

**REGISTRAR  
GURU NANAK PUBLIC SCHOOL  
SEC-36 CHANDIGARH**

**NAME OF THE WORK** : Construction of Auditorium at Guru Nanak Public School, Sector-36 , U.T Chandigarh

**ARCHITECTS** : Designers Consortium ( P ) Ltd.  
SCO 112-113 , First Floor  
Sector -8 C , Madhya Marg , Chandigarh  
Phone : 0172- 5019284,  
E : mail : dcpl8c@yahoo.com

**Name of Contractor / Firm** : M/s \_\_\_\_\_

**Whom tender** \_\_\_\_\_

Phone No. \_\_\_\_\_

**NIT No.** \_\_\_\_\_

**Dated** \_\_\_\_\_

**1. Cost of tender Documents** : Rs.50000/- ( Rupees Fifty thousand only )

**( Non Refundable )**

## **INDEX**

<b>SR.NO.</b>	<b>DESCRIPTION</b>
1.	Notice inviting tender
2.	Tender form
3.	General Instructions to the contractors
4.	Term and conditions of contract
5.	Technical specifications
6.	Schedule of Quantities
7.	Brands / Make of the material to be used in the work.
8.	Drawings

**REGISTRAR GURU NANAK PUBLIC SCHOOL SEC-36 CHANDIGARH**  
(Registrar,GNPS CHD.)

- 2.0 Sealed tenders on Percentage rates as per given specifications as mentioned in BOQ are invited from reputed and experienced contractors registered with CPWD, M.E.S, State PWD of Punjab , State PWD of Haryana and U.T. (Admin.).  
The bid shall be submitted in two envelopes , Technical bid & Financial bid only tech. bid shall be opened on the date of submission , Fine. bid shall be opened after scrutiny of the Technical bid only for the contractor who qualified as per terms.
- 3.0 Last date for submission of the bids is 13.02.2024 up to-14 00 hrs (2:00 PM) Technical bid shall be opened on the same day at 14:30 hrs (2:30 PM) in presence of representatives of the contractors who wish to be present.
- 4.0 Only those contractors who fulfill the following criteria shall be considered by Registrar, GNPS CHD. for evaluation of their respective bids,
- i) Should be registered with any one of the agencies/departments as mentioned at clause 1.0 above.
  - ii) Contractors/firms should have successfully completed during last 3 years ending last day of the month previous to the one in which the bids are invited, one similar work costing not less than Rs. 2.25 Crores. Similar works in this case will mean civil construction works.
  - iii) Average annual financial turnover during the last 3 (three) years ending 31 March of previous year should be at least Rs. 5 Crores . However Registrar, GNPS CHD. can relax any clause keeping in view the past performance & quality of existing works of the contractor for similar works.
- 5.0 Bids shall be accompanied with the following documents.
- a) Earnest Money Deposit (EMD) **Rs. 6,00,000/-** in the form of Demand Draft, clause 1.0 of General Conditions of Contract.
  - b) List of works carried out during the last 7 (seven) years supported by copies of work orders, completion certificates etc. issued by clients if not supplied earlier .
  - c) Balance sheet for the last three years if not supplied earlier .
- Bids of the contractors not meeting the eligibility criteria stipulated above, shall be rejected. Similarly, bids not accompanied with EMD shall be rejected.
- 6.0 Bidder shall submit its bid ( Priced Commercial Bid ) in a sealed envelopes .
- 7.0 Registrar, GNPS CHD reserves the right to accept or reject any bid without assigning any reason thereof.
- 8.0 Bids shall remain firm and valid for acceptance for a period of 90 days from the date of submission.

- 9.0 Registrar, GNPS CHD does not bind itself to accept the lowest bid and it reserves the right to accept or reject any or all the bids either in whole or in part without assigning any reason (s) thereof.
- 10.0 The rates quoted by the contractors for various items of BOQ shall be all inclusive covering material, labour, taxes, GST, profit, service tax on labour part as applicable from time to time, Now current is 18% of total contract value, etc. as specified in BOQ.
- 11.0 The rates shall be quoted in the enclosed Bill of quantities and duly signed by the contractor.
- 12.0 All erasures and alterations made while filling the tender must be attested by the initials of the bidders. Over-writing of figures is not permitted. Failure to comply with either of these will render the tender void. No request for any change in terms and conditions after the opening of tenders will be entertained.
- 13.0 The duration of the contract will be for one years and may be extended for a further period with mutual consent.
- 14.0 Successful contractor will be required to enter into a contract agreement with Registrar, GNPS CHD in the prescribed Performa for execution of the above mentioned work.
- 15.0 Conditional tenders are liable to be rejected.

**Registrar,  
GNPS CHD**

## **Tender Form**

To,

**Registrar,  
Guru Nanak Public School  
Chandigarh.**

Having examined the drawings, specifications design and schedule of quantities relating to the work specified in memorandum hereinafter set out and having examined the site of the work specified in the said memorandum.

1. I/ we hereby offer to execute the work specified in the memorandum at the rates mentioned in the attached schedule of quantities & conditions of the contract and with such material as are provided for, by and in all other respects in accordance with such conditions so far as they may be applicable.

### **Memorandum**

- |    |  |   |  |
|----|--|---|--|
| a) | Description of work  | : | Construction of Auditorium at Guru Nanak Public School Chandigarh  |
| b) | Earnest Money  | : | Rs. 6,00,000/- only  |
| c) | Time allowed for the completion of the work starting from ten days after issuance of award letter to commence the work | : | 12 Months  |
| d) | Earnest Money  | : | 2% of the contract value by bank guarantee of any scheduled bank   |
| e) | Performance Guarantee to be deposit before award the successful renderer   | : | 5% of the contract value by bank guarantee of any scheduled bank   |
| f) | Security money to be deducted from each RA Bill  | : | 3 % of the gross value of each R/A bill  |
| f) | Total security deposit TSD   | : | 2% (EMD) + 5% (PG)+3%<br>= 10% i.e. Rs 30 lacs   |
| g) | Refund of TSD  | : | i) 50% TSD after 3 months virtual completion of work and clearance of site.<br><br>ii) Balance after completion of defect liability period |
| h) | Defect liability period (DLP)  | : | 12 months from the date of completion of work.   |
| i) | Liquidated damage for delay  | : | maximum of 5% of the contract value.   |

2. Should this tender be accepted, I hereby agree to abide by and fulfill all terms, conditions and provisions of this contract.
3. We deposit a sum Rs. 6,00,000/- as earnest money with Principal Guru Nanak Public School Chandigarh which amount is not to bear any interest. Should I / we fail to execute the contract when called upon to do so. Registrar, GNPS CHD has all the right to forfeit this amount.
4. The list showing the particulars of major work carried out by us are enclosed.
5. Our Bankers are \_\_\_\_\_

**Signature and address  
of witness**

Yours faithfully

1. \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**Signature of contractor  
( Seal )**

2. \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

## **GENERAL INSTRUCTION TO CONTRACTORS**

1. Before tendering, the tenders shall visit the site, careful examine the terms and conditions of the contract. In case of any ambiguity, discrepancy should be got clarified from Registrar, GNPS CHD.
2. All documents shall be submitted in two sets one is Technical Bids and other is financial Bids.
3. The tenders shall remain open by the owner for the period of 90 Days from the date of opening of tenders.
4. The tenderers must quote only in forms issued by owner.
5. The rates should be quoted in figures and words all alterations / cutting shall be attested by the tenders.
6. Each page of the tenders documents shall be stamped by the tenderers.
7. The earnest money deposit of Rs.6,00,000/- paid by the successful tenderer along with tenderes shall be deemed to be converted into security on allotment of work.
8. **MODE OF SUBMISSION OF TENDERS:-**
  - a) Sealed tenders should be addressed to the “**Registrar, Guru Nanak Public School , Sector-36, Chandigarh.**” & should reach 13.02.2024 by 2:00 P.M.
  - b) Tenders shall be submitted in two envelopes one envelopes shall contain earnest money in the shape of DD & Contractor completed works, other envelopes shall contain financial Bid. Both these envelopes shall be placed in one envelop.
  - c) The contractor shall clearly write name of tenderer, name of firm quoting tenders & details of D.D. no. of earnest money.
  - d) All envelopes shall be duly sealed before submission to the office.
9. **OPENING OF TENDER:** The tender shall be opened in the office of **Registrar, Guru Nanak Public School, Sector-36, Chandigarh** in the presence of prospective bidders or their Authorised Representative who so ever wish to be present on 13.02.2024 at 2:30 P.M.
10. On receipt of intimation, the successful bidder is bound to implement the contract in stipulated time and within 30 days thereof the successful bidder shall sign the formal contract agreement.

**Registrar,  
Guru Nanak Public School  
Chandigarh**

## **TERMS AND CONDITIONS OF CONTRACT**

1. In these conditions, the specifications, schedule of quantities and contract agreement the following words shall have meaning herein assigned to them.

- a) **Employer / Owner** : Shall mean **Registrar, Guru Nanak Public School Sector-36, Chandigarh** or its authorized representative
- b) **Contractor** : Contractor shall mean \_\_\_\_\_  
\_\_\_\_\_ or  
his authorized representative.
- c) **Architect** : Shall mean M/s Designers Consortium (P) Ltd.  
SCO 112-13, First Floor, Sector -8-C, Chandigarh  
and shall include its assigns & successors.
- d) **Site** : Guru Nanak Public School Sector-36, Chandigarh
- e) **The contract** : All the terms and conditions, Schedule of quantities,  
General instructions to contractors & other documents  
attached with tender & any other documents mutually  
agreed after signing of the contract agreement.
- f) **Notice in writing** : Written notice delivered personally other wise  
proved to have been sent by registered post to the  
last known address of the contractor / company .
- g) **The works** : Shall mean Construction of Auditorium at Guru  
Nanak Public School, Sector-36, Chandigarh

### **2. EARNEST MONEY DEPOSITED:-**

The earnest money deposited (EMD) is Rs. 6,00,000/- ( Rupees Six Lacs only). The bidder shall pay this sum in the form of a Demand draft issued by the Scheduled Bank in favour of **“Principal Guru Nanak Public School Chandigarh”** Payable at Chandigarh. The EMD of unsuccessful bidder will be returned to them without any interest on allotment of work. EMD of the successful bidder shall be adjusted towards the retention money in running bill account.

### **3. SCOPE OF WORK:**

The scope of work includes construction of **Auditorium Building as per BOQ**. The works shall also inclusive of internal water supply services, Sewage / plumbing services, internal electrical services, Drainage system, etc & other services mentioned in the schedule of quantities & drawings.



4. **DRAWING & SCHEDULE OF QUANTITIES AND AGREEMENT.**

The contractor shall executed agreement in `triplicate. The employer shall furnish three copies of drawings & specifications to the contractor issued during progress of work free of cost. One copy of the contract, drawing & specification shall be available at the site for checking their perusal .

5. **SETTING OUT OF WORKS:**

The contractor shall set out the works and shall be responsible for true and perfect setting out of, the same for the correctness of the positions levels, dimensions and alignment of all parts thereof. If at any time any defect in this respect shall be detected during the progress of the works or within a defect liability period of completion of work, the contractor shall at his own expense rectify the defect to the entire satisfaction of the employers.

6. **MATERIAL & WORKMANSHIP:**

All the material / workmanship shall confirm to PB PWD specifications amended up to date / IS Code make approved by the employer. The contractor shall at his own arrange for and / or carry any test of any material which employee may require. The brand / make of the material other than supplied by employer shall be approved by the employer.

