates computed in the following manner. The rates for such items of work not included in the contract shall be computed as per the **"Basic Schedule of Rates - 2022"** issued by Public Works Department, GOVT of Rajasthan Ajmer Circle. If, however such items are neither covered by BSR than the item shall be computed on the basis of estimated quantities of materials and Labour and prevailing costs of materials and labours involved in the work and ten percent (15%) added towards establishment, tools/ plant, overheads and profit. The rates so derived shall be subject to the satisfaction and approval of the Architect / Owner.

b) Before any work, or work of an altered value or class is undertaken by the contractor, he shall procure an order in writing from the project engineer based upon the recommendation of the architect for carrying out such extras or variations unless he produces, if asked to do so, the written order for the same, as aforesaid, and he shall not be entitled to plead that the Architects omitted to provide such written order, as it is to be distinctly understood that the responsibility for obtaining such order, shall be with the Contractor.

c) The Contractor shall not be entitled to any other rates than the rates set out in the Bill of quantities on any plea that the work was in a different position, or of a different class from, or in a difficult position that shown on the plan or described in the specifications or Bill of Quantities unless an agreement entitling him to payment at other than the rates set out in the Bill of Quantities shall have been previously made and signed by the Owner and the Contractor.

20. **PAYMENTS WITHHELD**

The Architect/ Engineer may cause to withhold on account of subsequently discovered evidence, cause to nullify the whole or part of any certificate to such extent as may be necessary to protect the Owner from loss on account of:

a) Defective work not remedied.

b) Failure of the Contractor to make payments properly to Sub-Contractors or for materials or Labour or equipment.

c) Damage to another Contractor or Sub-Contractor's work

d) At reasonable doubts that the contract cannot be completed from the balance unpaid

e) A reasonable doubt that the Contractor intends to leave work items incomplete

f) Failure to provide samples, shop drawings, models or charts as called for,

g) Failure to honors the clauses of the agreement

21. **CONTRACT SUPERVISION**

The Contractor shall provide full and adequate supervision during the progress of the works and shall keep a competent and authorized project engineer with a minimum of 5 years of experience for this project constantly on the works. Such authorized Engineer must be able to receive and act upon all instructions, directions or orders given by Architect / his representatives.

22. **MATERIAL AND WORKMANSHIP**

a) All materials to be incorporated in the works shall be new and marked ISI. Materials, equipment and workmanship are to be of the best quality of the specified type and to the entire satisfaction of the J.E. The Contractor shall immediately remove from the premises any materials, equipment and/or workmanship, which in the opinion of the Architect/his representative, are detective or unsuitable and shall substitute proper materials, equipment, and / or workmanship at his own cost

'The term approval used in connection with this contract shall mean the approval of the J.E. In case of non-compliance of the instructions, as action as deemed fit under the clauses of the agreement shall be taken.

b) The Contractor, shall, if required, submit satisfactory evidence as to the kind and quality of materials and equipment

c) Where special makes or brand are called for in the schedule they are mentioned as standard. Other makes or brands of equal quality may be used provided approval is first obtained in writing from the Owner. Unless substitutions are requested and approved in writing no deviation from the Specifications will be permitted. In case it is noticed at latter stage that deviations have been made 'without prior approval of Owner, contractor has to redo the work again as per specification without any extra cost to owner.
d) The contractor shall indicate and submit written evidence of those materials or equipment called for in the specifications that are not obtainable for installation in the building within the time limit of the contract.
e) Failure to indicate the above within one week after signing of the Contract will be deemed sufficient cause for the denial of the request for the extension of the contract time because of the same.

f) All materials and equipment shall be delivered so as to ensure a speedy and un-interrupted progress of the work. It shall he stored without any obstructions as well as over loading or any portion of the structure, and the Contractor shall be entirely responsible for damage or loss to the materials by weather or other causes. Materials shall be stored in orderly manner and protected against damage by dilution or any cause whatsoever. When required, materials shall be stacked, stored or arranged as directed by the Architect

g) Immediately after the award of the contract, the contractor shall submit for approval to the J.E, a complete list of all materials and equipment's he and his sub-contractors propose to use in the work, of definite brand or make, which differs in any respect from those specified, and also the particular brand of any articles where more than one is specified as standard. He shall also list items not specially

mentioned in the specifications but which are necessary for the completion of the work.

h) The Contractor shall employ the right kind of workmen, jigs, tools and equipment to fabricate and install all materials and equipment, whether locally purchased or imported and whether provided by the Owner or Contractor, without any damage and in accordance with the manufacturer's instructions and manuals,

i) Inspection: All materials equipment and workmanship shall be subject to inspection and test by The Architect / J.E. at any and all times during manufacture/ construction. The Architect shall have the right to reject defective materials, equipment and workmanship and the Contractor shall promptly segregate and remove the rejected materials and equipment from the premises without any charge to owner. If the Contractor fails to proceed at once with the replacement of rejected materials/ or the correction of defective workmanship, the owner will replace such materials and equipment and/or correct bad workmanship and charge the cost thereof to the contractor or may terminate the right of the Contractor. Contractor shall provide promptly, without additional charge, all reasonable facilities, Labour, materials and equipment necessary for the safe and convenient inspection and test that may be required by the Architect.

j) Testing: All tests shall be conducted in a manner and through an organization selected by the Architect/J.E., the Contractor shall arrange for such test and shall also bear all expenses in connection therewith.

23. **DEDUCTIONS FOR UNCORRECTED WORK**

If the J.E. deems it in expedient to correct the damaged work or the work not done in accordance with the contract, an equitable deduction shall be made from the contract price mentioned by the J.E. shall be final.

24. **CORRECTION WORK BEFORE FINAL PAYMENT**

a) The JE shall conduct pre-final inspection just before the virtual completion of the work and prepare a list of sub-standard materials, equipment and detective work which fail to conform to the contract specifications. The contractor shall promptly replace the item mentioned in the list and shall bear the cost for making good all work of other contractors, destroyed or damaged by such replacement or removal.

b) If the Contractor fails to remove and replace above rejected materials, equipment and/or bad workmanship within a reasonable time, fixed by written notice, the Owner may employ and pay other persons to amend and make good such defects and the expenses consequent thereto shall be recovered from any amount due or which may become to the contractor. Decision of the owner will be final.

25. **VIRTUAL COMPLETION**

a) The work shall be considered as virtually completed only upon fulfilment of the procedure laid down in the clause above and when the Architect and the Owner have certified in writing that the work has been virtually completed. The defects liability period shall commence from the date of such certificate.

b) Should the owner decide to occupy the portion of a building before the contract is completed, the

same shall not constitute an acceptance of any part of the work unless so stated in writing by the Architect / J.E.

26. **DEFECTS**

a) The Contractor shall make good at his own cost and to the satisfaction of the J.E., all defects which in the opinion of the J.E., is not in accordance with the drawings or specifications, or Bill of quantities or as per instruction of the J.E., which may appear within six months after completion of work. Defects shall mean non-conformity, as determined by the J.E., of completed work / materials supplied, with the requirements laid down in the drawings, specifications, Bill of Quantities and other documents forming the part of the contract. In case of failure on part of the contractor same shall be rectified on risk and cost of the contractor and decision of the Owner will be final and binding.

b) Maintenance during Defects Liability period: The Contractor shall provide and maintain adequate staff and Labour at his own expense to attend to defects arising in the works during the defects liability period. He shall attend to the defects pointed out to him expeditiously. Failure to attend the defects shall be taken as breach of contract and action as per clause of contract be taken.

27. **ARCHITECT'S STATUS AND DECISIONS**

a) Status: The Architect (Mayo College) shall have general supervision and direction for the work. He is authority to stop the work whenever such stoppage may be necessary to ensure the proper execution of the work. The Architect shall be the interpreter of the Conditions of Contract and the judges of its performance.

b) Decisions: The Architect/ J.E. (Mayo College) shall, within a reasonable time, make decisions on all claims of the contractor and all other matters related to the executing and progress of the work or the interpretation of the contract documents. The decision, opinion, direction of the Architect & J.E. with respect to all or any of the following matters shall be full and final without appeal:

- Variation of modifications of the design.
- The Quality or quantity of works or the additions of omission or substitution of any work.
- Any discrepancy in the Drawings or between the Drawings and/or Specifications.
- The removal and / or re-execution of any works by the contractor
- The dismissal from the works of any persons employed thereon.
- The opening up for inspection of any work covered up
- The amending and making good of any defects under defects liability period
- Materials and workmanship
- The contractor to provide everything necessary for the proper execution of the work
- Provided that any action under the above clauses is subject to the approval of the Owner, of the variation has any financial implications.

c) Dismissal: The contractor shall on the report of the architect immediately dismiss from the works any person employed thereon by him who may, in the opinion of the architect or the Owner, be incompetent or misconduct's himself, and such person shall not be employed on the works without the permission of the architect or the owner.

28. **ACCESS TO THE WORKS**

Access for Owner and Architects to the works: The owner and the architect and their representatives

shall at all reasonable time have access to the works and to the work shop's or other places of the contractor, where work is being prepared for the contract, and when work is to be prepared in work shop's or other places of the sub-contractors, the contractor shall be a term in the sub-contract, contractor as far as possible, secure a right to access to those workshops or places for the owner, the Architect and their representatives and shall take all things reasonable necessary to make such right effective.

29. **INDIAN STANDARDS**

A reference made to any Indian Standard Specifications in these documents shall imply reference to the latest of that standard, including such revision / amendments as may be issued by the Indian Standard Institution during the tendency of the contract and the corresponding clauses/s herein shall hold valid in place of those referred to an. ISI shall also mean its successor Bureau of Indian Standards

30. **PROTECTION AND CLEANING**

a) The Contractor shall protect and preserve the works from all damage or accident by providing suitable and adequate measures as required by the Architect. The Architect may direst such due to failure to provide adequate protection

b) The Contractor shall properly clean the work as it progresses and shall promptly remove all rubbish and debris from the site from time to time as is necessary and as directed. On completion, the Contractor shall ensure that the premises- and/or site are cleaned and surplus materials, debris, sheds, etc. are removed so that the whole site is left fit for immediate use and to the satisfaction of the owner.

c) Fire Precautions: The contractor shall take all necessary precautions to prevent risk of fire and shall provide fire-fighting equipment for dealing with localized fires that may arise. All cutting equipment and other items of plant fuel and equipment subject to fire hazard must be safely and securely stored when not in use; the contractor shall ensure that no materials are burned on site.

31. **FORCE MAJEURE**

a) The right of the contractor to proceed with the work shall not be terminated because of any delay in completion of the work due to unforeseeable causes beyond the control and without the fault or negligence of the Contractor including but not limited to acts of God, or of the public enemy, restraints by Governing States, fires, floods, unusually severe weather.

b) If the Contractor is prevented from performance of the Contract for a period. In excess of thirty (30) consecutive days because of a Force Major, the Owner may terminate this contract by fifteen (15) days written notice and delivered to the contractor. In the event of this contract is so terminated, the Contractor shall be paid all costs actually incurred (this costs shall not include any other expenses occurred by the contractor towards the maintenance of his establishments etc.) for the work executed up to the date of termination. Failure to agree on an equitable adjustment shall be deemed as a dispute.