7. **SUBLETTING :**

The contractor shall executed the work by deploying his own Labour / Machinery in no case work shall be Subletted to other agencies, However in case of special services, like electrical services, fire fighting plumbing, water supply etc. sub letting can be allowed with specific permission of the employer.

8. **MEASUREMENT OF WORK:**

The work shall be measured by the contractor representative in the presence employer representatives as per mode of measurement – specified in IS Code amended time to time, in case of any contradiction then other procedures based on ISI or accepted mode by all the interested parties will be resorted to . The actual work done shall be measured at site.

9. **PRICES FOR EXTRA ITEMS:**

The extra items encountered during the execution of work shall be paid as under:-

The extra item which can be derived from schedule of quantities shall be paid accordingly in consultation with Architects . However, if extra item cannot be worked out on the basis of schedule of quantities , Analysis of rates shall be prepared on the basis of labour / material components of as per PB PWD Specification and Common Schedule of rates 2020 amended up to date and premium shall be paid as per approved by the Punjab Government on that chapter on that day with markets rates of (material + labour) and the contractor will be entitled to get 10% over and above the values so derived .

10. **REMOVAL OF WORK :-**

Any work material during execution of work found improper / under specification shall be rectified replaced by the contractor at his own cost & nothing extra shall be payable on this account.

11. **INSURANCE IN RESPECT OF DAMAGES:**

The contractor shall indemnify the employers and hold him harmless in respect of all losses and expenses arising from any such injury as damages to the persons or property or works farming subject matter of this contract and also claim made in respect of damages, whether under any statute or otherwise an also in respect any award or compensation or damage

consequent upon such claims. The contractor shall at his own expense, effect and maintain till issue of completion certificate under this contract, with any insurance company approved by the employer, and all risk policy for insurance for the full amount of the contract including earthquake risk in the name of the employer as per standard all risk policy for construction and deposit such policies as policies with the employer.

The contractor shall also have insurance coverage under the policy of Rs. 2 Lakhs per person for any accident on occurrence and Rs.15 Lakh in respect of damages to property for any one accident or occurrence. The contractor shall indemnify the employer against any claim under compensation act prevalent during currency of this contract. This shall be applicable for all employees including his sub contractor's employee and will remain in force until completion of this contract.

If the contractor fails to get the above mentioned policy instruments then employee can get the insurance on his behalf premium so paid will be deducted from his running bills.

**12) DATE OF COMMENCEMENT AND COMPLETION:-**

The date of commencement shall be the date of commencement, stated in memorandum or date of handing over of site whichever is later. The date of completion shall be as per memorandum. Specified in clause "C" or as per bona-fide extension in time granted by the employer.

**13) EXTENSION IN COMPLETION PERIOD:**

If in the opinion of employer the works are delayed by force majeure or by reasons beyond the control of contractor, then the extension in completion can be granted on reasonable grounds without imposing any extra financial liability to employer for the extended period of LD.

**14) SUBMISSION OF BILLS AND PAYMENTS:**

The contractor after completing the measurement as per clause shall submit the bill once in a month & payment shall be settled within 10 days of the submission of the bills. The contractor will have to obtain a certificate from the Architect that work has been carried out as per their design and issued drawing and specifications as laid in SOQ (Schedule of quantities) only before release of payment of that bill. Registrar, Guru Nanak Public School Chandigarh may hold the payment of that bill in absence of Architect's certificate. The payment shall be made in the shape of cheque. The payment can also be made in shape of DD on the request of the contractor and charge for DD shall be deducted from the bill.

**15) PRICES :**

The rate quoted by the firm / contractor will be firm during the contract period & no escalation / variation, whatsoever will be admissible / payable to the contractor. Such variation shall also not be payable in the event of extension in time limit, The prices / rates shall be inclusive of all taxes, GST, service tax as applicable from time to time, current GST is 18 % of the allotted contract value etc. nothing extra shall be payable on this account.

**16) TAXES TO BE DEDUCTED BY EMPLOYER:-**

The employer shall deduct (1) Income tax (2) GST / work contract tax and other tax if any thereon at applicable rates from all payments made to contractor. All taxes expenses for the material brought at site will be to the bidders account.

**17) FORCE MAJURE:**

The following shall amount to force majeure condition. Act of god, act of Govt. was Sabotage riots, Civil Commotion, police action, revolution , Flood, fire, cyclones and Earthquakes etc. Only time extension in time limit will be granted for the period the work remained suspended under force majeure terms and condition and nothing extra will be paid on this account.

**18) PERFORMANCE GUARANTEE:-**

The performance guarantee for the entire work will be valid upto one year after completion of the project. The bidder will replace / repair all the defects occurred during guarantee period at his cost.

**19) DAMAGES FOR DELAY IN WORK:** The time is essence of the contract and bidder shall complete the work within stipulated time period. In case of delay due to reasons attributable to the contractor the employer may levy penalty subject to maximum of 5% of the total contract value of the work.

**20) SECURITY :**

The contract or shall deposit 2% EMD of the contract value in shape of Bank Guarantee of any schedule bank. However further 5% Performance guarantee and 3% security on gross amount of the bill shall be deducted as retention amount from the running bills of the contractor. The earnest money of Rs.6,00,000/- will be adjusted against amount .

**21) REFUND OF THE SECURITY:**

The 50% of the amount of the security can be refunded after 3 months after release of final bill. The balance security shall be released after one year of completion of work.

**22) CONSUMPTION OF STEEL:**

The steel quantities for the consumption shall be measured in lengths & multiplied by standard weights of each dia bar given in relation IS Code 1786. The authorized laps, spacers shall be taken into account for the consumption purpose only. The wastage and return of scrap steel shall be governed by CPWD specifications.

**23) SITE ENGINEER :**

The contractor shall depute a degree holder site engineer assisted by diploma holder supervisor for the execution of work. The site engineer shall be authorized to have instructions from Registrar, Guru Nanak Public School Chandigarh/Architect to implement the same at site.

**24) CONSUMPTION OF CEMENT & STEEL:**

Cement and steel shall be supplied by the contractor and he shall provide bills for the same to Registrar Guru Nanak Public School Chandigarh as per the recommendation makes and certificates and test report of the same shall be furnished by the contractor at his cost. Further Registrar Guru Nanak Public School Chandigarh reserves the right to supply cement and steel itself. The same shall be got executed through the contractor on the quoted labour rates for the same.

**25) WATER & ELECTRICITY FOR CONSTRUCTION PURPOSE:**

All assistance will be given by REGISTRAR GURU NANAK PUBLIC SCHOOL CHANDIGARH for water and electricity Arrangements. However , expenditure on procurement, consumption ,Security charges etc. shall be borne by the contractor in all respects .

**26) STATUTORY COMPLIANCE:**

All persons deployed by the bidder for executing this contract shall be the employees (salaried, consultants, advisors, contractual workers etc.)

- a) That the contractor shall ensure that the said employees of the contractor do not indulge in any unlawful activity, including consumption of alcohol i.e., drinks on the said site. If the employer suffer's any loss or damage on the account of the said employee(s) indulging in any unlawful activity, the bidder shall indemnify the employer to the extent of the loss or damages suffered, which will be deducted by employer.
- b) That the contract shall be responsible for making all statutory compliances in respect of its aforesaid employees. If the employee suffer loss or damages on account of contractor shall indemnify the employer to the extent of the loss or damage suffered.
- c.) Contractor will be required to take workmen's compensation insurance policy to cover the risk of all their workmen engaged by him for this work before the start of installation work.. On his failure employee will be at liberty to get this done at their own & recover the premium of such insurance policy from their payments.
- d.) Bidder is liable responsible for complying with the provisions of Employees Provident Fund & Miscellaneous Provisions Act of 1952 and the schemes framed there under in so far as they are applicable to their establishment.
- e.) If employer suffers any loss or damage, or is called upon to make any payment on account of failure on the part of contractor to comply with to fulfill any of its statutory obligations under this agreement or any obligation is specially undertaken herein, contractor shall indemnify to the extent of such loss or damage suffered or payment made by employer.
- f.) As a whole bidder shall be responsible for making all statutory compliance, to the extent of their scope of work under this agreement.

**27) RIGHT OF TECHNICAL SCRUTINY OF THE FINAL BILL:**

The final bill of the work shall be submitted by the contractor within 15 days of the completion of the work & employer shall settle the bill within two months of submission of bills.

The employer shall have right to cause a technical examination of the work by any of the person as organization as appointed / authorized by Employer The contractor should submitted all the supporting vouchers and other record to check the final bill to the employer. If as a result of this examination or otherwise any sum is found to have been over paid or over credited it shall be lawful for the employer to recover the sum from any payment due to the contractor for this work of any other work being carried out by the contractor elsewhere under the employer. In case that is no payment pending with the employer the shortage if any shall be adjusted against the performance bank guarantee / amount available with the employer.

**28) SITE ORDER BOOK :**

The contractor shall maintain site order book. The engineer of the employer / Architect or his representative will record his comment on quality and pace of the work. The contractor will attend the comments of site order book and comply the instructions duly given in site order book and improve the quality of the work and also improve the pace of work. The site order book will be important document and shall have to maintain properly for future references .

**29) COMPLETION CERTIFICATE :**

The contractor will sign the as built Drawing in token of acceptance of the measurement. He will be asked to fill a format by the employer which will include all the major item of work and contractor will certify the quality of each item mentioned in the completion certification. Once the contractor declare the completion of the project , a joint inspection will be held with the representative of the employer and a list of defects will be notified. The contractor shall remove all defects so pointed out. Further process will be taken up for issuance of completion certificate by the Architect .

**30) SHUTTERING AND SCAFFOLDING:**

As this is a new project as such the contractor will fabricate shuttering to the exact size shown in the drawing in other words, the shuttering shall be tailor made and should be dedicate to project under taken by him The slip form should be used for columns in around. . The scaffolding should be MS Steel pipes with adjusting height and other jacks etc. to maintain level and verticalities .

**31) INSPECTION OF ARCHITECT:**

The works shall be open from inspection by the Architect of the project & his suggestions / instructions shall be immediately followed by the contractor.

**32) PROGRAM FOR EXECUTION OF WORK:**

The contractor should prepare his execution plans based on the time frame given to him for the completion of the project. This programme will be discussed with the employer. The final schedule of completion shall be signed by the contractor and submitted in triplicate. The work shall be monitored based on the submitted programme and in case of any delay in particulars activities the remedial measure to recover the loss of progress in the further month be taken. The time is the essence of contract so it will be binding on the contract to complete the work as per set schedule programme.

**33) FIELD QUALITY PLAN:**

The contract should submit his quality assurance plan and will generate inspection record at own setup laboratory. In the shape ok. The format of the ok card shall be approved by the employer. This ok card is necessary before start of any particulars activity and in case can ok card is not get signed, the work so carried out is liable to be rejected and on us for the same will rest with the contractor. The other tests for which facility is not available the contractor will carry out these test from approved lab on his own cost .

**34) TERMINATION OF CONTRACT BY THE EMPLOYER.**

If the contractor being an individual or a firm commits any "act of insolvency" or shall be adjudged an insolvent or being an incorporated Company shall have an order for compulsory winding up made against it or pass an effective resolution for winding up voluntarily or subject to supervision of the court and the official assignee or the liquidator in such acts of insolvency or

winding up, as the case may be, shall be unable within seven days after notice to him requiring him to do so, to show to the reasonable satisfaction of the employer he is able to carry out and fulfill the contract and to give security therefore, if so required by the employer.