32. **TERMINATION OF THE CONTRACT BY THE OWNER**

If the Contractor shall be adjudged bankrupt or if he should make a general assignment for the benefit of his creditors, or if a receiver shall be appointed on account of his insolvency or if he should

persistently or repeatedly refuse to carry on the work diligently or shall fail, except in case for which extension of time, is provided, to supply enough properly skilled workmen or proper materials or equipment, or persistently disregard laws, ordinances, or instruction of the Architect or otherwise be guilty of breach of the contract, or has suspended the works then the Owner upon the recommendation of the Architect, that sutlicient cause exists to justify such action, may without prejudice to any other

right or remedy and after giving the Contractor seven day's notice in writing, terminate the employment of the Contractor and take possession of the premises and of all materials, equipment and appliances thereon and. finish the work by whatever method he may deem expedient. In such case, the Contractor shall not be entitled to receive any further payment until the work is finished. If the amount due to the contractor for the work carried out by him as per the contract terms shall exceed the expense of finishing the work including compensation for additional management and administrative services such excess shall be paid to the contractor. If otherwise, the Contractor shall pay the difference to the Owner. The expense incurred by the Owner and the architect shall certify the damage incurred, through the Contractor's fault, and his decision in this matter shall be final and binding on the Contractor.

33. **ENTRY TO SITE**

It is hereby expressly declared that the entry of the Contractor (s) on the site will be merely as a license for carrying out the works under this agreement, and they shall not by his/their being allowed such entry on the premises acquire any right, lien or interest either in the works carried out by them under the agreement or attached thereto and their claim will only be in the nature of money found payable to them in accordance with the provisions contained herein

34. **SETTLEMENT OF DISPUTES**

All disputes and differences of any kind whatever arising out of or in connection with the contract or the carrying out of the works (whether during the progress of the works or after their completion, and whether before and after the determination, abandonment or breach of the Contract shall be referred to and settled by the Architect who shall state his decisions in writing. Such decision may be in the form of final certificate or otherwise. The decisions of the Architect with respect to any or all of the following matters shall be final and without appeal:

a) The variation or modifications of the design
b) The quality or quantity of works or the addition or omission or substitution of any work
c) Any discrepancy in the Drawings or between the Drawings and/or omission or substitution of any work
d) The removal and/ or re-execution of any work executed by the Contractor
e) The dismissal from the works of any person employed thereupon
f) The opening up for inspection any work covered up
g) The amending and making good of any defects under defects liability period
h) Acceptability of materials equipment and workmanship
i) Materials, Labour, tools and equipment necessary for the proper execution of work.
j) Assignment & sub-letting
k) Delay and extension of time.
l) Termination of contract by the Owner
m) Unsatisfactory progress of work.

n) But if either the Owner or the Contractor be dis-satisfied with the decision of the Architect on any matter, question or dispute of any kind except the matters listed above, then and in any such case either party (the Owner or the Contractor) may within twenty eight days, after receiving notice of such

decisions, give a written notice to other party through the Architect requiring that such matters which are in dispute or difference for which such written notice has been given is hereby referred to as the arbitration and final decision of a single Arbitrator being a person who is a Chartered Engineer/Chartered Architect/Chartered Surveyor (Building and Quantities) to be agreed upon and appointed by both the parties or in the case of disagreement as to the appointment of a single arbitrator to the arbitration of two Arbitrators both being persons who are Chartered Engineer /Chartered Architect / Chartered Surveyors (Building and Quantities), one to be appointed by such

Arbitrators, shall, before taking upon themselves the burden of reference appoint an umpire, who must also he a Chartered Engineer/Chartered Architect/ Chartered Surveyor as described earlier.

o) The Arbitrator, the Arbitrators or the Umpire shall have the power to open up, review and issue certificate opinion, decision, reacquisition or notice pertaining to the matters referred to them, upon every or any such references the cost of incidental to the reference and award respectively be at the discretion of the Arbitrator or Arbitrators or the Umpire shall be final and binding, on both the parties. The owner and the Contractor hereby also agree that the arbitration under this clause shall be a condition precedent to any right of action under the contract. The venue of arbitration hearings shall be Ajmer. In all cases where the amount of award is Rs 50,000/- and above the Arbitrator shall give reason for the award.

35. **JURISDICTION**
All matters arising out of or in any way connected with this agreement shall be deemed to have arisen in Ajmer and only the courts in Ajmer shall have jurisdiction to determine the same.

36. The Principal Mayo College reserves the rights to award the contract to any contractor regardless of the rates quoted by the contractor; any or all tenders may be rejected at the sole description of the Principal Mayo College Ajmer.

SPECIAL CONDITIONS OF CONTRACT

1. The forwarding letter and notice inviting tenders shall form part of the contract.

2. The contractor has to fully understand that the building which in this case is- **Making of Cupboards, Electric Wiring and Trunk Room at Ajaypal House, Mayo College** needs utmost care in protecting the heritage nature of the building. The contractor will make good any damage to the building caused by him during the execution of the works. Also any damage done by the Contractor to the building work etc. or ground surface, drains, sewerage, existing available drainage system pipeline etc. will be made good by the contractor at his own cost.

3. Royalty, Octroi, Terminal Taxes, Turn over tax , Sales Tax , Works contract Tax ,Excise duty ,VAT etc at prevailing rates shall have to be paid and borne by the contractor on all the materials collected by him for the execution of the works to the revenue authorities of State Governments etc and work/ sub-works executed.

4. Income tax as specified will be deducted at source as per Govt. notifications/ regulations.

5. On a periodic interval and on completion of the work (up to the handover) all the areas should be cleaned and protected and debris / rubbish disposed to a location as directed by the Architect. All floors, doors, windows, surface etc. shall be cleaned in manner which will render the work acceptable to Mayo College, Ajmer. No extra payment will be made on this account.

6. No compensation shall be paid to the contractor for any damage caused by rain, wind storm or floods to the work or to the material collected for the execution of work. He will make good all such damages at his own cost and no claim on this account will be entertained.

7. The Contractor will give all facilities at his own cost to the Architect & Owner, their engineers and representative for proper execution of the work including access to the site, inspection of all materials, works and measurements of quantities, necessary arrangement for site meeting etc. and shall work to their entire satisfaction. Contractor will provide at his own cost site office for the project management team of Architect / Owner with at least 4 nos. of chairs, 2 Nos of tables and a lockable document storage cabinet as directed.

8. Site order book will be kept at the site in which instructions shall be recorded by the owner / Architect and their representative. The contractor or his authorized agent shall sign the order book to acknowledge the instructions in all events and their compliance. Contractor should go through the site order book daily & details report on the action taken against instructions noted done by Architects / his representative should be submitted every week.

9. All verbal instruction given by the Architect (in site order book) will be considered as aced upon but the contractor should confirm the same in writing within 7 days from the date of such instruction falling which, it may not be accounted for in approved bills of the work.

10. The contractor will indemnify the Owner against all structural damages cause by his negligence, non – confirming use of partially completed structures, non-compliance of specifications, like removing the shuttering prior to due date or use of faulty material at work. Under such circumstances the

contractor under written orders of the Architect shall rectify and break all the damaged work at his own cost and rectify the same for which no extra payment will be made. The Architect may deduct reasonably.

11. The Contractor shall ensure that he has a valid license and is registered under Contract – Labour (Regulation and Abolition Act 1970) and that workmen employed by him for execution of works are suitably covered under workmen compensation act and that all liabilities arising out of the said Acts and **ESI, P.F**. and other legislative enactment applicable to such works and workmen shall be to the contractors account. The contractor will ensure that the prevalent labour laws and the minimum labour wages etc. (as applicable in the state) are followed and shall indemnify the Owners from any claims of this nature whatsoever, during the coarse of the subject works. The contract shall also indemnify and keep the owner harmless against any claims, demands, actions, or proceedings that may be made or adopted against the owners or that may be suffered by the owners by reason of anything done by the Contractor pursuant to any work done by him in execution of the said work.

12. The employer shall have the right to occupy the area in parts as and when such parts are completed and declared fit for occupation by the architect. The contractor shall have to complete the work of those areas on priority in consultation with the architect and hand over the same without affecting any of the clauses of the contract agreement. The architect as per the conditions of contract before such occupation shall give completion certificate for the work.

13. The contractor is expected to have read the specification and I.S Code which will be applicable to the work and with up to date correction slips.

14. Any extra item beyond the tender shall not be executed before the written approval of the Owner (Inspite of its being mentioned in the drawing / verbal instructions)

If the rates for the additional, altered or substituted work are not specifically provided in the schedule of Rates then such rates shall be derived from the rates are specified for a similar class of work in the contract. The Project Manager's interpretation as to what is a similar class of work and his decision on the method in which the rate is to be derived shall be final and binding on the contractor.

14.1 If the rates for additional, altered or substituted work can not be determined in the manner specified above, then the rates for such work shall be determined on the basis of actual consumption of materials, and actual use of labour and plant and machinery, as detailed below:
a. Cost of materials supplied by the contractor, at no more than prevailing market rates, incorporated in the work.

b. Cost of labour actually used at the site on the work at prevailing rates of labour.

c. 10% of the actual costs in respect of (a) and (b) above i.e. cost of material and labour +10% towards contractor's establishment, water and power charges and all other costs, overhead and profit plus WCT and S.T. as applicable in Ajmer shall be reimbursed. No profit shall be allowed on owner supplied materials.

15. On acceptance of the tender, the name of the accredited representative of the contractor, who would be responsible for taking instruction from the Architect / Owner, shall be communicated in writing to the owner / Architect.

16. The Deviation limits: The quantities of any item here forth mentioned in the Bill of Quantities are liable to vary (increase or decrease) up to any extent and can be deleted or added as per Architect instructions. The contractor shall not have any extra claim whatsoever on these varied quantities. This clause shall supersede all other clauses appearing at other places regarding the deviation limit.

17. If the materials of the approved make are not used in the work, such work shall be rightly rejected and not paid for at all.

18. Recovery for the materials issued to the contractor: The cost of material issued to the contractor will be recovered from the bills submitted by the contractor.

19. The Contractor shall bear all the incidental charges for cartage, storage and safe custody of materials issued by the owner against damage due to sun, rain dampness, fire, theft etc.

20. The contractor will be required to obtain Photo Gate pass from the Owner for the individuals working under him after furnishing all the relevant particulars like name, address, fathers name etc. Any attempt of impersonification will be viewed seriously and suitable disciplinary action taken.

21. Approved Equal: “Approved equal “shall mean an alternative product / service approved by the Architect / Owner as equivalent to that specified in the contract documents.

22. Shop drawings: After the award of contract the contractor shall furnish for the approval of the Architect / Owner, samples and shop drawings required by the specifications or by the Architect / Owner. Samples shall be delivered as directed by the Architect / Owner. The Contractor shall prepare execution drawings for all electrical services which shall include lighting, power, telephone distribution boards etc and carry out the work after the approval of above drawings. No extra payment is due to the contractor for preparation of any samples / execution drawings.

23. Completion Drawings: The Contractor while handling over the installation shall submit 3 sets of completion drawings. The drawings shall show all the light points, power points, cable route GI, CI, PVC, UPVC, all plumbing points layout etc. and also the contractor should submit a schematic diagram for the entire electrical, plumbing & sanitary installation.

24. Payment to Sub Contractor: Incase the contractor fails to make necessary payments to the sub-contractor for the work carried out by them, the employer can pay to such sub-contractor direct up on the certificate of the consultant all payment to deducted by way of set off the amount so paid by the Employer from any sums due or which may become due from the Employer to the Contractor.

25. Final payment to be made only after complete cleaning of site in all aspects.

SPECIAL CONDITIONS OF CONTRACT - ELECTRICAL WORK

1. SCOPE OF WORK:

The scope of work to be carried out under this contract comprises of the supply, installation, testing and commissioning of Electrical work complete as listed out in Schedule of Quantities. The general character and scope of work to be carried out under this contract is presented in drawings and specifications. The contractor shall carry out and complete the said work under this contract in every respect in conformity with the contract documents and with direction of and to the satisfaction of the Owner and Consultant/ Architect. The contractor shall furnish labour, materials, equipment, transportation and incidentals necessary for the completion of work as described in the Tender Documents.

2. FEES AND PERMITS:

The Contractor shall obtain all permits/licenses and pay for any and all fees required for the installation, inspection and the commissioning of the work.

3. DRAWINGS:

The Drawings prepared by the consultants are indicative only of the general arrangement of the installation work. The Contractor shall follow these drawings and specifications in preparing his shop drawings and subsequent installation. He shall check the drawings of other trades to verify space for his installation**.**

Shop drawings shall be provided of the Main and Sub-Main Switchboards, Distribution Boards, Cable Trays, Reactive Power Compensation Panel, and any other switchboards and panels, wherever applicable and approval shall be obtained from the Consultant / Developer before commencing fabrication or procurement.

Any equipment or switchboard manufactured without the written consent of the Consultant / Developer prior to the approval drawings shall be liable for rejection.

Drawings show general run of cables, approximate locations of outlets and equipment, utility symbols and schematic diagrams of no dimensional significance. Refer to the Architectural drawings for locations and also obtain approval from the Consultant / Developer wherever dimensions are not shown, or locations cannot be determined from the drawings. Do not scale drawings to obtain locations

4. MEASUREMENTS OF WORK:

Payment for Conduiting, cables, earth strips and wires etc. will be made on linear measurements and will be measured up to and including the bends.

5. TESTING:

On completion of the installation the testing will be done in conformity with the stipulated performance specifications. Any shortcoming detected in the system/ materials/ workmanship shall be rectified by the contractor to the entire satisfaction of the consultant without any extra

cost to the owner. The installation shall be tested again after removal of the defects and shall be commissioned only after approval by the competent inspecting authority and the Consultant/Owner.

The Contractor shall notify the Consultant at least 7 working days before testing of each system. The Consultant reserves the right to be present when such tests are being made.
If the Electrical Inspectorate requires manufacturer's test reports for any equipment used in the project, the Contractor shall obtain such approvals at no extra cost to the client. Such approved reports shall be handed over to the Consultant / client.

Calibration certificates shall be obtained from the Meter and Relay Testing Department of the Electricity Board for all relays and meters used in the project at no extra cost to the client

6. COMPLETION CERTIFICATE:

On completion of the installation a certificate in an approved form shall be furnished by the contractor. The contractor shall be responsible for getting the entire installation duly approved by the Electrical Inspector or other concerned authorities, if any, and shall bear all expenses in connection with the same.

7. SCOPE OF WORK

The scope of work to be carried out under this contract briefly comprises of:

a) **INTERNAL & EXTERNAL WORK** : Supply, Installation, connecting, testing and commissioning of the following :

i) Conduiting and wiring for all light points, exhaust fans, Light & power socket outlets, three phase outlets and equipment wiring.
ii) Complete Earthing system
iii) Conduiting for Telephone system.
iv) Conduiting for Computer system.
v) All Cables, Mains & Sub-Mains
vi) All Final Distribution Boards.
vii) All Light fixtures.

b) The contractor shall carry out and complete the work under this contract in every respect in confirming with the current rules and regulations of the local Electricity Authority, stipulations of the Indian Standard Institution, and with the directions of and to the satisfaction of the owner. The contractor shall furnish all labour, material, appliances, equipment, transportation and incidentals necessary for providing, installing, testing and commissioning of the whole electrical installation as specified herein and shown as drawings.

This also includes any materials, appliances, equipment and incidential work not specifically mentioned herein or noted on the drawings/documents as being furnished or installed but which are customary to make the installation in working order. The work shall include all incidentals and jobs connected with Electrical installation such as earthing work and cutting chases/holes and making good the same and grouting and equipment.

All Civil works in connection with the Electrical Installation including supply, laying and fixing of necessary inserts, hooks, brackets and sleeves etc.

On completion of the work and before issuing of virtual completion certificate the contractor shall submit to owner “As installed drawings” showing all the details of work done by him.

The contractor shall have a valid contracting licence before starting the work and till the completion of work.

TECHNICAL SPECIFICATION OF ELECTRIC WORK

1 SPECIFICATIONS FOR INTERNAL WIRING

1.1. SYSTEM OF WIRING:

The system of wiring shall consist of single/multi core FRLS PVC insulated stranded copper conductor wires in non-metallic FRLS PVC conduits/ metallic M.S. conduits as called for in the BOQ. All conduits shall be on the surface, (supported from the Ceiling), in the False Ceiling and concealed in other areas where RCC slab is provided unless otherwise called for in the drawings. All down conduits shall be concealed unless otherwise called for.

1.2. GENERAL

Prior to laying of conduits, the Contractor shall get approved the conduit layout indicating the route of conduit, number and size of conduits, location of junction/ inspection/pull boxes, size and location of switch boxes, point outlet boxes and other details. These conduit layouts shall be got approved by the Consultant and then only conduit layout should be started. Any modification or suggestions shall be approved by the Consultant before the laying of conduits.

1.3. MATERIALS:

M.S. conduits shall conform to Indian Standards IS: 1653 - 1964 -Specification for Rigid Steel conduits for Electrical wiring with the latest amendments.

M.S. CONDUITS:

M.S. conduits shall be solid drawn or lap welded conduits. Stove enameled inside and outside with minimum wall thickness of 1.6 mm for conduits up to 25 mm diameter and 2.0 mm wall thickness for conduits 32 mm diameter and above.
M.S Conduit pipe shall be used for all systems including Fire Alarm & Computer system.

FRLS PVC CONDUITS:

FRLS PVC conduits shall be rigid, unplasticised, heavy gauge having 1.8 mm wall thickness up to 20 mm diameter and 2.0 mm wall thickness for all sizes above 20 mm diameter. Minimum size of conduit shall be 20 mm dia. Minimum size of conduit for Power point wiring shall be 25 mm dia. The conduits shall be delivered to the site of construction in original bundles and each length of conduit shall bear the label of the manufacturer. The number of insulated copper wires that may be drawn into the conduits of various sizes are given below and the fill shall not exceed 40% the maximum permissible number of 650/1100 volts grade single/multi core PVC insulated copper conductor wires of different sizes that may be drawn into rigid metallic or non-metallic conduits.

SIZE OF WIRE	SIZE OF CONDUITS (MM)					
Nominal cross-sectional area of wires in sq. mm	20	25	32	40	50	nominal Dia in mm (Maximum number of wires)
1.5	5	6	18	-	-	
2.5	3	4	10	-	-	
4.0	2	3	5	10	-	
6.0	-	4	6	8	-	
10.0	-	-	3	4	-	
16.0	-	-	-		3	
					5	
25.0	-	-	-		2	
					3	

1.4 FRLS PVC CONDUIT ACCESSORIES & CONNECTIONS:

The accessories used for FRLS PVC conduits shall conform to Indian Standards IS: 3419-1988- (Specification for fittings for non-metallic conduits).PVC conduits shall be joined by means of screwed or plain couplers. Where there are long runs of straight conduits, inspection boxes shall be provided at intervals as approved by the consultant. The threads of the pipe and sockets shall be free from grease and oil. It shall be thoroughly cleaned before making the screwed/plain joints. Proper jointing materials as recommended by manufacturers shall be used for jointing of FRLS PVC pipes. Use PVC couplers and connectors for FRLS PVC pipe connections and terminations in boxes. All the joints shall be fully water tight. Junction boxes and running joints shall be provided at suitable places to allow for subsequent extensions if any, without undue dismantling of conduit system. As far as possible diagonal run of conduits shall be avoided. Junction between conduit and adapter boxes, back outlet boxes, switch boxes and the like must be provided with entry spouts and smooth PVC bushes. Joints between conduit and iron clad Distribution Boards or control gear shall be effected by means of conduit couplers into each of which will be coupled smooth PVC bush from the inside of box or case. Conduit system shall be erect and straight as far as possible. All jointing methods shall be subject to the approval of the consultant.

BENDS IN CONDUITS:

Where necessary bends or diversions may be achieved by means of bends and or circular inspection boxes with adequate and suitable inlet and outlet screwed joints. In case of recessed system each junction box shall be provided with a cover properly secured and flush with the finished wall surface, so that the conductors inside the conduits are easily accessible. No bend shall have a radius of less than 2.5 times the outside diameter of the conduit. Conduits shall be cold bend by means of a Bending spring available with the manufacturers. In case it is not available then Heat may be used to soften the PVC conduits, by filling sand in the pipe. Use of PVC conduit in places where ambient temperature is 60 degrees or above is prohibited. PVC Solvent shall be used for joints between conduits, conduits & Junction box etc. PVC checknuts and bushes shall be used for joining conduit with outlet boxes. PVC

Closures shall be provided on unused mouths of Junction boxes.

Separate conduits shall be provided for the following system.

i) Lights, Exhaust fans & 5A Light sockets.
ii) Power sockets
iii) Telephone System
iv) Television, Computer & Music system
v) Emergency System.
vi) Public Address System
vii) Fire Alarm System.

Separate switchboards/outlets shall be provided for the following system.

i) Lights, Exhaust fans & 5A Light sockets.
ii) Power sockets & A/C outlets
iii) Telephone System
iv) Television, Computer & Music system
v) Emergency System.
vi) Public Address System
vii) Fire Alarm system.

1.5 FIXING CONDUITS:

Conduits and junction boxes shall be kept in position and proper holdfasts shall be provided. Conduits shall be so arranged as to facilitate easy drawing of wires through them. Adequate junction boxes of approved shape and size shall be provided. All conduits shall be installed so as to avoid steam and hot water pipes. After the conduits, junction boxes, outlet boxes & switch boxes are installed in position their outlets shall be properly plugged so that water, mortar, insects or any other foreign matter does not enter into the conduit system. Exposed conduits shall be fixed by means of spacer bar/ saddles at intervals of not more than 600 mm in normal run and 500 mm from both sides of fitting or accessories. The saddles shall be of 3 mm x 19 mm mild steel flat, properly treated with primer and painted, securely fixed to support by means of nuts and bolts/rawl bolts and MS screws as required.

Conduits shall be laid in a neat and organised manner as directed and approved by the Consultant. Conduit runs shall be planned so as not to conflict with any other service pipe lines/ducts.

Where exposed conduits are suspended from the structure they shall be clamped firmly and rigidly to hangers of design to be approved by the Architect. Where hangers are to be anchored to reinforced concrete appropriate inserts and necessary devices for their fixing shall be provided at the time of fixing. Making holes or openings in the concrete will generally not be allowed. In case it is unavoidable prior permission of the Consultant shall be obtained. Conduits shall be fixed in the chase by means of staples not more than 600 mm apart and the chase filled with cement mortar 1:4. Cutting of horizontal chases in walls is prohibited.

1.6. PROTECTION

To minimize condensation or sweating inside the conduit pipes all outlets of conduit system

shall be adequately ventilated as directed and approved by the Consultant. All screwed and socketed connections shall be adequately made fully water tight by the use of proper jointing materials i.e. Tropolin for PVC conduits & white lead for metal conduits.