Or if the contractor (when individual, firm or incorporated Company) shall suffer execution or other process of other process of Court attaching property to be issued against the Contractor.

Or shall suffer any payment under contract to be attached by or on behalf of any of the creditors of the contractor.

Or shall assign or sublet this contract without the consent in writing of die employer first hand obtained.

Or shall charge or encumber this contract or any payments due or which may become due to the contractor here under.

- (i) Has abandoned the contract or
- (ii) Has failed to commence the works, or has without any lawful excuse under these conditions
- (iii) Suspended the progress of the works for fourteen days after receiving from the Architect notice to proceed or
- (iv) Has failed to proceed with the works with such due diligence and failed to make such due progress as would enable the works to be completed within the time agreed upon, or works to be completed within the time agreed upon, or
- (v) Has failed to remove materials from the site or to pull down and replace work for seven days after receiving from the Architect written, notice that the said materials or work were condemned and rejected by the employer / Architect under these conditions.
- (vi) Has neglected or failed persistently to observe and perform all or any of the acts, matters or things by this contract to be observed and performed by the contractor for seven days after written notice shall have been given to the contractor requiring the contractor to observes or perform the same.

Then and in any of the said cases the Employer may, notwithstanding any previous waiver, after giving seven days notice in writing to the contractor, determine the contract, but without thereby affecting the obligations and liabilities of the contractor, the whole of which shall continue in force as fully as if the contract had not been so determined, and as if the works subsequently executed had been executed by or on behalf of the contractor and further, the employer by his agents or servants may enter upon and take possession of the works and all plant, tools, scaffoldings, sheds machinery stream and other power utensils and materials lying upon the premises or the adjoining lands or roads, and use the same as his own properties or may employ the same by means of his own servants and workmen in carrying on and completing the works or by employing any other contractor shall not in way interrupt or do any act properly or may employ the same by means of his own servants and workmen in carrying on and completing the works or by employing any other contractor shall not in any way interrupt or do any act, matter

or thing to prevent or hinder such other contractor or other person or persons employed for completing 3rd finishing or using the materials and plant for the works. When the works shall be completed or as soon thereafter as contractor to remove his surplus materials and plant, and should the contractor fails to do so within a period of fourteen days after receipt thereof by him, the Employer may sell the same by public auction and give credit to die contractor for the net amount realized. The Architect shall thereafter ascertain and certify in writing under his hand what if anything shall be due or payable to or by the Employer, for the value of the said plant and materials so taken possession of by the Employer and the expense or loss which the Employer shall have been put to in procuring the works to be completed and the amount, if any owing to the contractor and the amount which shall be so certified shall thereupon be paid by the Employer to the Contractor or by the Contractor to the Employer, the Employer as the case may be, and the certificate of die architect-shall be final and conclusive between the parties.

**35. ARBITRATION:**

Any dispute or differences what so ever arising between the parties out of or relating to the construction, meaning, scope, operation or effect of this agreement or the validity of the breach thereof shall be referred for arbitration to any person who shall be appointed by **Registrar, Guru Nanak Public School Chandigarh** as a sole arbitrator and the award made in pursuance thereof shall be final and binding upon both the parties. Before going in arbitration contractor has to obtain the technical certificate on the matters which are arbitrated upon.

**36. INTERPRETATION :**

In case of contradiction during execution of work following priority shall be considered.

- 1 Schedule of Quantities
- 2 Technical Specifications
- 3 Drawings
- 4 General Condition of Contracts
- 5 General Instructions to contractors
- 6 NIT

**37. JURISDICTION:**

Further the aforesaid clause 38, for any consequent legal remedy, only civil court Chandigarh shall have jurisdiction in respect of this contract.

## **TECHNICAL SPECIFICATIONS ( GENERAL BUILDING WORK )**

### **1.1 Section A – General:**

The scope of work covers execution and completion of the foundations and the superstructure of the Construction of Auditorium at Guru Nanak Public School Chandigarh in accordance with drawings and specifications prepared by and under the direction of the Architects and to the satisfaction of the employer/architects.

#### **Drawing**

Three copies of drawings, the Schedule of Quantities and specifications shall be furnish by the architect to the contractor for his own use until the completion of the work and shall be accessible at all reasonable times to the architects or their representatives.

All important drawing to be mounted on boards and placed on racks and indexed.

#### **Dimensions**

Figured dimension are in all cases to be accepted in preference to scaled sizes. Large scale details take precedence over small scale drawings. In case of discrepancy the contractor is asked for clarification before proceeding with the work.

#### **Contractor to inspect site**

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

#### **Access to site.**

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

#### **Setting out:**

3. The contractor shall set out the building in accordance with the plans. All grid /center lines should be pegged out to the satisfaction of the Registrar, Guru Nanak Public School, Chandigarh. The contractor shall be responsible for the correctness of the lining out and any inaccuracies are to be rectified at his own expenses. He will be responsible for taking ground levels of the site before setting out and recording them without any extra charge.

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



#### **Treasure Trove:**

4. Should any treasure, fossils, minerals or work of art of antiquarial interest be found during excavation or while carrying out the works, the contractor shall give immediate notice to the architects of any discovery and shall hand over such findings to the employer.

#### **Access for Inspection:**

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

#### **Attendance upon all trades:**

6. The general contractor shall be required to attend on all the tradesmen or subcontractor/contractors appointed by the employers for water supply, sanitary, electrical installation, lifts, air-conditioning, water-proofing, security equipment, hardware, telephone and other specialists contractors. The rates quoted shall be inclusive of all attendance and also allow the other contractors, appointed by the employer, use of his scaffolding.

#### **Water supply:**

7. Water shall be arranged by the contractor with the assistance of agency i.e. GNPS and charges of water supply used during execution to be paid by the contractual agency at his own cost as per notification and policy by the Chandigarh Administration.

#### **Gatekeeper and Watchman:**

8. The contractor from the time of being placed in possession of the site must take arrangements for watching, lighting and protecting the work, all material, workmen and the public during day and night on all days including Sundays and holidays at his own cost.

#### **Storage for Materials:**

9. The contractor shall provide for all necessary sheds of adequate dimensions for storage and protection of material like cement, Steel, timber, and such other material including tools and equipment which are likely to deteriorate by the action of sun, wind, rain or other natural causes due to exposure in the open. For cement the contractor shall arrange for leak-proof go-down of sufficient size to store not less than 3 months requirement of cement.

All such sheds shall be cleared away and the whole area left in good order on completion of the contract to the satisfaction of the employer.

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

#### **Cost of Transporting :**

10. The contractor shall allow in his own cost for all transporting, unloading, stacking and storing of supplies of goods and materials for this work on the site and in the places approved from time to time by

the architects. The contractor shall allow in his price for transport of all material controlled or otherwise to the site.

**W.C. and Sanitary Accommodation & Office Accessories and Accommodations:**

11. The contractor shall provide at his own cost and expense adequate closet and sanitary accommodation complying in every respect to the rules and regulations in force of the local authorities and other public bodies, for his workmen, for the workmen of nominated sub contractors and other contractors Working in the building, the Engineer, and other Employer's agent connected with this building project and maintain the same in good working order.

The contractor shall also provide at his own expense adequate office accommodation for the Engineer preferably contiguous to his office and shall maintain the same in a satisfactory condition and shall provide light, fan and attendant etc. for the same and shall remove them after completion of the works. He shall arrange to provide a dumpy level . Theodolite and at all times maintain in good working order at site, to enable the Engineer to check the lines and levels of the work.

**Materials, Workmanship and Samples :**

12. Materials shall be of approved quality and the best of their kind available and shall generally confirm to IS specifications. The contractor shall order all the materials required for the execution of the work as early as necessary and ensure that such materials are on site well ahead of requirement for use in the work. The work involved calls for high standard of workmanship combined with speed and to the entire satisfaction of the Architects.

**Rates for Non -Tendered items**

Rates of items not included in Schedule of Quantities shall be settled by the Architects / Registrar, Guru Nanak Public School Chandigarh as mentioned in the Extra rates clause of the contract Conditions 10.

**Rate to Include**

The rates quoted shall be for all heights and depths and for finished work.

**To Ascertain from contractors for the other Trades**

The contractor shall ascertain from other contractors as directed by the Architects all particulars relating to their work with regard to the order of its execution and the position in which chases, holes and similar items will be required, before the work is taken in hand as no claims for extras will be allowed for cutting away work already executed in consequence of any neglect by the Contractors to ascertain these particulars beforehand.

Before ordering materials, the contractor shall get the samples approved from the architects well in time.

## **Testing of work and materials**

13. The contractor shall arrange to test of all the materials to be used on work and work of portions of works from the approved Laboratory by Registrar, Guru Nanak Public School Chandigarh. Before sending the samples of materials for testing the samples shall be sealed and signed jointly by the contractor and the representative from the Registrar, Guru Nanak Public School Chandigarh and each sample shall be given distinct identification mark. On receipt of the various test reports, proper record shall be maintained for all the tests carried out showing respective identification marks of the samples and results. If after any such tests, the work or portion of works is found to be defective or unsound in the opinion of the Registrar, Guru Nanak Public School Chandigarh /Architects the contractor shall pull down and re-do such works at their own cost. The materials which are found not confirming to the relevant. BIS provisions after testing, shall be immediately removed from the site by the contractor.

In case the contractor fails to get the work/position of works/materials tested at appropriate time the employer will arrange for getting such testing done in all testing charges and other incidental expenditure incurred by the employer in connection with such tests shall be recovered from the contractor.

14. Besides the provisions made in the Terms & conditions of the contract, the contractor will be required to provide and maintain in working order the adequate power driven equipment during the construction work :

## **FOREMAN AND TRADESMEN :**

15. All Tradesmen shall be experienced men properly equipped with suitable tools for carrying out all the work of carpentry and joinery and other specialist trades in a first class manner and where the Registrar, Guru Nanak Public School Chandigarh / Architects deem necessary, the Contractor shall provide any such tool, special or ordinary which are considered necessary for carrying out of the work in a proper manner.

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

## **Work Programme / Weekly Progress Report :**

16. The contractor shall prepare and submit to the Architects / Registrar, Guru Nanak Public School Chandigarh for approval, a PERT/CPM chart showing the programme of construction of various items fitted within the period of stipulated for competition within 30 days of the communication of the acceptance of the tender. The contractor shall also furnish necessary particulars to the Engineer-in-Charge for compiling weekly progress reports in the form furnished by the Registrar, Guru Nanak Public School Chandigarh. Approved programme shall be the basis for monitoring the progress of work. The contractors also should update and re-analyze PERT/CPM chart as often as required as per direction of the Bank to assess and reassess the progress of work done and take corrective measures for making out any deficiency.

## **Clearing of Site**

17. The contractor shall after completion of the work clear the site of all debris left over materials at his own expense to the entire satisfaction of the Employer and Municipal or other public authorities.

## **Photographs**

18. The contractor shall at his own expense supply to the Architects / Registrar, Guru Nanak Public School Chandigarh with triplicate copies of large photographs not less than 25 x 20 cm (10" x 8") of the works taken from two approved position of each building at intervals of not more than 3 months during the progress of the work, or at every important stage of construction.

## **Preparation of Building for Occupation and use on Completion :**

19. The whole of the work shall be thoroughly inspected by the contractors and all deficiencies and defects put right. On completion of such inspection, the contractor shall inform the Architects in writing, that he has finished the work .

## **Ready for the Architects inspection**

On completion, the contractor shall clean all windows and doors and all glass panes, including cleaning of all floors, staircases and every part of the building including oiling of all hardware. He will leave the entire building neat and clean and ready for immediate occupation and to the satisfaction of the Architects / Registrar, Guru Nanak Public School Chandigarh .