1.7. SWITCH-OUTLET BOXES AND JUNCTION BOXES

All boxes shall conform to Indian Standards IS: 5133(Part-1)-1969 (Specification for boxes for enclosure of Electrical accessories) with the latest amendments. All outlet boxes for switches, sockets & other receptacles shall be fabricated from 1.6mm thick mild steel sheets duly painted with rust proof paint (zinc passivated) as called for, having smooth external & internal surfaces to true finish. Junction boxes and outlet boxes in contact with earth or installed in areas exposed to the weather shall be of 2mm thick mild steel and painted. Where called for, outlet boxes for receiving switches, telephone outlets T.V. outlets, power plugs etc. shall be fabricated to provide shape and size to suit the cover plates of approved make for different utilities. The cover plates shall be of best quality Hylam sheets or ISI grade Urea Formaldehyde Thermosetting insulating material which shall be both mechanically strong and fire retardant, as approved by the Consultant. Proper supports shall be provided in the outlet boxes to fix the cover plates of switches as required. Separate screwed earth terminal shall be provided inside the box for earthing purpose. All boxes shall have adequate number of knockout holes of required diameter for conduit entry. Where called for outlet boxes for receiving switches and fan regulators in one box, shall be fabricated to approved shape and size to accommodate fan regulators and switches to be fixed on grid plates. These boxes shall be covered with Hylam sheets or ISI grade Urea Formaldehyde Thermosetting insulating material which shall be both mechanically strong and fire retardant. All junction boxes, pull boxes and outlet boxes shall be provided with sheet cover Urea Formaldehyde Thermosetting insulating material. The box cover shall be secured to the box with adequate number of round head brass screws of approved make. Outlets exposed to the weather shall be fully weather tight, complete with rubber gasketed covers, glass where used shall be fully heat resistant for the duty. The outlet boxes shall be painted with two coats of bitumastic paint before they are fixed in position. All Outlet boxes fixed in concrete/recessed in wall shall be of a minimum depth of 55mm.

1.8. INSPECTION BOXES

Rust proof (Zinc passivated) inspection boxes of 1.6mm thick mild steel sheet and of required size, having smooth external and internal finish shall be provided to permit periodical inspection and to facilitate removal and replacement of wires when required. Inspection boxes shall be mounted flush with ceiling/walls finished surface and shall be provided with screwed covers of Urea Formaldehyde Thermosetting insulating material sheet cover secured to the box with brass screws. Adequate holes shall be provided for ventilation in the inspection box covers.

1.9. CONDUCTORS

FRLS PVC insulated multistrand copper conductor wires of 1100 Volts grade shall be used for three phase distribution and FRLS PVC insulated multistrand copper conductor wires of 1100 V grade shall also be used for Single phase distribution and shall conform to IS : 694 - 1964 with the latest amendments and shall be ISI marked.

1.10. BUNCHING OF WIRES

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.

1.11. DRAWING OF CONDUCTORS

The drawing and jointing of copper conductor wires shall be executed with due regard to the following precautions, while drawing insulated wires into the conduits. Care shall be taken to avoid scratches and kinks which cause breakage of conductors. There shall be no sharp bends.
Insulation shall be shaved off for a length of 15mm at the end of wire like sharpening of a pencil and it shall not be removed by cutting it square or ringing.
FRLS PVC insulated copper conductor wire ends before connection shall be properly soldered (at least 15mm length) with special Cu solder for copper conductor or shall be properly crimped with copper lugs/sockets as the case may be. Strands of wires shall not be out for connecting to the terminals. All strands of wires shall be soldered at the end before connection. The connecting brass-screws shall have flat ends. 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. Conduc- tors having nominal cross sectional area exceeding 6 Sq mm shall always be provided with cable sockets. At all bolted terminals, brass flat washer of large area and approved steel spring washers shall be used. Brass nuts and bolts shall be used for all connections.

Only certified wiremen and cable jointers shall be employed to do jointing work. All wire shall bear the manufacturer's label and the voltage grade at one meter intervals for the full length of coil, and shall be brought to site in new and original packages.

The sub-circuit wiring for points shall be carried out in looping system and no joint shall be allowed in the length of the conductors. 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 cleared of moisture, dust, and dirt or any other obstruction by drawing dry cloth through the conduits. The minimum size of FRLS PVC insulated stranded copper conductor wire for all sub circuit wiring for lights, exhaust fans, ceiling fan and 5A Light sockets points shall be 1.5 Sq mm. In case of power circuit not more than two 15 Amp power outlets shall be grouped in one circuit, wiring for the first power outlet shall be carried out with FRLS PVC insulated 6.0 sq mm copper conductor wires. Wiring for the second power outlet shall be carried with FRLS PVC insulated 4.0 sq mm copper conductor wires. All power outlets shall be connected with 4.0 sq mm FRLS PVC insulated copper conductor wires to the earth terminal of outlet. Separate circuit shall run with FRLS PVC insulated 4.0 sq mm copper conductor wires for water heaters, kitchen equipment, window Air conditioners and similar outlets at locations as shown on drawings.

The minimum size of wire from final distribution board to first tapping point in the circuit shall be 2.5 Sq mm FRLS PVC insulated stranded copper conductor wires. Circuit shall not have more than a total of 8 points of fans, 5A Light sockets and Light points and its load shall not exceed 800 watts. Not more than two power circuits shall be drawn through the same conduit. Separate earth wire shall run for each circuit. In case two circuits of the same phase are running in the same conduit then a common earth wire is permissible. The size of earth wire for all the light points, ceiling fans, exhaust fans , light sockets, outlet boxes etc. shall be 1.5 sq mm FRLS PVC insulated copper conductor wires.

1.12. JOINTS

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 to outlet. Joints where unavoidable, due to any specified reasons, prior permission in writing shall be obtained from the Consultant before making such connections.

1.13. MAINS AND SUB-MAINS

Mains and sub-mains wires where called for shall be of the rated capacity and approved make. Every main and sub-main shall be drawn into an independent adequate size conduit. Adequate size draw boxes shall be provided at convenient locations to facilitate easy drawing of the mains and sub-mains. An independent earth wire of proper rating shall be provided. The earth wires shall run along the entire length of the mains and sub-mains. The earth wires shall be fixed to conduits by means of suitable copper clips at not more than 1000mm distance. Where mains and sub-main cables are connected to switch gears, sufficient extra length of sub-main and main cable shall be provided to facilitate easy connections and maintenance.

1.14. LOAD BALANCING

Balancing of circuits in three phase installation shall be planned before the commencement of wiring, shall be got approved by the Consultant and shall be strictly adhered to.

1.15. COLOUR CODE OF CONDUCTORS

Colour code shall be maintained for the entire wiring installation; red, yellow, blue for three phases and “off” circuit black for neutral and green for earth (or bare earth wire)

Telephone Multicore cables shall be of approved make and shall conform to following specifications.

i) Type of conductor ….. Electrolytic Annealed Tinned Cu conductor. (ATC)
ii) Diameter of Conductor 0.61 mm dia uniform (minimum size)
iii) Weight of conductor.2.52 Kg/Km minimum. iv) Resistance of conductor at 20 degree... 60 Ohms/Km, ... v) Radial Thickness of PVC insulation 0.3mm $\pm$ 0.05mm uniform
vi) Radious Thickness of PVC sheathing 1.2mm uniform $\pm$ 0.2mm
vii) Overall diameter of insulated conductor. 1.2mm uniform
viii) High voltage Test. Able to withstand upto 500 volts D.C. up to 12 hours immersion in water.

1.16 M.S.CONDUIT ACCESSORIES & CONNECTIONS:

The accessories used for M.S. conduits shall conform to Indian Standards IS: 3837-1966-(Specification for fittings for Rigid steel conduits with the latest amendments. M.S. conduits shall be joined by means of screwed or plain couplers. Where there are long runs of straight

conduits, inspection boxes shall be provided at intervals as approved by the Consultant. The threads of the pipe and sockets shall be free from grease and oil. It shall be thoroughly cleaned before making the screwed/plain joints.

Proper jointing and cleaning materials as recommended by manufacturers shall be used for jointing and cleaning of M.S. pipes. Use M.S. couplers and connectors for M.S.pipe connections and terminations in boxes. All the joints shall be fully water tight. Junction boxes and running joints shall be provided at suitable places to allow for subsequent extensions if any, without undue dismantling of conduit system. As far as possible diagonal run of conduits shall be avoided. Junction between conduit and adapter boxes, back outlet boxes, switch boxes and the like must be provided with entry spouts and smooth M.S. bushes and M.S. Checknuts. Joints between conduit and iron clad Distribution Boards or control gear shall be effected by means of conduit couplers into each of which will be coupled smooth M.S. bush from the inside of box or case. Conduit system shall be erect and straight as far as possible. All jointing methods shall be subject to the approval of the Consultant.

M.S. CONDUIT CONNECTIONS:

Conduit connections for MS conduits shall be screwed metal to metal and be painted with one coat of self- etching zinc chromate primer and two coats of enamel paint. The threads and sockets shall be free from grease and oil. Connections between screwed conduit and sheet metal boxes shall be by means of a brass hexagon smooth bore bush, fixed inside the box. Checknuts to be provided on inside and outside of box and connected through a coupler to the conduit or as directed by the Consultant. The joints in the conduits shall be free of burrs to avoid damage to insulation of conductors while pulling them through the conduits. Connections between PVC and MS conduits shall be through a junction box. Direct connection between PVC and MS conduits is not allowed.

2 CABLES

2.1. GENERAL

MV Cables shall be supplied, laid tested and commissioned in accordance with drawing specifications, relevant Indian Standards specification, Indian Electricity Act and manufacturer's instructions. The cable shall be delivered at site in original drums with manufacturers name clearly written on the drums.

2.2. MATERIAL

MV CABLES : MV Cables shall be FR XLPE PVC insulated aluminium conductor armoured and unarmoured cables conforming to IS: 1554 (part I&II)-1976 & IS : 694-1977 (PVC Insulated cables for working voltages upto and including 1100 volts (second revision) with latest amendments. MV cables shall be suitable for underground use and laid in trenches, ducts, cable trays, under roads and paved areas. MV Cables shall be termite resistant and shall be of approved make.

2.3. JOINTS IN CABLES

The contractor shall take care to see that all the cables are apportioned to various locations in such a manner as to ensure no straight joints in the cable run. If the straight joint in cable

is unavoidable due to any specified reasons, prior permission in writing shall be obtained from the Consultant before the use of such straight joints in cable.

2.4. JOINTING BOXES FOR CABLES

Cable jointing boxes shall be of appropriate size, suitable for PVC insulated cables of particular voltage ratings, and shall be manufactured by approved manufacturers.

2.5. JOINTING OF CABLES

All cable joints shall be made in suitable approved cable joint boxes. Jointing of cables in the joint boxes and the filling in of compound shall be done in accordance with the best practice in trade, in accordance with manufacturer's instructions and in an approved manner. All straight Joints shall be done in epoxy mold boxes with TROPOLIC/ M-Seal resin or approved equal. All terminal ends of conductors shall be heavily soldered upto at least 50mm length.

All cables shall be jointed color to color and tested for insulation resistance and continuity before jointing commences. The seals of cables must not be removed until preparations for jointing are completed. Joints shall be finished on the same day as commenced and sufficient protection from the weather shall be arranged.

2.6. FILLING OF EPOXY COMPOUND

Equal quantities of resin and hardener shall be taken and mixed thoroughly by hand until the mixture is free from white patches and has uniform color. No water, oil or any other liquid shall be added to the mixture to make it soft as this will effect the properties of the compound. The mixture shall be used within 30-40 minutes of mixing. The surface on which epoxy compound is to be used shall be free from dust, rust, oil, grease and shall be dry. No disturbance or movement of joint shall be made till the epoxy compound has completely hardened. A smooth surface can be made by rubbing a damp cloth smoothly on the compound before it sets. The joints shall be painted after it has completely hardened.

2.7. CABLES TERMINATION

Cable termination shall be done in terminal cable box using cable glands and the cable ends sealed with sealing compound.

2.8. BONDING OF CABLES

Where a cable enters any piece of apparatus, it shall be connected to the casing by means of an approved type of armoured clamps and gland. The clamps must grip the armoring firmly to the gland or casing, so that in the event of ground movement no undue stress is passed on to the cable conductors. The glands shall be either to the lead sheath by means of 'Plumbing Joint' as on a cone of approved materials, capable of being compressed into lead sheath. The gland or cone shall be capable of effecting a good electrical bond between both the armoring and lead of the cable and the casing.

2.9. LAYING OF CABLES

Cables shall be laid by skilled and experienced workmen using adequate rollers to minimize stretching of the cable. The cable drums shall be placed on jacks before unwinding the cable.

Great care shall be exercised in laying cable to avoid forming kinks. The drums shall be unrolled and cables run over wooden rollers in trenches at intervals not exceeding 2 meters. Cables shall be laid at depth of 750mm depth below ground level in the case of MV Cables. A cushion of sand, not less than 75mm shall be provided both above and below the cable, joint boxes and other accessories. HV and MV cables shall not be laid in the same trench and/or alongside of water main. The cable shall be laid in excavated trench 80mm layer of sand shall be spread over the cable. The cable then shall be lifted and placed over the sand bed. The second layer of 80mm sand then be spread over the cable. The relative position of the cables laid in the same trench shall be preserved and the cables shall not cross each other as far as possible. At all changes in direction in horizontal and vertical planes, the cable shall be bent smooth with a radius of bend not less than 12 times the diameter of cable. Minimum 3 M long loop shall be provided at both sides of every straight joint and 5 Meters at each end of the cable. Distinguishing marks shall be made on the cable ends for identification. Insulation tapes of appropriate voltage and in red, yellow and blue colours shall be wrapped just below the sockets for phase identification. Aluminium Labels etched with the size of cable shall be provided around the two ends of each cable.

2.10. PROTECTION OF CABLES

The cable shall be protected by placing burnt bricks over the cables 600mm wide on the top layer of sand for the full length of underground cable. Where more than one cable is running in the same trench, the bricks shall cover all the cables and shall project a minimum of 80mm on either side of the cable.

Cable under road crossings and any surfaces subjected to heavy traffic, shall be protected by running them through Hume pipes of suitable size and Heavy grade quality. Cables under paved areas (which form part of the building) shall be protected by running them through Stoneware/Hume pipes of 150 mm dia (minimum size) one meter below road level.

2.11. CABLES INSIDE BUILDINGS

Cables inside buildings shall be laid either in masonry trenches or carried on through trays or brackets. Where cables run in ducts inside the buildings the cables shall be adequately clamped to angle iron brackets, secured to the wall, as directed and approved by the Consultant. Where cables are suspended from ceilings they shall be carried over troughs or trays as directed and approved by the Architect. The supports shall be placed not more than 1.0 meter apart. All cables passing through walls below paved area, and concrete shall run through stone ware pipes or Hume pipes of adequate diameter recessed or exposed as directed. Cables running along walls shall be supported and clamped to saddles, or hanger rigidly anchored at close intervals. Clear space between parallel cables shall be equal to the diameter of the cable but not less than 50mm. Where called for cable trenches shall be filled with fine sand. The contractor shall ensure that hangers, brackets and other supporting arrangements for cables are placed in proper position at the time of building the walls, concreting slabs, etc. cutting holes or opening in concrete may be carried out only with prior permission of the Architect.

All excavations and back fill including timbering, shoring and pumping required for the installation of the cables shall be carried out as per the drawings and requirements laid down elsewhere. Trenches shall be dug true to line and grades. Back fill for trenches shall be filled in layers not exceeding 150mm. Each layer shall be properly rammed and consolidated before laying the next layer. The Contractor shall restore all surfaces roadways, sidewalks, curbs, walls or other works cut by excavation of their original condition, to the satisfaction of Consultant.

2.12. MARKERS AND WARNING PLATES

Approved CI cables markers shall be provided along the route of the cables at every 30 meter distance and at both ends of road crossing, indicating HV cables and MV cables as applicable. Special CI markers shall be provided at all buried cable joints indicating "Electrical Cable Joints. GI plates engraving the size of cable and the place it serves shall be tied to the cable at regular intervals of 2 meters for easily identification of the cables.

2.13. TESTING OF CABLES

Prior to burying of the cables, following tests shall be carried out:

a. Insulation test between phases and phase to earth for each length of cable before and after jointing.

On completion of cable laying work and jointing the following tests shall be conducted in the presence of the Consultants.

a. Insulation Resistance test (Sectional and Overall)
b. Continuity Resistance Test.
c. Sheath continuity Test.
d. Earth Test.
e. Physical Dimensions Test.

All tests shall be carried out in accordance with relevant Indian Standard Codes of practice and Indian Electricity Rules. The contractor shall provide necessary instruments, equipment and labour for conducting the above test and shall bear all expenses in connection with such tests. All tests shall be carried out in the presence of the Architect / Consultant.

3.0 EARTHING

3.1 EARTHING

All the non-current metal parts of electrical installation shall be earthed properly. All metal conduits, trunking, cable sheaths, switchgear, outlet boxes, distribution boards, light fittings, fans and all other parts made of metal or conductive material shall be bonded together and connected by means of specified earthing system.
All earthing will be in conformity with the relevant provision of Rules 33 and 61 of the Indian Electricity Rules 1956 and Indian Standard Specifications IS: 3043-1987 with latest amendments.

3.2. EARTHING CONDUCTORS

All earthing conductors shall be of high conductivity electrolytic copper of 99 % purity and shall be protected against mechanical injury or corrosion.

3.3. SIZING OF EARTHING CONDUCTORS

The cross sectional area of copper earthing conductor shall be same as the active conductor for sizes of active copper conductor upto 4.0 Sqmm and shall be half the size for 16 sq mm active copper conductor and above. All fixtures, fans, outlet boxes and junction boxes shall be earthed with 1.5 Sqmm PVC Insulated copper conductor wires. All power sockets and single phase A/C units shall be earthed with 4.0 PVC Insulated copper conductor wires. All Three phase Final Distribution Boards shall be earthed with 2 Nos 4 mm dia bare copper

conductor wires. The sizes of the earth continuity conductors should not be less than half of the largest current carrying conductors.

3.4. CONNECTION OF EARTHING CONDUCTORS

Main earthing conductors shall be taken from the earth connections at the main switchboards to an earth electrode with which the connection is to be made. Sub main earthing conductors shall run from the main switchboard to the sub-distribution boards. Final distribution boards earthing conductors shall run from sub-distribution boards.

3.5. PROHIBITED CONNECTIONS

Neutral conductor, sprinkler pipes, or pipes conveying gas, water, or inflammable liquid, structural steel work, metallic enclosures or cables and conductors, metallic conduits and lightning protection system conductors shall not be used as a means of earthing an installation or even as a link in an earthing system. The electrical resistance of metallic enclosures for cables and conductors measured between earth connections at the main switchboard and any other point on the completed installation shall be low enough to permit the passage of current necessary to operate fuse or circuit breakers and shall not exceed 1 ohm.

3.6. PROTECTION FROM CORROSION

Connections between copper and galvanised equipment shall be made on vertical face and protected with paint and grease. Galvanised fixing clamps shall not be used for fixing earth conductors. Only copper fixing clamps shall be used for fixing earth conductors. When there is evidence that the soil is aggressive to copper, buried earthing conductors shall be protected by suitable serving and sheathing.

3.7. EARTHING STATION

Plate Electrode Earthing: Earthing electrode shall consist of a tinned copper plate not less than 300mm x 300mm x 3mm thick as called for in the Schedule. The plate electrode shall be buried as far as practicable below permanent moisture level but in any case not less than 4.2 meters below ground level. Wherever possible earth electrodes shall be located as near the water tap, water drain or a down take pipe as possible. Earth electrodes shall not be installed in proximity to a metal fence. It shall be kept clear of the buildings foundations and in no case shall it be nearer than 2 meters from the outer face of the wall. The earth plate shall be set vertically and surrounded with 150mm thick layer of charcoal, dust and salt mixture. 20mm GI pipe shall run from the top edge of the plate to the ground level. The top of the pipe shall be provided with a funnel and a mesh for watering the earth through a pipe. The funnel over the GI Pipe shall be housed in a masonry chamber, approximately 300mm x 300mm x 300mm deep. The masonry chamber shall be provided with a cast iron cover resting over a GI frame embedded in masonry. Refer Sketch for additional details.

Pipe Electrode Earthing: Earthing electrode shall consist of a GI Pipe (class 'A') Indian Tube Company make or approved equal not less than 40mm dia and 4.5 meters long. GI Pipe electrode shall be cut tapered at the bottom and provided with holes of 12mm dia drilled at 75mm interval upto 2.5 meters length from bottom. The electrode shall be buried vertically in the ground as far as practicable below permanent moisture level with its top not less than 1.25 M below ground level. The electrode shall be in one piece and no joints shall be allowed in the electrode. Wherever possible earth electrodes shall be located as near water tap, water drain or a down take pipe. Earth electrodes shall not be located in proximity to a metal fence. It shall be kept clear of the building foundations and in no case shall be nearer than 2 meters from the outer face of the wall. Refer Sketch for additional details.

The pipe earth electrode shall be kept vertically and surrounded with 150mm thick layer of

charcoal dust and salt mixture upto a height of 2.5 meters from the bottom. At the top of the electrode a funnel with amesh shall be provided for watering the earth. The main earth conductors shall be connected to the electrode just below the funnel, with proper terminal lugs and check nuts. The funnel over the GI pipe and earth connection housed in a masonry chamber, approximately 350mm deep. The masonry chamber shall be provided with a cast iron cover resting over a CI frame embedded in masonry.

3.8. EARTH CONNECTION

All metal clad switches and other equipment carrying single phase current, shall be connected to earth by a single connection. All metal clad switches carrying medium voltage and high voltage shall be connected with earth by two separate and distinct connections. The earthing conductors inside the building wherever exposed shall be properly protected from mechanical injury by running the same in GI Pipe of adequate size.

Earthing conductors outside the building shall be laid 600mm below the finished ground level. The over lapping in copper strips at joints where required, shall be minimum 75mm. The joints shall be riveted and brazed with copper rivets and greased in approved manner. Sweated lugs of adequate capacity and size shall be used for all termination of wires above 1 Sqmm size and bare copper wire above 2.0mm dia. Lugs shall be bolted to the equipment body after the metal body is cleaned of paint and other oily substance and properly tinned. The earth wires entering the Final Distribution Boards shall be terminated with copper sockets crimped to its ends and tightened to the terminal with the help of flat end brass screws.