## **Contractor to Provide Notice Board with details of work etc.**

20. The contractor shall provide a notice board on proper supports 3m x 2m (10' x 6') in a position approved by the Registrar, Guru Nanak Public School Chandigarh . He shall allow for painting and lettering stating name of work, name of date of commencement and completion of work , Architects, Structural Consultants, General Contractor and Sub Contractors all letters except that of the name of the work shall be in letters not exceeding 5 cm. in height and all to the approval of the Architects / Registrar, Guru Nanak Public School Chandigarh.

## **Vouchers**

21. The contractor shall furnish the Registrar, Guru Nanak Public School Chandigarh with vouchers on request, to prove that the materials are as specified and to indicate the rates at which the materials are purchased in order to work out the rate analysis of the non-tender items which he may be called upon to carry out.

## **Protections :**

22. The contractor shall properly cover up and protect all work throughout the duration of work until completion, particularly masonry / finish, mouldings , steps, tiles or special floor finishes, staircases and balustrades, doors and window frames, plaster angles, lighting and sanitary fittings, glass paint work and all finishing.

## **1.2 Section B. Materials**

1. Materials shall be of the best approved quality obtainable and they shall comply with the respective Indian Standard Specifications or as mentioned in Schedule of quantities .

2. Samples of all materials shall be got approved before placing order and the approved sample shall be deposited with the Registrar, Guru Nanak Public School Chandigarh / Architect.
3. In case of non-availability of materials in metric sizes the nearest size in FPS units shall be provided with the prior approval of the Registrar, Guru Nanak Public School Chandigarh / Architects for which neither extra will be paid nor any rebate shall be recovered.
4. All the materials shall be tested in any testing laboratory approved by the Architect/Employer. Results of such tests in original issued by the laboratory shall be submitted to the Registrar, Guru Nanak Public School, Chandigarh / Architects with copy to Engineer-In-Charge. The entire charges connected with such testing including for repeated tests if ordered by the Architects shall be borne by the Contractor.
5. It shall be obligatory for the contractor to furnish certificate, if demanded by the Architects / Registrar, Guru Nanak Public School Chandigarh from manufacturer or the material supplier that the work has been carried out by using their material.
6. All materials supplied by the employer/any other specialist firms shall be properly stored and the contractor shall be responsible for its safe custody until they are required on the works and till the completion of work.
7. Unless otherwise shown on the drawings or mentioned in the “Schedule of Quantities” or Special Specifications, the quality of materials, workmanship, dimensions etc. shall be specified herein under.
8. All equipment and facilities for carrying out field test on materials shall be provided by the Contractors without any extra cost.

**(a) Cement**

Cement shall comply in every respect with the requirements of the latest publication of IS 1269 and unless otherwise specified Ordinary Portland Cement (43 Grade; i.e. ACC, UltraTech, J.K Cement) shall be used. The weight of ordinary portland cement shall be taken as 1440 kg per cum. (90 lbs. per cft.). Cement shall be measured by weight and in whole bags, and each undisturbed and sealed 50 kg. bag being considered equivalent to 34.72. It (1.2 cft.) in volume. Care should be taken to see that each bag contains full quantity of cement. When part bag is required cement shall be taken by weight or measured in measuring boxes.

No other make of cement but that approved by the Registrar, Guru Nanak Public School Chandigarh / Architects will be allowed on works and the source of supply shall not be changed without approval of the Architects in writing. Test Certificates to show that cement is fully complying the specifications shall be submitted to the Architects and notwithstanding this, the Architects may at their discretion, order that the cement brought on site and which they may consider damaged or of doubtful quality for any reason whatsoever, shall be retested in an approved testing laboratory and fresh certificates of its soundness shall be produced. Cement ordered for retesting shall not be used for any work pending results of tests .

Cement shall be stored in weather-proof shed with raised wooden plank flooring to prevent deterioration by dampness or intrusion of foreign matter. It shall be stored in such a way as to allow the removal and use of cement chronological order of receipt i.e. first receive being first used. Cement deteriorated and /or clodded shall not be used on work but shall be removed at once from the site.

Weekly record of cement received and consumed shall be maintained by the Contractor in an approved form and submitted to the Architects.

### **(b) Fine Aggregate**

Sand shall conform to IS: 383

It shall pass through a I.S. Sieve 4.75mm (3/16 B.S.) test sieve, leaving a residue not more than 5%. It shall be from natural source of crushed stone screenings. If allowed, chemically, inert, clean sharp, hard, durable well graded and free from dust, clay, shale large pebbles, salt, organic matter, loam mica or other deleterious matter. The sum of percentages of silt in sand shall not exceed of 5% by weight. It shall be washed if directed to reduce the percentage of silt substance to acceptable limits. Sand shall not contain any trace of salt and it shall be tested and sand containing any trace of salt shall be rejected.

The fine aggregate for concrete shall be graded within limits as specified in IS : 383, and the Fineness Moulus may range between 2.50 to 3.50.

The fine aggregate shall be stacked carefully on a clean hard dry surface so that it will not get mixed up with deleterious foreign materials. If such a surface is not available a platform of planks or corrugated iron sheet or brick floor or a thin layer of lean concrete shall be prepared.

### **(c) Coarse Aggregate**

Shall consist of crushed or broken stone 95% of which shall be retained on 4.75mm IS test sieve. It shall be obtained from crushing Granite. Quartzite, trap, basalt or similar approved stones from approved quarry and shall conform to IS : 383 and IS 516. Coarse aggregate shall be chemically inert when mixed with cement and shall be cubical in shape and free soft, friable, thin, porous, laminated or flaky pieces. It shall be free from dust and any other foreign matter.

Gravel/Shingle of desired grading may be permitted as a substitute in part or full in plain cement concrete if the Architect is otherwise satisfied about the quality of aggregate. For all RCC, works the size of coarse aggregate shall be 20mm and down gauge.

### **(d) Reinforcement**

Reinforcement shall be conforming to IS : 1786 TMT bars (i.e. TATA, SAIL, JINDAL, ESSAR).

All finished bars shall be free from cracks, surface flaws, laminations, jagged and imperfect edges.

### **(e) Bricks**

Bricks shall generally comply with IS : 1077 except in size which shall be conforming to the sizes locally available. Depending upon the quality of bricks they shall be classified as 1st class.

Bricks shall be the best quality locally available table moulded well burnt but not over burnt, have plane rectangular faces with parallel side and sharp right angled edges, have a fine compact and uniform texture. The bricks shall be free from cracks, chips flaw, stones or lumps of any kind and shall not show efflorescence either dry or subsequent to soaking in water. It shall emit a clear ringing sound on being struck and shall not absorb water more than 20% by weight. Common building bricks shall have a minimum compressive strength of 100 kg./sq.cm. for load bearing wall construction, unless otherwise specifically stated in the schedule of quantities.

**(f) Water :**

Water shall generally comply with IS : 3025 for mixing cement mortar or concrete shall not be salty or brackish and shall be clean reasonably clear and free from objectionable quantities of silt and traces of oil acid and injurious alkali, salts, organic matter and other deleterious materials which will either weaken the mortar or concrete or cause efflorescence or attack the steel in reinforced cement concrete. Water shall be obtained from sources approved by the Architect. **The Ph value of water shall not be less than 6, Potable water** is generally considered satisfactory for mixing and curing concrete, mortar masonry etc. Where water other than main source is used this shall be tested in an approved testing laboratory to establish its suitability. All charges connected therewith shall be borne by the contractors.

**(g) Timber :**

Timber shall be well seasoned and of the best quality wood of specified species viz.  
Timber shall be considered as well seasoned if its moisture content does not exceed the following limits.

- |   |     |
|---|-----|
| (i) Timber for Frames                   | 14% |
| (ii) Timber for Planking, Shutters etc. | 12% |

The moisture content of timber shall be determined according to method described in paragraph 4 of IS 287 for maximum permissible moisture content of Timber used for different purposes in different climatic zones.

In measuring cross-sectional dimensions of the frame pieces tolerance up-to 1.5mm shall be allowed for each planned surface.

**(h) 1<sup>st</sup> Class Brown Belly Teak Wood & Ivory Coast wood :**

1st class Brown Belly Teak Wood means teak wood of good quality and well seasoned. It shall have uniform colour, reasonably straight grains and shall be free from large, loose, dead knots, cracks, shakes, warp, twists, bends, sap wood or defects of any kind. No individual hard and sound knot shall be more than 2.5cm in diameter and aggregate area of all knots shall not exceed 1% of the area of the piece. There shall not be less than 5 growth rings per 2.5cm width.

**(i) Compressed fibre wood and panel :**

The compressed fibre wood selected shall comply with the latest BIS requirements. The compressed fibre wood panel shall be chemically treated with high pressure and properly seasoned without twist and bend as specified for door shutters.

**(j) Flush Doors :**

All flush doors shall be solid core exterior grade unless otherwise specified and it shall generally conform to IS 2202 and shall be fabricated as described under specification.

**(k) Floor Tiles :**

Plain Ceramic tiles, vitrified tiles, cement tiles, chequered tiles, Granite tiles shall conform to latest BIS – standards. For proper shade grey or white cement with pigment shall be used. All floor Tiles shall be compacted by mechanical vibration and hydraulically pressed and

shall have desired pattern of chip distribution. The size and thickness of tiles shall be as per BOQ. The thickness of Vitrified tiles shall be up to 8 mm to 10 mm of vitrification having sizes not less than 600mmx1200mm and the thickness of the tile shall be as per manufacture and work to be executed according to the detailed Architectural drawings and as pattern of tile mentioned there in, nothing shall be paid extra over and above the quoted rate if the tile of size to be greater than 600mmx1200mm.

**(l) Glazed Tiles :**

Coloured glazed tiles shall comply with latest IS amendments and it shall be from an approved manufacturer and shall be flat and true to shape. They shall be free from cracks, crazing, spots, chipped edges and corners. The glazing and colour shall be of uniform shade and unless otherwise specified the tile shall have an average thickness of 5.00 mm with allowable tolerances as mentioned in IS Standards .

**(m) Granite :**

Shall be of selected quality, hard, sound, dense and homogenous texture, free from cracks, decay, weathering the flaws. Stones slab shall be of uniform colour and as approved by the Architect. They shall be machine cut and machine polished where specified and shall conform to the required sizes. Thickness of granite flooring shall be as specified in the respective items to be executed at site as per CSR 2020 amended up to date.

**(n) Glass :**

Glass used for glazing shall be float glass of best approved quality, free from flaws, specks bubbles and shall be 5 mm thick upto 0.90 m x 1.50 m size and for larger size. It shall be 6 mm thick unless otherwise specified in the Schedule of quantities. Frosted Glass shall be used in Toilets .

**(o) Paints :**

Lime for lime wash dry distemper, oil bound distemper, cement, primer, oil paint enamel paint flat oil paint, plastic emulsion paint anti-corrosive primer, red lead water proof cement paint shall be from an approved manufacturer and shall conform to the latest Indian Standards for various paints, ready mixed paints as received from the manufacturer without any admixture shall be used except for addition of thinner, if recommended by the manufacturer. The makes shall be as per annexed with tender or specifically approved by the owner .

**(p) Cement Mortar**

Cement mortar shall be of proportions specified for each type of work in the schedule. It shall be composed of portland cement and sand. The ingredients shall be accurately gauged by measure and shall be well and evenly mixed together in a mechanical pan mixture, care being taken not to add more water than is required. No mortar that has begun to set shall be used, river sand shall be used unless otherwise specified.