3.9. EARTH RESISTANCE

The earth resistivity of the soil where the earthing stations are located shall be submitted to the Consultant before the earthing work starts and get the approval of the Consultant/Owner. If the earth resistance is too high and multiple electrode earthing does/not give adequate low resistance to earth, than the soil resistivity immediately surrounding the earth electrodes shall be reduced by adding sodium chloride, calcium chloride, sodium carbonate, copper sulphate, salt and soft coke or charcoal in suitable proportions as directed by the consultants.

3.10. RESISTANCE TO EARTH

3.11. The resistance of each earth system shall not exceed 1.0 ohm in the case of Medium Voltage system and
0.5 ohm in the case of High Voltage system.

4 TESTING

4.1. GENERAL

On completion of the work the entire installation shall be subject to following tests:

a) Wiring Continuity Test
b) Insulation Resistance Test
c) Earth Continuity Test
d) Earth Resistively Test

Besides the above any other test specified by the local Authority shall also be carried out.
All tested and calibrated instruments for testing, labour, materials and incidentals necessary to conduct the above tests shall be provided by the Contractor at his own cost.

4.2. TESTING OF WIRING

All wiring systems shall be tested for continuity of circuits, short circuits and earthing after wiring is complete and before energising. The Test Certificates for the complete wiring shall be submitted in the Format and the Total Electrical Installation shall be got approved by the Electrical Inspector.

4.3. INSULATION RESISTANCE TEST

The insulation resistance shall be measured by applying between earth and the whole system of conductors, or any section thereof with all fuses in place and all switches closed (except in concentric wiring) all lamps in position of both poles of the installation, otherwise electrically connected together, a direct current pressure of not less than twice the working pressure (provided that it does not exceed 660 volts for medium voltage circuits) be applied. Where the supply is derived from A.C. three phase system, the neutral pole of which is connected to earth, either direct or through added resistance, pressure shall be deemed to be that which is maintained between the phase conductor and the neutral. The insulation resistance measured as above shall not be less than 50 divided by the number of points on the circuit provided that the whole installation shall not be required to have an insulation resistance greater than one mega ohm. The insulation resistance shall not be measured between all conductors connected to one phase conductor of the supply and all the conductors connected to the middle wire or to the neutral or to the other phase conductors of the supply. Such a test shall be carried out after removing all metallic connections between the two poles of the installation and in these circumstances the insulation resistance between conductors of installation shall not be less than that specified above.

The insulation resistance between the case of frame work of housing and power appliances, and all live parts of each appliance shall not be less than that specified in the relevant Indian Standard Specifications or where there is no such specification shall not be less than half a mega ohm.

4.4. TESTING OF POLARITY OF NON-LINKED SINGLE POLE SWITCHES

In a two wire installation a test shall be made to verify that all non-linked single pole switches have been fitted in the same conductor throughout, and such conductor shall be labelled or marked for connection to an outer or phase conductor or to the non-earthed conductor of the supply. In the three or four wire installation a test shall be made to verify that every non-linked single Pole switch is fitted in a conductor to one of the outer or phase conductor of the supply. The entire electrical installation shall be subject to the final acceptance of the Consultant as well as the local authorities.

4.5. EARTH RESISTIVITY TEST

Earth resistivity test shall be carried out in accordance with Indian Standard code of practice for earthing IS: 3043:1987. All tests shall be carried out in the presence of the Consultant/Owner.

4.6 TEST CERTIFICATES

The Electrical Installation shall be tested as per relevant Indian Standards and Test Certificate to this effect shall be submitted to the Owner. The Contractor has to get the Total Electrical Installation approved by the Electrical Inspector and the permission to energise the same shall be submitted to the Owner.

5 SAFETY REQUIREMENTS

5.1 SCOPE

This section covers the requirements of items to be provided in the sub-station for compliance with statutory regulations, safety and operational needs.

5.2 REQUIREMENTS

Safety provisions shall be generally in conformity with the relevant Indian Standards and I.E. Rules and Regulations. In particular the following items shall be provided.

(a) Insulation Mats

Insulation Mats conforming to IS: 5424-1969 shall be provided in front of main switch boards and other control equipment as specified.

(b) First Aid Charts and First Aid Box

Charts (one in English, one in Hindi, one in Regional language), displaying methods of giving artificial respiration to a recipient of electrical shock shall be prominently provided at appropriate place. Standard

First Aid Boxes containing materials as prescribed by St. John Ambulance brigade or Indian Red Cross should be provided in each sub-station.

(c) Danger Plate

Danger plates shall be provided on HV and MV equipment's. MV danger notice plate shall be 200mm x 150mm made of mild steel at least 2mm thick vitreous enamelled white on both sides and with inscriptions in signal red Colour on front side as required.

(d) Fire Extinguishers

Portable CO2 conforming to IS : 2878-1976 dry chemical conforming to IS 2171-1976 extinguishers shall be installed in the sub-station at suitable places as specified.

(e) Fire Buckets

Fire buckets conforming to IS: 2546-1974 shall be installed with the suitable stand for storage of water and sand.

(f) Tool Box

A standard tool box containing necessary tools required for operation and maintenance shall be provided in sub-station.

(g) Caution Board

Necessary number of caution boards as "Man on Line" "Don't switch on' etc. shall be available in the sub-station.

(h) Key Board

A key board of required size shall be provided at a proper place containing castell key, and

all other keys of sub-station and allied areas.

6.0 M V PANELS, SUB-DISTRIBUTION BOARDS & FINAL DISTRIBUTION BOARDS

The PANELS shall be suitable for operation on 3 phase, 4 wire, 415 Volts, 50 cycles, neutral grounded at transformer and short circuit level not less than 31 MVA at 415 volts.

The PANELS shall comply with the latest edition of relevant Indian Standards and Indian Electricity Rules and Regulations. All PANELS shall be fabricated by the contractor by using specified components as per the specifications given below:

6.1. CONSTRUCTION FEATURES

The PANELSs shall be metal enclosed sheet steel cubical, indoor, dead front, and floor mounting type. The distribution boards shall be totally enclosed, completely dust and vermin proof. Gaskets between all adjacent units and beneath all covers shall be provided to render the joints dust proof. PANELS shall be preferably arranged in multitier formation. All doors and covers shall be fully gasketed with foam rubber and/or rubber strips and shall be lockable. All MS sheet steel used in the construction of PANELS shall be 2mm thick and shall be cut to different sizes and bolted as necessary to provide a rigid support for all components. Joints of any kind in sheet metal shall be bolted type and not welded type.

All covers shall be properly fitted and square with the frame, and holes in the PANELS correctly positioned. Fixing screws shall enter into holes tapped into an adequate thickness of metal or provided with hank nuts. Self-threading screws shall not be used in the construction of PANELS. A base channel of 75mm x 40mm x 5mm thick shall be provided at the bottom. A minimum of 200 mm between the floor of MV PANELS & Distribution board and lower most unit shall be provided. The PANELS shall be of adequate size with a provision of 20% spare space to accommodate possible future additional switchgear in addition to spare feeders.

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Knockout holes of appropriate size and number shall be provided in the PANELSs in conformity with the location of incoming and outgoing cables.

PANELS shall be provided with removable aluminium plates at top and bottom to drill holes for cable entry at site.

The PANELS shall be suitable for IP 42 protection.

6.2. CIRCUIT COMPARTMENTS

Each circuit breaker, MCCB and switch fuse units shall be housed in separate compartments and shall be enclosed on all sides. Sheet steel hinged lockable door shall be duly interlocked with the ACB/MCCB/switch fuse unit in ‘on’ and ‘off’ position. Safety interlocks shall be provided for air circuit breakers to prevent the breaker from being drawn out when the breaker is in ‘on’ position. The door shall not form an integral part of the draw out position of the ACB. All instruments and indicating lamps shall not be mounted on the ACB compartment door. Sheet steel barriers shall be provided between the tiers in a vertical section. The Knobs for holding the cubicle door in closed position shall be spring operating rotating type and not screwed type.

6.3. INSTRUMENT ACCOMMODATION

Separate and adequate compartments shall be provided for accommodating instruments, indicating lamps, control contractors and control fuses etc. These shall be accessible for testing and maintenance without any danger of accidental contact with live parts of the circuit breaker, bus bar and connections.

6.4. BUS BARS & BUS BAR CONNECTION

The bus bar and interconnections shall be of electrolytic Copper of 99.9 % purity of rectangular cross sections suitable for full load current for phase bus bars and full rated current for neutral bus bar and shall be extendible on either side. Minimum 200 Amps capacity bus bars shall be provided in the distribution boards. The bus bars and interconnections shall be insulated with P C V Heat shrinking sleeves and color coded. The bus bars shall be supported on unbreakable, non hygroscopic insulated SMC supports at regular intervals to withstand the forces arising from short circuit in the system. All bus bars shall be provided in a separate chamber and properly ventilated. The current density of copper shall not be more than 1.6 Amps per sq.mm cross sectional area of Bus bar. If Aluminium bus bars are provided the current density of Aluminium shall not be more than 0.8 Amps per sq. mm cross section of Aluminium bus bar. Maximum allowable temperature for the Bus bar to be rrestricted to 85^0 C.

All bus bar connections in PANELS shall be done by drilling holes in bus bars and connecting by cadmium plated M.S. bolts and nuts. 20% Additional cross section of bus bars shall be provided in all distribution boards to cover up the holes drilled in the bus bars. Spring and flat washers shall be used for tightening the bolts.

Automatically operated safety shutters to screen the live cluster when the breaker is withdrawn from cubicle is to be provided.

All connections between bus bars and switches and between switches and cable alley terminals shall be through solid copper strips of proper size to carry full rated current and insulated with PVC heat shrinking sleeves . All the PANELSs shall be completely factory wired, ready for connection. All the terminals shall have adequate current rating and size to suit individual feeder requirements. Each feeder shall be clearly numbered from left to right to correspond with wiring diagram. All the switches and feeders shall be distinctly marked with a small description of the service installed. Minimum width of Busbar Alley shall be 300 mm and that of cable alley shall be 450 mm.

6.5. TERMINALS

The outgoing terminals and neutral link shall be brought out to a cable alley suitably located and accessible from the PANELS front. The current transformer for instruments metering shall be mounted on the terminal blocks. Cable compartments shall be provided for incoming and outgoing cables with suitable bus bar extension and supports.

6.6. WIREWAYS

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

6.7. CABLE COMPARTMENTS

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

Switch/MCC B's terminals shall be brought out to terminal blocks in the cable compartment. The switch board shall have in each PANELS thermostatically controlled space heaters/ ventilation fans.

6.8. METERS

All meters shall be housed in a separate compartment and accessible from front only. Lockable doors shall be provided for the metering compartment. The details of other meters and indicating lamps are as described in each switch board and neutral selector switch of appropriate range and scale. Wiring for meters shall be color coded and labelled with approved plastic ferrules for easy identification. All meters shall be digital.

6.9. CURRENT TRANSFORMERS

Where ammeters are called for CT's shall be provided for current measuring more than 60 Amps. Each phase shall be provided with separate current transformer of accuracy class I and suitable V.A. Burden for operation of associated metering and Relays. Current transformers shall be in accordance with IS: 2705- 1964 as amended upto date and Cast Resin Type. Tape wound CTS are not acceptable. The name plate of CT's. Shall be fixed in such a way it can be easily readable without dismantling.