If hand mixing is allowed then it shall be done on pucca water-proof platform 5% extra cement shall be used and which shall be borne by the Contractor . The gauged materials shall be put on the platform and mixed dry. Water will then be added and the whole mixed again until it is homogeneous and of uniform colour. Not more than one bag of cement shall be mixed at one time and which can be consumed within half an hour of its mixing.



## Mode of Measurement

The method of measurement for various items of works shall be as described in this section. For items not covered in this Section, method of measurement shall be as per CPWD specification 2019/IS : 1200.

### 01. Excavation :

a) Excavation for foundations of columns, beams wall and like, excavation for plinth beams, basements etc. shall be measured and paid net as per drawing dimensions of length and breadth of concrete (bed concrete) where as specified at the lowest levels and depth of excavation level and ground levels taken before excavation. Any additional excavation required for working space, formwork, planking, dewatering, shoring and strutting, plastering etc. shall not be measured and paid for separately and the rate quoted by the contractor are deemed to have included these factors. No increase in bulk after excavation shall be considered.

b) Where excavation is made for leveling the site, levels shall be taken before start and after completion of excavation and total quantity of excavation computed from these levels in the manner approved by the Registrar, Guru Nanak Public School Chandigarh

- (c) In addition to the factors mentioned in para (a) above, the rates for excavation shall also include for the following :-
- i) Clearing the site.
  - ii) Letting out works and setting up bench marks and other reference marks.
  - iii) Providing shoring, strutting and subsequently removing the same.
  - iv) Bailing and pumping out of water from whatever the source as required and directed.
  - v) Excavation to all depths (unless otherwise specified in the schedule of quantities) and removal of all materials of whatever nature, wet or dry, as necessary for construction of foundation, basement etc. and preparing the bed for laying foundation, basement etc. and preparing the bed for laying hardcore or concrete.
  - vi) Sorting out useful excavated materials and conveying beyond the structure and stacking them neatly on the site for backfilling or reuse as directed.
  - vii) Backfilling of trenches using approved excavated materials upto natural ground levels in layers not exceeding 30cm. In depth including watering, ramming and consolidating.
  - viii) Necessary protection (fencing, lighting, watching etc.) including labour, materials and equipment to ensure safety and protection against risk or accidents.
  - ix) Removal of surplus excavated material from the site as directed to the contractor to dump and dispose off.

(D) Rates for excavation shall include excavation in any material such soft or hard soil, moorum, soft rock, boulders, concrete/asphalt/stone paved surfaces, old masonry or concrete foundations etc., except hard rock. Hard rock which is in solid bed which can be removed only by blasting or wedging or chiselling shall be measured separately.

(e) Excavation for hard rock shall be measured from stacks of excavated hard rock and reduced by 50% for bulkage and voids. Where soil including soft rock and hard rock are mixed hard rock after excavation shall be stacked separately and measured after reducing of 50% for bulkage and voids.

## **2. Earth Filling :**

Earth filling in plinth shall be done using approved excavated material or suitable filling material brought in by the contractor from outside sources as per the directions of the architect. Quantity of earth filling shall be computed from the ground level at the start of earth filling and the top level of consolidated filled surface. Earth filling should be done not more than in layer of 20 cm. For each layer watering, ramming should be done before laying subsequent layer.

In open spaces filling shall be measured from cross sections of embankments, levels of which are recorded by means of levels before start of the work and after completion of work.

## **3. Cement Concrete (Plain and Reinforced)**

Cement concrete in P.C.C. and R.C.C. item shall be measured exclusive of reinforcement and plaster thickness but shall include necessary cost of shuttering, centering, hire charges of all equipment, curing, hacking and fair finish. Reinforcement and plaster shall be measured and paid separately.

Items like R.C.C. pre-cast jalli, R.C.C. pipes other such item which are normally manufactured in factories as well as those items which have been specifically mentioned in schedule of quantities shall be measured inclusive or reinforcement.

No deduction will be made for opening upto 0.1 sqm. and no extra labour for forming such opening or voids shall be paid.

Columns shall be measured from the top of the footing and shall be measured through including flare of the column in case of flat slab construction.

Beams shall be measured from face to face of columns/beams and shall include haunches, if any. The depth of the beams (other than raft foundation beams) shall be measured from the top of the slab to bottom of the beam. In case of inverted beams and semi-inverted beams depth shall be overall depth of beam.

In case of combined footings and raft foundation. The exposed portion of beam rib shall be measured as beam and the remaining portion measured in footing/raft slab.

Slab (other than in raft foundation) shall be measured in bays (Clear of beams) with deduction for column portion.

Chajjas only projected portion shall be measured in cubic meter.

## **Staircase**

Measurement shall be in cum. staircase comprising of step soffit slab, landing slab shall be measured and paid under this item. Side parapet walls, railings, finishing of risers and treads and that the reinforcement and plastering etc. shall be paid separately under reinforcement items.

#### **4. Reinforcement**

Shall be measured in lengths of bar as actually placed in position on the standard weight basis, no allowance being made in the weight for rolling margin. Wastage and binding wire shall not be measured. Authorized overlaps and spacers shall only be measured for payment purpose .

#### **5. Brick Work**

Except walls of half-brick thickness or less, all brick work shall be measured in cubic meters. Walls of half brick thickness or less shall each be measured separately and given in square meters stating the thickness in specifications .

##### **Thickness of Wall :**

Brick walls upto and including three bricks in thickness shall be measured in multiples of half-brick which shall be deemed to be inclusive of the mortar joints. Where fractions of half-brick occur to architectural or other reasons, the measurement shall be taken as full half-brick. for walling, which is more than three bricks in thickness the actual of wall shall be measured to the nearest centimeters.

Honeycombed brick walling shall be given in square meters stating the thickness of wall and the pattern of honey combing. Honeycomb openings shall not be deducted.

##### **Deductions :**

No deductions or additions shall be made any account for

1. Ends of dissimilar materials (i.e. joists, beams, lintels, lofts, griders, rafter, purlins, trusses, corbels, steps etc.) upto 500 square centimeter in section.
- ii) Opening upto 0.1 sq.m. in section.
- iii) Wall plates, bed plates and bearing of slabs, chajjas and the like where the thickness does not exceed 10 cm and the bearing does not extend over the full width of the wall.

#### **6. Wood work :**

All work shall be measured net as fixed, no extra measurement will be given for shape, joints, splayed meeting stiles of doors and windows and shall be measured in unit of square metres.

Area over one face inclusive of exposed frame thickness (excluding width of cover mould) shall be measured in case of door windows and ventilators when frames area included in the item. Portions embedded in masonry or flooring shall not be measured. Where frames are measured separately mode of measurement shall be as per CPWD specification 2019.

Reduction in quoted rates will not be made for the material used of specified sizes including permissible tolerance as per IS code. Link wise no increase will be admissible for using material sizes beyond the size specified in the agreement/drawing.

## **7. Flooring, skirting dado :**

Flooring shall be measured from skirting to skirting and where the wall surfaces are plastered or provided with dado it shall be measured from plaster to plaster or dado to dado.

The skirting and dado shall be measured clear from the floor the top of tile, and the length shall be between finished tile faces measured along the floor.

## **8. Plastering**

All plastering work shall be measured in square metres unless otherwise described. Net area of surface plastered shall be measured. No deductions will be made for ends of joints beams, posts and openings not exceeding 0.5 sqm. each and to addition shall be made for reveals, Jambs, soffits sills etc. of these openings nor for finishing the plaster around openings, ends of joists, beams and posts etc.

## **9. Painting, White washing, colour Washing and Distempering**

All painting work shall be measured in square metres. Net area of surface painted shall be measured. No deductions will be made for unpainted surfaces of ends of joists, beams, posts etc. and openings not exceeding 0.5 sqm. and no addition shall be made for reveals, jambs soffits, sills etc. of these openings.

## **Workmanship**

### **Clearing of site , excavation, and earth filling**

#### **General**

Trenches for wall foundations column footings. raft foundations, pile caps, plinth beams water tanks, cess pits etc. shall be excavated to the exact length, width and depth shown or figured on the drawing or as may be directed by the Architects. If taken out to greater length. Width or depth than shown or required the extra work occasioned there by shall be done at contractors expenses. Extra depth shall be brought up by plain cement concrete, filling 1:4:8/1:5:10 proportion and extra length and width filled in by framed earth or moorum or if the architect thinks it necessary for the stability of the work by 1:5:10 concrete, as may be directed at the contractors cost.

Excavated material shall be used for filling in plinth or each side of the foundation blocks or trenches or it shall be spread elsewhere on or near the site of work including watering ramming and consolidating or carted away from site, free of charge as may be ordered.

The contractor shall at his own expense and without extra charge, make provision for supporting all utility services, lighting the trenches, separating and stacking serviceable materials neatly, shoring, timbering, strutting bailing out water sub-soil or rain water including pumping at any stage of the work. Trenches shall be kept free of water while masonry or concrete works are in progress and till the Architects consider that concrete is sufficiently safe.

## **Earth filling**

**General :** Filling shall be done with good earth, moorum, stone chips or disintegrated building debris. It shall be free from salts, organic matter, black cotton or slushy earth and combustible material. All clods shall be broken.

### **(a) Filling in plinth :**

Shall be done in layers not exceeding 20cm, amply watered and consolidated by ramming with iron or wooden rammers weighing 7 to 8 kgs. and having base 20 cm. square or 20 cm diameter. When the filling reaches the finished level, surface be flooded with water for at least 24 hours, allowed to dry rammed and consolidated after making good any settlement in order to avoid settlement at a later stage. Special care shall be taken to pack earth under plinth beams and column corners. Finished level of filling shall be kept to a slope intended to be given to the floor.

### **(b) Filling in outdoor portions and for site development**

Shall be done in layers of 20 cm. Each layer shall be adequately watered. When filling reaches the required level the top most layer shall be dressed to proper section, grade and chamber and rolled by 8 to 10 tones power roller and adequately watered to aid compaction.

## **Levelling Course :**

It shall be either plain cement concrete of leaner mix or lime concrete which shall be proportioned as stipulated in the relevant item and mixed and placed in position conforming to line and level shown on the drawing and compacted by approved means and cured adequately.

## **Plain and Reinforced Cement Concrete :**

**General :** Except where they are varied by the requirements of this specification due provision of Indian Standard Specification Is 456- 2000 for plain and reinforced concrete and IS – 1786 part I &II for mild and medium, Tensile steel bars and hard drawn steel applicable together with the latest amendments shall be held to specifications to ensure that all concrete placed at various locations of job should be durable strong enough to carry the design loads. It should wear well and practically be impervious to water. It should be free from such defects as shrinkage, cracking and honey combing.

## **Proportioning the mix**

In ordinary concrete, excluding controlled concrete, proportion of cement to fine and coarse aggregate shall be as specified in the respective items and shall be accurately measured as in Table A below. These proportions are based on assumption that the aggregate are dry.

If aggregates are moist allowance shall be made for bulking in accordance with IS : 2386. Allowance shall also be made for surface water present in aggregate when computing water content. Surface water present shall be determined by one of field methods described in IS : 2386 (Part 111). in the absence of exact data the amount of surface water may be estimated from the values given in Table B below.

**Mixing :**

Concrete of 1:1.5:3 or richer mix shall be mixed in an approved mechanical mixer, the mixer and the mixing platform shall be suitably protected from wind and rain. Aggregate shall be accurately measured out in boxes and mixed dry along with cement, water shall then be added in measured Quantity and mixing shall be continued until there is an uniform distribution of the materials and the mass is uniform in colour and consistency but in no case shall the mixing be done for less than 2 minutes.