6.10. INDICATING PANELS AND METERING EQUIPMENT

All meters and indicating instruments shall be accordance with relevant Indian Standards. The meters shall be flush mounted and drawout type. Indicating lamps shall be neon type and of low burden. Indicating lamps shall be backed up with fuses of 5 Amps and toggle switch.

6.11. EARTHING

Copper earth bars of 25mm x 3mm shall be provided for all PANELSs for the full length and connected to the frame work of the PANELS.

Provision shall be made for connection from this earth bar to the main earthing bar on both sides of the PANELS.

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6.12. PAINTING

All sheet steel work shall under go a process of degreasing pickling in acid, cold rinsing, phosphating, passivating and then sprayed with a high corrosion resistant primer. The primer shall be baked in an oven. The finishing paint treatment shall be by powder coating.

6.13. LABELS

Engraved anodized aluminium labels shall be provided on all incoming and outgoing feeder switches. Circuit diagram showing the control wiring shall be pasted on inside of the PANELS door and covered with transparent laminated plastic sheet. The Label shall indicate the name of the feeder, the specific area it is feeding, ampere rating and the cable size it is receiving. The Labels shall be provided on the backside of the PANELS in case of back access.

All the PANELS shall be subject to tests specified in relevant Indian Standards and test certificate shall be furnished.

6.14. SHOP DRAWING

Before fabricating the PANELSs the contractor has to submit shop drawing showing the general arrangements, bill of materials and the wiring diagram for all the PANELS to the Consultant and get approval from the Consultant.

6.15. INSPECTION

At all reasonable times during production and prior to shipment of equipment the contractor shall provide and secure for Consultant/ Owners representative every reasonable access and facility at their plant for inspection.

6.16. TEST CERTIFICATES

Testing of PANELS shall be carried out at factory and at site as specified in Indian Standards. The test certificates for the tests carried out at factory shall be submitted in duplicate.

6.17 MINIATURE CIRCUIT BREAKER (MCB)

Miniature circuit breaker shall be quick make and break type and confirm with Indian Standards IS: 8828
– 1978 (Specifications for Miniature Air Break Circuit breakers for voltage not exceeding 1000V) the housing of MCB's shall be heat resistant and having a high impact strength. The fault current of MCB's shall not be less than 9000 Amps at 230 volts. The MCB's shall be flush mounted and shall be provided with trip free manual operating mechanism "ON" and "OFF" indications.

The MCB contacts shall be silver nickel and silver graphite alloy coated with silver. Proper arc chutes shall be provided to quench the arc immediately. MCB's shall be provided with magnetic fluid plunger release for over current and short circuit protection. The over load or short circuit devices shall have a common trip bar in the case of DP and TPN Miniature circuit breakers. The MCB shall be tested and certified as per Indian Standards prior to installation.

6.18 LV MCCB (Moulded Case Circuit Breakers)

6.18.1 General

Moulded case circuit breakers shall be incorporated in the switch board wherever specified. MCCB shall conform to the latest IEC 60947-Part 1&2 & IS 13947:1993 in all respects.

1. They shall be of Category A with a rated service breaking capacity (Ics) rating.
2. MCCBs shall be available in fixed or plug-in/withdraw able versions as well as in 3-pole and 4-pole versions. For plug-in/withdraw able versions, a safety trip shall provide advanced opening to prevent connection and disconnection of a closed circuit breaker.
3. MCCBs shall be designed for both vertical and horizontal mounting, without any adverse effect on electrical performance. It shall be possible to supply power either from the upstream or downstream side
4. MCCBs shall provide class II insulation (according to IEC 60664-1 standard) between the front and internal power circuits.
5. Rated insulation voltage shall be 750V AC (50/60 Hz).
6. The circuit breaker shall comply with the isolation function requirement of IEC 60947-2 section 7.1.2 to marked as suitable for isolation/disconnection to facilitate safety of operating personnel while the breaker is in use.
7. All MCCBs required as per BOQ shall have Ics – rating not Icu rating.

6.18.2 Construction

- For maximum safety, the power contacts shall be insulated in an enclosure made of a thermosetting material from other functions such as the operating mechanism, the case, the trip unit and auxiliaries.
- The operating mechanism of MCCBs shall be of the quick-make, quick-break type with fault tripping overriding manual operation. All poles shall operate simultaneously for circuit breaker opening, closing and tripping
- MCCBs shall be actuated by a toggle or handle that clearly indicates the three positions: ON, OFF and TRIPPED in order to ensure suitability for isolation complying with IEC 60947-2
- The operating mechanism shall be designed such that the toggle or handle can only be in OFF position if the power contacts are all actually separated, in OFF position, the toggle or handle shall indicate the isolation position. Isolation shall be provided by a double break on the main circuit
- MCCB shall be equipped with a “push to trip” button in front to test operation and the opening of poles.

6.18.3 Current Limiting, Discrimination & Endurance

- MCCBs shall comprise a device, designed to trip the circuit-breaker in the event of high-value short-circuit currents. This device shall be independent of trip unit.
- The electrical endurance of MCCBs, as defined by IEC 60947-2 standard, shall be at least equal to 3 times the minimum required by the standard
- The MCCB shall employ maintenance free double break contact system to minimize the let-through energies and capable of achieving discrimination up to the full short circuit capacity of the downstream MCCB. The manufacturer shall provide both the discrimination tables (with test certificates) and let-through energy curves.

6.18.4 Accessories

MCCB shall be provided with the following accessories, as specified in schedule of quantities.

i) Under voltage trip
ii) Shunt trip
iii) Alarm switch
iv) Auxiliary switches

All the accessories shall be rated for continuous operation. These Auxiliaries shall be common for the similar type and range of MCCBs.

It should be possible to fit MCCBs with a motor mechanism for electrically controlled operation.

6.18.5 Interlocking

Moulded, case circuit breakers shall be provided with the following interlocking devices.

a) Extended door handle.
b) Handle interlock to prevent unnecessary manipulations of the breaker.
c) Door interlock to prevent the door being opened when the breaker is in ON position.
d) Defeat-interlocking device to open the door even if the breaker is in ON position.

The MCCB shall be current limiting type and comprise of quick make – Break switching mechanism. MCCBs shall be capable of defined variable overload adjustment. All MCCBs shall have adjustable short circuit pick-up.

The trip command shall override all other commands. Protection Functions Wherever

Specified

- All the MCCBs shall be with microprocessor based trip units with adjustable Overload & Short circuit protection. Earth fault/Earth leakage protection shall be provided in the MCCB.
- Trip units shall be fully interchangeable type and it should be possible to upgrade the trip unit anytime without any modifications in the installation.
- In case of overload, Pre alarm indication shall be provided on the MCCB.

- Trip units shall be adjustable and it shall be possible to fit lead seals to prevent unauthorised access to the settings.
- Trip units shall comply with appendix F of IEC 60947-2 standard (measurement of rms current values, electromagnetic compatibility, etc.)

- Protection settings shall apply to all circuit breaker poles.

- Trip units shall be equipped with Thermal memory feature to reduce the stress on the installation in case of repetitive overloads.
- All electronic components shall withstand temperatures up to 125 °C.

6.18.6 Testing

a) Original test certificate of the MCCB as per IEC 60947-1 &2 or IS13947 shall be furnished.

b) Pre-commissioning tests on the switch board PANELS incorporating the MCCB shall be done as per standard specifications.

LIST OF APPROVED MAKES OF CIVIL MATERIALS

1.	Chlorpyriphios	-	DE-NOCIL, Cynamide
2.	Structural Sealant	-	Wacker, Dow Corning, GE
3.	Structural Steel	-	TATA. SAIL, RATHI, JINDAL
4.	Reinforcement Steel (TMT (FE 415 Grade)	-	TATA, SAIL, RATHI, JINDAL
5.	M.S. Pipe, Tubes, Bar, Flats, Angle, Tee Sections	-	TATA, SAIL, ARUN, JINDAL
6.	Cement OPC/PPC	-	Ultratech, JK Super, JK Laxmi, Wonder, Birla Uttam, Birla Chetak
7.	Sand	-	Banas, Shopur,
8.	Grit	-	Nasirabad
9.	Bricks	-	SSB/VBC/JBC
10.	Stone	-	Local (Dumada, Sri Nagar, Gagwana)
11.	Tiles	-	Kajaria, Somani ,Johnson, Orient, Nitco (1st Quality)
12.	Wood	-	Sal, MP Teak 2nd Class
13.	Fitting	-	S.S.
14.	Sand Stone	-	Dholpur Beige/Jodhpur Beige
15.	Marble	-	Kasaria Green, Jasalmer Yellow, Rajnagar white
16.	Granite	-	Jhansi Red, Jhunjhunu Red, South Black
17.	Wall Putty	-	Birla J K,
18.	Aluminium	-	Jindal / Hindalco
19.	Glass Panes	-	Saint Goben, Modi, Tata, Asi
20.	Concrete admixture	-	Fosroc/ Cico.
21.	Polysulphide sealant	-	Pidilite, Chemetall-Rai
22.	Bitumen Impregnated Board	-	Shalitex or approved equivalent

23	Polyethylene back up rod	-	Supreme Ind. Ltd. or approved equivalent
24	PVC water stops	-	Fixopan / Sintex
25.	White Cement	-	Birla, J.K
26.	Water proofing compound	-	Sika or approved equivalent
27.	Shuttering Ply	-	Jyoti Ply, Archid, Merino
28.	APP Polymeric Polyethylene Felt	-	'PIDILITE' or approved equivalent
29.	Expanded Polystyrene	-	Beardshell or approved equivalent (Thermocole)
30.	Extruded Polystyrene	-	Iso board ND or approved equivalent
31.	Hessian Based Felt	-	'BITUMAT' or approved equivalent

Note: In the List of recommended above, out of makes mentioned in the list, only 1st make shall be quoted for and used. However, if due to non-availability or any other technical reasons, the alternative make is allowed, it shall be subject to price adjustment.

LIST OF APPROVED MAKES OF ELECTRICAL MATERIALS

1.	PVC Insulated copper wire for internal wiring	-	Havel's, Anchor, Standard, Rallision, R.R. Cables, Polycab
2.	PVC Insulated copper/Al power cables (Armoured	-	Havel's, Polycab, Rallision
3.	Telephone Cables	-	Delton, Skyline, Anchor, R.R.Cables,
4.	Plate type switches &socket and other wiring accessories	-	Phinolex Anchor, SSK, Rider
5.	Miniature Circuit Breakers and Isolators and DB	-	Havel's, Indokoop, Standard
6.	ELCB/RCCB	-	Havel's, Indokoop, Standard
7.	P.V.C. Conduit, Junction Box and other Accessories	-	Diamond, Prince, Avon kota, Mayoor, Kumar
8.	Light fixtures	-	Philips/Wipro/Regent
9.	GLS Lamps/ CFL Lamps /Tube light	-	Philips / Wipro/Surya
10.	Gang Box	-	Make same as make of switch and Sockets.
11.	Conduit accessories	-	Sharma/Steel craft/ Rama
12.	Switches, Plugs	-	Philips/Crabtree/Legrand (modular type) Northwest/ Schneider
13.	Maintenance Earthing	-	Dehn, obobettermann
14.	Any other items	-	Sample to be approved by Engineer in charge

SCHEDULE OF QUANTITIES FOR MAKING OF CUPBOARDS, ELECTRIC WIRING AND TRUNK ROOM AT AJAYPAL HOUSE, MAYO COLLEGE AJMER F.Y 2025-26

(Quantities may vary subject to site condition)

Items mentioned below are for all floors & levels unless otherwise mentioned in each item.