When hand mixing is permitted with the approval of the Registrar, Guru Nanak Public School Chandigarh it shall be carried out on a water tight mixing platform and care shall be taken to ensure that mixing is continued until the mass is uniform in colour and consistency. For all hand mixed concrete 10 percent extra cement shall be added for which no extra payment shall be allowed.

**Consistency :**

Quantity of water for making reinforced concrete shall be sufficient, so as to ensure that concrete shall surround and properly grip all the reinforcement. The best consistency shall be that which will flow sluggishly without flattening out and without separation of coarse aggregates from the mortar. The degree of plasticity shall depend on the nature of work and atmospheric temperature and whether compacted. The slumps shown in Table C obtained by the standard slump test carried out in accordance with the procedure laid down in IS : 1199 – 1959 shall be adopted for different types of work.

**Admixtures :**

The use of admixtures may be allowed only if approved by the structural consultant and his decision in this regard shall be final.

**Transporting :**

Concrete shall be conveyed from the place of mixing to the place of final deposit as rapidly as practically by methods which will prevent segregation or loss of any of the ingredients. If segregation does occur during transport, the concrete shall be remixed before being placed. In no case more than 30 minutes shall elapse between mixing and consolidation in its position.

Placing shall be placed in layers of suitable thickness or in strips and compacted before initial setting commences and should not be subsequently disturbed. Method of placing shall be such as to preclude segregation and as far as practicable the placing shall be continuous. Special care shall be taken in accordance with IS 456 while laying concrete under extreme weather.

Concrete shall be thoroughly compacted during the operation of placing and thoroughly worked around the reinforcement embedded fixtures and spaded, against concerns of the form work and by punning, rodding mechanically vibrating or by any other approved means. In addition form work shall be tapped tightly by using wooden mallet at the pouring head. The number and type of vibrator to be used shall be subject to the approval of Registrar, Guru Nanak Public School Chandigarh and in general immersion type vibrators / surface vibrators shall be used. External vibrators shall also be used whenever directed.

The intensity and duration of vibration shall be sufficient to cause complete settlement and compaction without any stratification of successive layers or separation of ingredient of formation of laitance. Vibrator shall be inserted vertically in the concrete at points not more than 45 cm. Apart and withdrawn very slowly when air bubbles no longer come on the surface. Over vibration or vibration of very wet

mixes is harmful and should be avoided. Care shall be taken to utilize the vibrator only to compact the concrete and not to spread it. Sufficient number of reserve vibrators in good working condition shall be kept on hand at all times. So as to ensure that there is no stackening or interruption in compacting.

### **Construction Joints :**

Concreting shall be carried out end to end continuously as far as possible and when construction joints are totally unavoidable, it shall be located in a predetermined position approved by the Registrar, Guru Nanak Public School Chandigarh / Architect. The joints shall be straight and at angles to the direction of main reinforcement. When the work has to be resumed on a surface which has hardened, such surface shall be roughened. It shall be swept clean, thoroughly wetted and covered with a 13mm thick layer of mortar composed of cement and sand in the same ratio as the cement and sand in the concrete mix. This 13mm layer of mortar shall be freshly mixed and placed immediately before the placing of concrete.

Where the concrete has not fully hardened, all laitance shall be removed by scrubbing the wet surface with wire or bristle brushes, care being taken to avoid dislodgement of particles of aggregate. The surface shall be thoroughly wetted and free water removed. The surface shall be thoroughly wetted and free water removed. The surface then be coated with neat cement grout. In horizontal joints the first layer of the concrete to be placed on this surface shall not exceed 15cm. thickness and shall be well rammed against old work, particular attention being paid to corners.

### **Expansion Joints :**

Expansion joints shall be provided where required, as shown on the drawing or as directed by the Registrar, Guru Nanak Public School Chandigarh . The joints shall be filled with approved quality filler.

### **Curing :**

Concrete shall be carefully protected during first stage of hardening from harmful effects of excessive heat, drying winds, rain or running water. It shall be covered with a layer of sacking sand, canvas, hessian or similar absorbant material and kept constantly wet for days from the date of placing of concrete. Alternatively, the concrete being thoroughly wetted and covered by layer of approved water proof material which should be kept in contact with it for seven days.

### **Form Work :**

The contractor shall use steel shuttering specifically fabricated approved for each type of flat roof slab column beam and other structural component . The old and used can be permitted with prior approval of Registrar, Guru Nanak Public School Chandigarh's representative .

The form work shall conform to the shape, lines and dimensions as shown on the plans and be so constructed as to remain sufficiently rigid during the placing and compacting of the concrete and shall be sufficiently water tight to prevent the loss of cement slurry from the concrete. Form work or centering shall be constructed of steel or timber and adequately designed to support the full weight of wet concrete without deflection and retain its form during laying, vibrating ramming and setting of concrete.

All props shall be straight and of full height and no joints shall be allowed. Props shall be braced with thin bamboos or wooden battens and where additional staging is necessary extra care shall be taken, to use bigger diameter props with bracing at 4 or 5 levels. All props shall be supported on sole plates and double wales. All the time of removing props these wedges shall be gently eased and not knocked out.

All rubbish, chipings, shavings and saw dust shall be removed from the interior of the forms before the concrete is placed and the form work in contact with the concrete shall be cleaned and thoroughly wetted or treated with non-staining mineral oil or any other approved material. Care shall be taken that oil or any other such approved material is kept out of contact with the reinforcement.

All form work shall be removed without shock or vibration and shall be eased off carefully in order to allow the structure to take up its load gradually. Forms shall not be disturbed until concrete has adequately hardened to take up superimposed load coming on it and in no circumstances shall form be struck until the concrete reaches a strength of at least twice the stress to which the concrete may be subjected at the time of striking.

In the normal circumstances (generally where temperatures are above 21 degree centigrade) and where ordinary portland cement is used, forms may be struck after expiry of following periods :

- |   |   |
|---|---|
| (a) Walls, columns and vertical sides of beams                                | 24 to 48 hours or as may be directed by the Registrar, Guru Nanak Public School, Chandigarh |
| (b) Bottom of slab upto 4.5m span   | 10 days   |
| (c) Bottom of slab upto 4.5m span<br>Bottom of beam and arch rib upto 6m span | 18 days   |
| (d) Bottom of beams and arch rib over 6m span                                 | 21 days   |

However, this period may be increased or decreased at the discretion of Registrar, Guru Nanak Public School Chandigarh / Architects. Special care shall be taken while striking the centering of cantilivered slab canopies, portal frames folded plate construction and period of striking centering shall be as determined by the Registrar, Guru Nanak Public School, Chandigarh .

If directed, forms shall be given an upward camber to ensure that the beams do not have any sag. Surface that becomes exposed on removal of forms shall be carefully examined and any fins, burrs, projections etc. that are detected shall be removed. Any honeycombing of minor nature shall be finished neatly with cement mortar 1:2 after obtaining prior approval of the Engineer in-charge.

Any work showing signs of damage through premature or careless removal of centering or shuttering, shall be reconstructed by the contractor at his own cost.

### Tests :

All the work shall be executed strictly as per Punjab PWD Specifications amended up to date /IS: 456: 2000 and any other BIS applicable. The frequency of works test shall be at such intervals as ordered by the Architect and subject to that every 150 cum. concrete placed or part thereof and for a day's concrete exceeding 20 cum. a batch of 6 cubes shall be made for every sample and 3 of them tested after 7 days and the remaining 3 cubes shall be tested after 28 days. The criteria for acceptance of a concrete as conforming to the specified proportion/grade of concrete shall be in accordance with IS : 456:2000 and the



contractor shall entirely re-do the rejected work at his own cost. Strength of 28 days shall alone be considered for acceptance.

The contractor shall arrange to carry out the tests in accordance with the relevant Indian Standard Specifications in an approved laboratory and the test reports in original submitted Registrar, Guru Nanak Public School Chandigarh. The entire cost of testing shall be borne by the contractor.

### **Steel Reinforcement:**

Reinforcement shall be accurately fabricated, placed and adequately maintained in position as shown on drawings or as directed by the Registrar, Guru Nanak Public School Chandigarh / Architect. All finished bars shall be free from cracks, surface, flaws, and laminations, jagged and imperfect edges. Cement Mortar blocks shall be used to give requisite cover as shown on the drawing or as directed and all intersections of bars shall be firmly tied with binding wire of 16 to 18 gauge. Reinforcement shall be bent in accordance with the procedure stipulated in IS : 2502:1963 and will not be straightened in a manner which will injure the material.

All reinforcement shall immediately, before placing in concrete, be thoroughly cleaned of loose mill scale, loose rust, oil and grease or other deleterious matter that would destroy or reduce bond.

Reinforcement in reinforced concrete members shall not be connected by welding of coupling except in accordance with relevant ISS and with the previous approval of the architect. Overlaps and joints shall be staggered and located at points, along the span where neither shear nor bending moment is maximum.

### **Cover**

Reinforcement shall have cover as shown on the RCC drawings or as per latest IS Codes and its latest amendment and where not specified the thickness of cover shall be as follows. Cement mortar block in cm 1:1 shall be used for making cover blocks.

- (a) At each end of reinforcing bar not less than 25mm nor less than twice the diameter of such rod or bar.
- (b) For a longitudinal reinforcing bar in a column not less than 40mm nor less than the diameter of such rod or bar. In the case of columns of minimum dimensions of 20 cm. or under whose reinforcing bars do not exceed 13mm the cover of 25mm may be used.
- (c) For longitudinal reinforcing bar in a beam not less than 25mm nor less than the diameter of such rod or bar.
- (d) For tensile compressive, shear or other reinforcement in a slab not less 13 mm nor less than the diameter of such reinforcement.
- (e) For any other reinforcement not less than 13mm nor less than the diameter of such reinforcement.

## **SPECIFICATION FOR CONTROLLED CONCRETE**

### **GENERAL:**

1.1 However the controlled concrete for foundation , beam , column slabs and water retaining structures shall be supplied by the Registrar, Guru Nanak Public School Chandigarh at required level and contractor will arrange for laying of concrete only . Further to this the ready mixed concrete will be supplied at pump-crete locations and further delivery to the site Shall be done by the contractor by using and installing employer's supplied pipes and fittings at required levels.

1.2 RMC mix design shall be got approved by the Registrar, Guru Nanak Public School Chandigarh for implementation at site by the contractor.

1.3 All concrete shall comply with the requirements of IS : 456. Wherever reference is made to any Indian Standard Code of practice it shall mean the latest version of the relevant standard in use.

1.4 Concrete work shall be supervised by a competent concrete technologist approved by the Registrar, Guru Nanak Public School Chandigarh whose duty will be to supervise all stages of designing the mix, preparation and placing of concrete. All cubes shall be made and site test carried out under his direct supervision in the presence of Registrar, Guru Nanak Public School Chandigarh or his authorized representatives in approved laboratory.

1.5 Before the commencement of construction work, the contractor shall apply to the Registrar, Guru Nanak Public School Chandigarh for his approval drawing showing the general detailed arrangement for concreting plant.

1.6 All material which have been damaged, contaminated or have deteriorated or do not comply in any way with the requirement of this specifications shall be rejected and shall be removed from the site at the contractor's own expense.

1.7 Materials viz.. Cement, fine aggregates, coarse aggregates water etc. shall be tested, if directed, in an approved testing laboratory of Registrar, Guru Nanak Public School Chandigarh.