ESTIMATED COST ₹ 20.50 LACS EXCLUDING GST

S NO	DESCRIPTION	AMOUNT (₹)
A	Civil Works	
B	Electrical Works	
	Total	
	GST	
	Total Amount	

We agree to work at …… .% (…… percent) **Above / Below** on the "Basic Schedule of Rates- 2022" issued by Public Works Department, Govt of Rajasthan for specific items not covered by "Bill of quantities.

SCHEDULE OF QUANTITIES FOR MAKING OF CUPBOARDS, ELECTRIC WIRING AND TRUNK ROOM AT AJAYPAL HOUSE, MAYO COLLEGE AJMER F.Y 2025-26

(Quantities may vary subject to site condition)

Items mentioned below are for all floors & levels unless otherwise mentioned in each item.

ESTIMATED COST ₹ 20.50 LACS EXCLUDING GST

CIVIL WORK

S NO	PARTICULARS	UNIT	QTY	RATE	AMOUNT
A	**DISMANTLING**				
	NOTE: All malba/ demolished material to be removed from site and transported to local municipal approved dump/location and handling over the usable material to Mayo College				
1	Complete Civil, Sanitary Plumbing & Electrical Work dismantling of existing building like all plaster, pointing, necessary stone Masonary, flooring, brick work, doors and windows, all sanitary and plumbing fittings, all electrical fittings etc. including removing of malba. Plinth area to be measured	Sqm	1160		
B	**CONCRETE WORK**				
1	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level, including ramming, finishing etc. and excluding centring & shuttering.				
a	1:3:6 (1 Cement : 3 coarse sand : 6 graded stone aggregate 20 mm nominal size)	Cum			
2	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work at all levels and also to be provided below floors wherever required.				
a	1:2:4 (1 Cement : 2 coarse sand : 4 graded stone aggregate 20 mm nominal size)	Cum	12		
C	**BRICK WORK**				
1	Half brick masonry in superstructure, above plinth level in cement mortar 1:4 (1 cement : 4 coarse sand) including providing and placing in position 2 Nos. 6mm dia M.S. bars at every third course of half brick masonry (with F.P.S. bricks)	Sqm	130		
D	**WOOD WORK**				
	All wood work including required SS hardware and holdfasts as required				

1	Providing wood work in frames of doors, windows, clerestory windows and other frames, wrought frames and fixing in position.				
a	Sal wood	Cum	1.50		
2	Providing and fixing ISI flush door shutters of approved quality and make non decorative type core of black board construction with internal frame of 1st class hard wood and well matched 3mm commercial ply veneering with vertical grains or cross bands face veneers on both faces of shutters along with providing 25mm thick teak wood battens on all side/edges of the shutters including all necessary hardware in SS.				
a	25 mm thick including ISI marked stainless steel butt hinges with necessary screws finished with laminate on both sides. **FOR CUPBOARDS.**	Sqm	105		
3	Providing and fixing of beading on Chowkhat size 75 mm x 10 mm.	Rmt	325		
E	**STEEL WORK**				
1	Structure steel work in single section fixed without connecting plate including cutting, hosting, fixing in position and applying steel primer above plinth level up to 4.5 meter height.				
a	In RS joints, tees, angles, channels, etc.	Kg	50		
F	**FLOORING**				
1	Providing and laying 25-35 mm thick Bhilwara Stone over average 20 mm thick CM 1:6 with admixture of pigment to match the shade of stone with joint thickness up to 15mm.	Sqm	50		
2	Providing and fixing pre-polished granite stone, machine cut for Kitchen / toilet platforms, venity counters facias, skirting, risers and similar locations or required size of approved shade, color and texture laid over 20 mm thick base cement mortar 1:4 (1 cement : 4 coarse sand) with joints treated with cement, mixed with matching pigment, epoxy touch ups, at all levels, also includes cost of making opening of required shape and size for washbasins/kitchen sick and holes for pillar cock etc. as required including half round moulding to edges. (Base rate of stone Rs. 125/- per Sqft) for **Shelves.**	Sqm	80		
3	Moulding on granite / kota stone.				

a	Half round on granite stone with granite polish.	Rmt	100		
b	Full round on granite stone with granite polish.	Rmt	25		
G	**FINISHING**				
1	Providing on old/new surface of walls in cement sand mortar 1:6 including raking of joints etc. complete fine finished.				
a	Providing up to 25 mm cement plaster over in cement mortar 1:6 (1 cement : 6 coarse sand)	Sqm	600		
2	Removing white or color wash by scrapping and sand papering and preparing the surface smooth including necessary repair to scratches by sandla/loi.	Sqm	2100		
3	Scraping and removing of existing enamel paint/polish from chowkhats, doors, windows and ventilations by applying paint remover and scratching using sharp glass edges and then sanding to smooth finish revealing original wood fixture and color complete in all respect.	Sqm	200		
4	Painting with synthetic enamel paint including priming coat with primer of approved brands and manufacture of required color to give an even shade, Two or more coats on old and new work over as under coat of suitable shade with ordinary paint of approved brand and manufacture for door/ window/ ventilator frames & shutters including beading etc. fixed on it.	Sqm	350		
5	Providing and applying J K white cement based putty over cement plaster surface for making even surface.	Sqm	1100		
6	Distempering with acrylic distemper of approved brand and shade (two or more coats) and of required shade on new work, over and including, priming coat of whiting to give an even shade including all scaffolding.	Sqm	2100		
	TOTAL AMOUNT (A)				

SCHEDULE OF QUANTITIES FOR MAKING OF CUPBOARDS, ELECTRIC WIRING AND TRUNK ROOM AT AJAYPAL HOUSE, MAYO COLLEGE AJMER F.Y 2025-26

(Quantities may vary subject to site condition)

Items mentioned below are for all floors & levels unless otherwise mentioned in each item.

ELECTRICAL WORK

S NO	PARTICULARS	UNIT	QTY	RATE	AMOUNT
1.0	**POINT WIRING AND SUB MAIN WIRING**				
	1. The Point wiring shall include the rates for:				
	a. Before placing order for the items like switch, conduit, wire etc. samples should be submitted and approved from consultant and client. All items used at site shall be displayed on a sample plate.				
	b. Point wiring will include cost of minor civil work like providing expanded metal mesh of 10 x 15 mm strand, 150 mm wide, 1 mm thick over recessed vertical conduit in walls along with the steel hooks and finally covered with the cements mixture (Murg Jali). The Point wiring cost will include circuit wiring, conduits, accessories , wires, switches plates, metal boxes, junction boxes etc.				
	c. The wiring item shall also include the cost of providing and fixing the numbering ferrules in all the wires.				
	d. For point wiring the cost of flexible conduits, conduit coupler and connector shall be included in the rates quoted.				
1.1	Wiring for following points with 1.5 Sq.mm PVC insulated flexible copper conductor single core wires of 1100 V grade in recess or surface PVC medium grade ISI marked conduit (IS-9537-Part-III) with Anchor / Havells make modular switches and accessories complete with accessories such as bends, junction boxes pull wire including 1.0 sq.mm copper conductor green color earth wire for earthling of all metal boxes, light fixtures, exhaust fan etc. complete as required including circuit wiring.				
a	One Light point controlled	No.	100		
b	Exhaust fan point with 6A 3 pin socket outlet near exhaust fan and controlled with 1 no. 6A switch	No.	10		

1.2	Wiring for light and power socket outlets with following sizes PVC insulated flexible copper conductor single core wires of 1100 V grade in recess or surface PVC medium grade ISI marked conduit (IS : 9537 Part-III) complete with accessories such as bends junction boxes, pull boxes, etc with piano type switches and sockets, 1.6 mm thick G.I. boxes of suitable size embedded in wall and concealed and flushed with wall or mounted on trunking including cutting and refilling the chases etc. inclusive of circuit wiring as required, and inclusive of PVC insulated copper earth conductor for socket outlets as per specification.				
a	6A 5 pin raw power socket outlet with 6A switch mounted side by side with 2 x 1.5 sq.mm PVC insulated single core flexible copper conductor wires and one no. 1.5 sq.mm insulated green color earth wire.	No.	80		
b	16A 6 pin raw power socket outlet with 16A switch mounted side by side with 4.0 sq.mm PVC insulated single core flexible copper conductor wires and one no. 2.5 sq.mm insulated green color earth wire.	No.	20		
c	Providing and fixing call bell with switch including wire, conduit pipe etc. complete.	No.	2		
d	Providing and fixing Dish TV point	Each	2		
e	Providing and fixing fan regulator	Each	60		
2.0	**DISTRIBUTION BOARDS**				
	1. All DB shall be factory fabricated only				
	2. The rates shall also include the cost of thimbles and numbering ferrules in all the wire.				
	3. All light MCB shall be of B curve and for power shall be of C curves.				
2.1	supplying and fixing of 240/415 volts **10 KA** miniature circuit breaker / isolators of following rating in **the existing MCB DBs** complete with connections, testing and commissioning etc. as required				
a	6-32A single pole MCB	No.	64		
b	40-63A Four pole MCB	No.	4		
2.2	Supplying and fixing of following types of factory fabricated prewired **TPN double** door sheet steel MCB distribution boards, moisture, dust and vermin proof having **IP 42 degree of protection**, 240/415 volts, on surface/recess, complete with tinned copper bus bar, neutral bus bar, earth bar,				

	din bar, interconnections, finished with powder coating including , earthing etc. as required :				
a	4 way TPN DB	No.	2		
2.3	Supplying and fixing of following types of factory fabricated prewired TPN **double door** sheet steel MCB distribution boards, moisture, dust and vermin proof having **IP 42 degree of protection**, 240/415 volts, on surface/recess, complete with tinned copper bus bar, neutral bus bar, earth bar, din bar, interconnections, finished with powder coating including , earthling etc. as required :				
a	6 way TPN DB	No.	2		
3	**POINT AND SUB MAIN WIRING**				
1	Providing and Laying FRPVC 2.5Sqmm x1 copper wire with 1.5 Sq.mm earth wire including P.V.C.conduit.	Rmt.	200		
2	Providing and Laying FRPVC 4 Sqmm x4 copper wire with 1.5 Sq.mm earth wire including P.V.C.conduit.	Rmt.	200		
4	**TV AND INTERNET CABLE**				
	TV Cable in existing Conduit				
1	Supplying and fixing co-axial TV Cable RG - 6 grade, 0.7 mm solid copper conductor PE insulated, shielded with fine tinned copper braid and protected with PVC sheath in the surface/ recessed PVC conduit as required.	Rmt.	200		
2	Supply and laying of Cat 6 Internet cable.	Rmt.	150		
3	Supply and laying of conduit pipe for Internet cable	Rmt.	150		
5	**LIGHTING FIXTURES AND FANS**				
	Necessary down rods, hanging chains etc. shall be part of the fixtures.				
	Samples of all the fixtures shall be submitted to the consultants before supply & approval is taken.				
5.1	Fixing decorative ceiling lights 6" wide	No.	20		
5.2	Providing and fixing of 36 Walt LED tube light	No.	40		
5.3	Providing and fixing of 48" ceiling fan	No.	20		
6	**Solar Points with ELCB**	Each	4		
	TOTAL AMOUNT (B)				