1.8 The concrete mix shall be designed by any of the recognized methods. The proportions chosen should be such that the concrete is of adequate workability for the conditions prevailing on the work in question and can be properly compacted.

1.9 The maximum total quantity of aggregate by weight shall not exceed what is shown in the table given below in paragraph 3.3 except where otherwise specifically permitted by the Registrar, Guru Nanak Public School, Chandigarh .

1.10 Except where it can be shown to the satisfaction of the Architect/ Consultant that supply of properly graded aggregate of uniform quality can be maintained over the period of work, the grading of aggregate should be controlled by obtaining the coarse aggregate in different sizes and blended them in the right proportions for various mix design, the different sized being stocked in separate stock piles. The material should be stock piled preferably a day before use. The grading of coarse and fine aggregate should be checked as frequently as possible, the frequency for the given job being determined by the Architect/Consultant to ensure that the suppliers are maintaining the uniform grading with that of the samples used in the preliminary tests.

1.11 In proportioning concrete, the quantity of both cement and aggregate should be determined by weight. Water should be either measured by volume in calibrated tanks or weighted. All measuring equipment shall be maintained in a clean serviceable condition and their accuracy periodically checked.

## **2. Materials :**

2.1.1 **Cement** : Shall comply in every respect with the requirement of the relevant IS Code for Ordinary Portland Cement ( 43 Grade ) and shall be obtained from approved sources.

2.1.2 Cement should be stored in suitable weather-proof structures on raised wooden platform and in stacks which are not higher than ten bags. Sufficient space shall be provided for circulation and rotation of bags in order to minimize the length of storage of any of the bags. Provisions for storage shall be ample and the consignment of cement as received shall be separately stored in such a manner as to provide easy access for the identification and the inspection of such consignment. Cost of providing these structure shall be borne by the contractor.

2.1.3 Stored cement shall meet the test requirements at any time after storage when a retest is ordered by the Architect/Consultant. Cement concerning where there is doubt shall not be used pending testing and satisfactory results. All cement not conforming to specifications and rejected by the Registrar, Guru Nanak Public School Chandigarh shall be removed immediately from the site of work.

2.1.4. Cement shall be used in a sequence in which it arrives in order that no cement shall be unnecessarily stored for a long period. If cement becomes lumpy due to partial hydration it shall be removed from the site immediately.

2.2.1 **ADMIXTURES OR PLASTICIZER** : Shall be allowed to improve workability only if there is proved evidence that neither the strength nor the other requisite qualities of concrete and steel accessories grout are impaired by their use. The use of admixtures containing calcium chloride, Fluorides, Nitrates and sulphates is prohibited. The Architect's decision on all matters relating to the use of admixtures shall be final.

2.2.2. Admixtures shall be stored in a suitable weather-proof shed/ building. Any material which is deteriorated or which have been contaminated or damaged during transit or at site shall be immediately removed from the site and replaced at contractor's own expense.

2.3.1. **FINE AGGREGATES:** Shall conform with the requirement of IS : 383 and relevant portion of IS : 515. It shall be chemically inert, strong, hard durable of limited porosity, free from adherent coatings, clay, lumps, coal and coal residues, and shall not contain any organic matter of other admixtures that may cause corrosion of reinforcement or impaired the strength or durability of the concrete. The maximum quantity of the deleterious material shall not exceed the limits specified in the relevant Indian Standard Specifications.

2.4.1. **COARSE AGGREGATE** : shall conform with the requirements of IS: 383 and relevant portion of IS : 515. It shall consist of hard, dense, durable, uncoated crushed rock . Use of gravel shall be allowed only if specified. Aggregate shall be free from soft, friable, thin or flaky pieces. It shall be free from injurious amounts of alkali and organic matter other than deleterious materials. The maximum

quantity of deleterious materials shall not exceed the limits specified in the relevant Indian Standard Specifications.

2.4.2. In selecting coarse as well as fine aggregates, the contractor shall satisfy himself that the source is suitable and adequate for regular supply and a watch shall be maintained that the particles shape and grading remain reasonably uniform throughout the process of work. If directed by the Registrar, Guru Nanak Public School Chandigarh the aggregates shall be washed at contractor's expense.

2.4.3. For both fine and coarse aggregate, preliminary tests shall be carried for physical characteristic limits of the deleterious substances, soundness etc. prior to commencement of work and also when the source of supply is changed.

**2.5.1. WATER :** Water used for both curing and mixing shall be free from injurious amounts of deleterious materials. Potable water is generally considered satisfactory for mixing and curing concrete. Water containing any sugar or an excess of acid, alkali or salt, shall not be permitted for use. Water which fails to satisfy the IS 3025 shall not be used.

2.5.2. In case of doubt, the Registrar, Guru Nanak Public School Chandigarh may require that concrete mixed with water proposed to be used should not have a compression strength lower than 90% of the strength of concrete mixed with distilled water.

**2.6.1. Reinforcement :** All reinforcement shall conform with the requirement of relevant IS specifications for mild steel, deformed steel etc. All reinforcement, when placed in position shall be clean and free from loose mild scales, dust, loose rust, and coats of paints, oil, or other coatings which may destroy or reduce bond.

2.6.2. Welded joints may be allowed only when test shall be made to prove that the joints are of full strength of the bars connected. Welding of reinforcement shall be done in accordance with the recommendations of relevant Indian Standards for welding of mild steel bars used in reinforced cement concrete.

**3.1 Concrete Mix Design:** Concrete mix for various specified design strength shall be worked out by the contractor by any of the recognized method of mix design. There shall be one or two or more mix designs for same grade of concrete, for different workability as required for different structural members such as slabs, beams, columns etc.

3.2 The selected mix proportion shall ensure that workability of fresh concrete is suitable for conditions of handling and placing so that after compaction it surrounds all reinforcement ducts etc. and completely fills the form work. When the concrete is hardened its quality shall be such as to comply with the strength durability and other requirements, taking into account the conditions to which it will be exposed.

3.3 The preliminary mix design shall assume only good control, unless the contractor can prove from his past experience that he is capable of achieving high degree of control. Before arriving at average strength values the contractor shall give due regard to the criteria of acceptance for preliminary tests as stipulated in IS : 456 ( Please see table 1) 5 companion cube shall constitute a test and the average strength of 5 companion cubes tested shall not be less than stipulated strength for preliminary tests. The design mix and control shall be accepted if only one out of five cubes may give a value less than a specified strength (Ref Cl. 5.2.2.1 and 5.4.2 of IS : 456 1964). The contractor shall prepare well in advance all calculations, tabulations, graphs pertaining to concrete mix design and preliminary test

results and submit the copies to Registrar, Guru Nanak Public School Chandigarh for their instructions. Only that mix which is approved in writing by the Registrar, Guru Nanak Public School Chandigarh shall be allowed on the works. However, it shall be clearly understood that such approval shall not absolve the contractor of his responsibility for compliance of works test results.

3.4 The minimum cement content for various mixes as well as the maximum aggregate cement ratio shall be as under :-

One Cement bag weighs 50kg and measures 0.03472 cum.

S.No.	Description	Unit	Quantities		
			Cement (Bags)	Fine aggregates (cum)	Coarse aggregates (cum)
27.1	Cement concrete:-				
i	M20	cum	6.80	0.43	0.85
ii	M25	cum	7.30	0.43	0.85
iii	M30	cum	7.50	0.43	0.85
iv	M35	cum	8.10	0.43	0.85
v	M40	cum	8.80	0.43	0.85

#### 4. Mixing & Placing of Concrete :

**4.1 Measurement of Materials :** Cement – In proportioning concrete, the quantity of both cement and aggregate shall be determined by weight. Where the weight of the cement is determined by accepting the maker's weight per bag, a number of bags as directed by the Architect/consultant shall be weighed separately to check the net weight. Where cement is weight on the site and not in bags it shall be weight separately from the aggregate.

**4.2 Aggregate:** Aggregate shall be batched by weight in a mechanical weigh batcher or batching plant unless otherwise specified in the schedule of quantities. Where volumetric proportions are allowed with the consent of the Architect/Consultant, the conversion from weight to that of volume shall be on the basis of dry bulk densities of the aggregate.

**4.3 Water :** Water shall be measured either by volume in calibrated tans or weighed. Water shall not be measured using ordinary buckets. Measurement of water to control and maintain water cement ratio is of utmost importance and adequate attention shall be given by the contractor to the satisfaction of the Architect/Consultant.

4.4 All measuring equipment shall be of mixed in a mechanical mixer. Thorough mixing of concrete is essential and mixer shall always be operated at the speed recommended by the makers. The mixing time from the time of adding water shall be in accordance with IS : 1791, but in no case mixing shall be done for less than two minutes to ensure that the materials are uniformly disturbed and the mass is uniform in colour and consistency. When the mixing is over, the entire contents of the drum shall be discharged in one operation into a hopper or a container to avoid segregation of mortar from coarse aggregate. If the concrete is allowed to be unloaded on a platform, it shall be watertight. After day's work the mixer shall be thoroughly washed and blades cleaned otherwise mixing drum will soon become callous with hardened concrete which will impair the efficiency of the mixer, Inside of the drum shall be inspected regularly any blades which are worn out or broken should be replaced.

**4.5 Transporting :** Concrete shall be handled from the place of mixing to the place of final deposit as rapidly as practicable by methods which will prevent the segregation or loss of any of the ingredients. If segregation occurs during transport the concrete shall be mixed before being placed.

**4.6.1 Placing :** Concrete shall be placed in position and compacted before initial setting commences and when once compacted it shall not be subsequently disturbed. Method of placing shall be such as to preclude segregation.

**4.6.2** During hot or cold weather, concrete shall be transported in deep containers to reduce loss of water by evaporation during hot weather and loss of water during cold weather. Deep containers are specified on account of their lower ratio of surface area to mass.

**4.6.3** Concrete shall not be dropped into position from a height greater than 1.5 metres.

**4.6.4** Before the concrete is actually placed in position, the inside of the forms shall be inspected to ensure that the shuttering is watertight and the surface treated with approved composition. All debris, sand dust etc. shall be removed from shuttering before concrete is placed in position.

**4.6.5** Concrete shall be placed in suitable layers depending upon the nature of work and in no case shall be more than 30 cms. thick, placing shall be confined as far as practicable.

**4.6.6** When concrete is required to be placed under adverse condition viz. extreme weather conditions, under water, in alkali soils and in alkaline water the requirements as stipulated in IS 456 shall be complied.

**4.7.1 Compaction :** Concrete shall be thoroughly compacted during the operation of placing and thoroughly worked around the reinforcement around embedded fixtures and into corners of the form work. Means of compaction shall be by rodding, punning and by light tapping the form work on the external face at the actual pouring head and this shall be followed by mechanical vibration by using approved type of vibrator.

**4.7.2** Beams and columns shall be vibrated using immersion vibrators as per IS :25050 and IS : 3558, thin sections like water tanks walls shall be vibrated using clamp on vibrators and shall be vibrated using surface vibrators. The contractors shall at times have in reserve sufficient vibrators of each type to guard against shut down of the work occasioned by the failure of the equipment. No concreting shall be permitted in the event of power failure.

**4.7.3** The intensity and duration of vibration shall be sufficient to ensure complete settlement and compaction without any satisfaction of successive layer of separation of ingredients or information of laitance. Immersion vibrators shall be inserted vertically and not at an angle at regular intervals not more than 45 cms. apart withdrawn very slowly when air bubbles no longer come on the surface. It is better to vibrate at smaller intervals for shorter periods of time, rather than at wider intervals for longer periods of time. To avoid trapping of air the thickness of layer of concrete to be vibrated shall not be less than 15 cms and maximum advisable shall be 45cms. The vibrator shall be used only to aid compaction and shall never be used to push concrete laterally in the forms.

**4.7.4 Curing :** Concrete shall be carefully protected during first stage of hardening from harmful effects of excessive heat, drying winds, running down of surface, water and shocks. Concrete shall be prevented from drying out atleast for a period of 14 days and thereafter the surface kept moist for another 7 days.

The method of curing shall be that horizontal surfaces shall be kept covered with ponded water for a continuous period of 14 days and vertical surfaces like columns, fins etc. shall be covered with straw, hessian etc. and kept constantly wet by water spray. Mere sprinkling of water on vertical surfaces shall not be allowed.

**5.1 Testing and Acceptance of Concrete :** Method of sampling and testing shall be carried out as per IS 1199 and Is 516 and evaluation of test results shall be as per IS 456 in general and clause (Clause 6.1, 9.2.2, 15.1.1 and 36.1) hereafter in particular.

5.2 Tests shall be conducted on compaction cubes of specimen. Companion specimens shall be cast from a single batch of concrete and shall be of the same age at the time of testing. The average strength of three companion specimens shall constitute the result of that test. From each sample of concrete 6 companion cubes shall be taken. Three of these shall be tested at 7 days and the remaining 3 at 28 days.

5.3 A minimum of two such samples giving 12 cubes shall be obtained per mix per day or for every 30 cum. or fraction thereof for each grade, whichever gives more number of cubes. All these cubes shall be tested in the site laboratory or any recognized laboratory. The Architect / Consultant may at his absolute discretion increase or decrease the frequency of tests.

5.4 The criteria for acceptance of a concrete shall be in accordance of a concrete shall be in accordance with the latest version of IS 456 and the consequences of rejection shall be at the expense of contractors. Strength of 28 days shall alone be considered for acceptance.

**TABLE-1 : Strength Requirement of Concrete:**

S.No.	Grade Designation	Specified Characteristics Compressive strength of 150mm cube at 28 days (N/mm <sup>2</sup> )
1	M10	10
2	M15	15
3	M20	20
4	M25	25
5	M30	30
6	M35	35
7	M40	40
8	M45	45
9	M50	50
10	M55	55

#### **5.4.4 BRICK MASONRY**

##### **General :**

All brick work should be carried out as shown on the drawings with setbacks, projections, cuttings toothing etc. wherever the proportion of cement mortar has not been specifically mentioned. Cement mortar in the proportion of 1:6 shall be used flat bricks arches shall be provided wherever required without any extra cost. Brick work shall be kept wet while in progress till mortar has properly set. On holidays or when work is stopped top of all unfinished masonry shall be kept wet should the mortar become dry, white or powdery for want of curing work shall be pulled down and rebuilt at the contractors expense.

### **Brick Work 1<sup>st</sup> Class**

Bricks shall be thoroughly cleaned, well wetted and soaked for at-least twelve hours in fresh water before being used on the work. Bricks shall be of locally available best quality.

English bond shall be used throughout in walling; a good bond shall be maintained through the work. Both laterally and transversely, In walling, the courses shall be kept perfectly horizontal and in plumb with the frogs facing upwards. Vertical joints shall not exceed 10 mm thickness and shall be full of mortar. No broken bricks shall be used except as closers. After days works all joints shall be raked to 12 mm, depth to provide for proper key to plastering.

Mortar used shall be as specified in respective items and every course of brick work shall be flushed with mortar grout.

Whole of the masonry work shall be brought up at one uniform level throughout the structure, but where breaks are unavoidable, joints shall be made in good long step. All junctions of walls and cross walls shall be carefully bonded into the main walls. The rate of laying masonry may be upto a height of 60cm. per day if cement mortar is used. Greater heights may be heights may be built only if permitted by the Architect.

During rains, work shall be carefully covered to prevent mortar from being washed away. Should any mortar or cement be washed away the work shall be removed and rebuilt at the contractors expenses.

### **5.4.5 Wood work**

Timber used shall conform to specification described under materials, doors, windows ventilators wall panelling, false ceiling etc. shall be in accordance with Architects, drawing in every detail and all joiners work shall be accurately set out, framed and finished in a proper workman - like manner. Frames of doors, windows, and ventilators etc. and shutter styles and rails shall be of best sold teak of quality specified in the schedule of quantities. The scantlings shall be accurately planed smooth. Rebates, rounding, and mouldings shall be made as shown on the drawings. Patching or plugging of any kind shall not be allowed. Joints shall be simple, neat and strong. Framed joints shall be coated with suitable adhesive like glue or synthetic resin before the frames are put together. All mortice and tenon joints shall fit in fully and accurately without wedging on filling. The joints shall be pinned with hard wood or bamboo pins of 10mm to 12mm dia or rust resisting star shaped metal pins of 8mm after the frames are put together and pressed in position by means of a press. The frames shall be protected during the progress of work by suitable boxing. All portions of timber abutting against or embedded in masonry or concrete shall be treated against termites by giving a coat of any approved wood preservative.

Unless otherwise specified all door frames shall have six m.s. flat holdfasts and windows frames shall have four holdfasts. Holdfast shall be provided to the ventilators, if directed. Size of holdfast shall be 300mm x 40mm x 4.0 mm. M.S. flat bent to shape with fish tail end and it shall be fixed to frame with sufficient number of screws as directed. When door frames sufficient number of screws as directed. When door frames are to be fixed to RCC column or RCC wall. holdfasts shall be substituted by suitable arrangement such as coach screws, rawl bolts etc. to secure frames to RCC columns or RCC wall as directed by Registrar, Guru Nanak Public School Chandigarh .

### **Panelled Shutter :**

Panels shall be of pattern and size as shown on the drawings or as directed Registrar, Guru Nanak Public School Chandigarh teak wood panel panels shall be in one piece wherever possible. Where two or more pieces are permitted, they shall be of equal width. Panels shall be framed into grooves made in



styles and rails to the full depth of groove and faces shall be closely fitted to sides of groove. Where panels specified are block board, it shall be solid core with teak internal lipping and of approved make.

Partly panelled and partly glazed shutter shall be similar to panelled shutter except that such parts as are directed shall be glazed with plain or ground glass as specified. Styles and rails shall be rebated 12mm to receive glass. Sash bars shall be moulded and rebated and mitred on sides to receive the glass which shall be fixed with putty and beads.

### **Hardware Fittings**

Brass hardware fittings and fixtures shall be arranged by the contractor and approved by the Registrar, Guru Nanak Public School Chandigarh and the cost of fixings fitting shall be included in the rate quoted as mentioned in SOQ. The fixing shall be done workman like manner in accordance with the manufactures specifications. The contractor shall be held responsible for working of all moving parts dependent on proper fixing. He will also be responsible for any breakage due to negligence during fixing or lack of protection before the building is handed over.

Hardware required for fixing false ceiling, wall panelling etc. shall be arranged by the contractor at his cost. Apart from the hardware fittings required for the joinery items, the contractor shall have to fix all other items of hardware fittings to be supplied by the employer viz. coat/picture hooks, numericals, letters to denote buildings, hanging rods etc. as directed by the Registrar, Guru Nanak Public School Chandigarh

Painting and polishing of wood work shall be as per specifications under respective heads.

### **Flush Doors :**

All flush doors shall be solid core unless otherwise specified. It shall conform to the relevant specifications of IS 2202 and shall be obtained from approved manufacturers. The finished thickness of the shutter shall be mentioned in the items. Face veneers shall be of the pattern and colour approved by the architect and an approved sample shall be deposited with the Architect for reference.

The solid core shall be wood laminate prepared from battens of well seasoned and treated good quality wood having straight grains. The battens shall be of uniform size of about 2.5cm width. These shall be properly glued and machine pressed together, with grains of each piece reversed from that of adjoining one. The longitudinal joints of the battens shall be staggered and no piece shall be less than 50 cm. in length. Alternatively, the core shall be of solid teak particles board. Edges of the core shall be lipped internally with 1<sup>st</sup> class teak wood battens of 4 cm ( 1.5") minimum depth, glued and machine pressed along with the core.

The core surface shall then have two or three veneers firmly glued on each face. The first veneer (called cross band) shall be laid with its grains at right angles to those of the core and the second and the third veneers with their grains parallel to those of the core. The under veneers shall be of good quality, durable and well seasoned wood. The face veneers shall be of minimum 1 mm thickness and of well matched and seasoned first class teak, laid along with grains of the core battens. The combined thickness of the veneers on each face shall not be less than 4 mm. Thermosetting synthetic resin conforming to IS 303 or moisture proof plywood grade M.P.F.I. shall be used in manufacture. 1.0 mm thick laminate may

also be affixed on the both sides if required . In addition to internal lipping all doors shall have external lipping all around 6 mm to 10 mm thick.

#### **UPVC Windows :**

Providing and fixing in position Un plasticized Poly Vinyl Chloride (UPVC ) window shutters including UPVC Chowkhats strengthened with Galvanized Iron with handles , hinges and locking , roll up and shutter systems with fixing of glass etc. complete in all respects as per Design and drawing .

#### **M.S. Grills and Railings .**

Steel used in the manufacture of rolled steel sections shall not have more than 0.060% of sulphur and 0.065% of phosphorus. The carbon content shall not exceed 0.30% and shall be of weldable quality. In all other respects, the rolled steel sections shall conform to IS 226: 1975.

#### **Collapsible Steel Gate :**

It shall consist of vertical double channels at 10 cm centers. The size of channel T section for top and bottom shall be as approved by the Architects. The gates shall be provided with necessary bolts, Nuts, locking arrangements, stoppers and the brass handles on both sides. The gate shall be coated with one coat of anticorrosive paint before erection and two coats of synthetic enamel paint of approved quality and shade.

#### **Wrought Iron Grilles :**

Grilles shall be manufactured as per drawings and the welded joints shall be smooth. The grilles shall be painted with one coat of anti corrosive paint before fixing and two coats of synthetic enamel paint of approved quality and shade.

#### **Expansion Gaps :**

Particular care must be taken to ensure free expansion and contraction, wherever provided for, in drawings or special specifications.

#### **Vitrified Tile Flooring & wooden skirting,**

Vitrified floor tiles shall be used over rich mortar ratio and wooden skirting as specified in SOQ shall be fixed all around . In common areas and in balconies granite tiles shall be used . All

flooring, skirting, etc. shall be executed strictly as per relevant IS specification and in workmanlike manner.

#### **Preparation of surface :**

Before the operation for laying topping is started the surface of base concrete shall be thoroughly cleaned of all dirt, loose particles, coked mortar dropping's and laitance if any, by scrubbing with coir or steel wire brush. Where the concrete has hardened so much that roughening of surface by wire brush is not possible, the surface shall be roughened by chipping or hacking at close intervals. The surface shall

then be cleaned with water and kept wet for 12 hours and surplus water shall be removed by mopping before the topping is laid.

### **Dado, Skirting and Risers**

Tiles shall conform to IS : 1237:2012 and shall be of approved design. The tiles shall be fixed with neat cement grout on a backing coat consisting of 1:4 cement sand plaster of 15mm to 20mm thick. The top and bottom junctions of tiles shall be rounded off neatly as directed. The joints shall be filled with matching shade coloured cement slurry. The surface be kept wet for 7 days and then polished with carborundum stone to obtain smooth surface and fine polish

### **Colour Glazed tiles in Dado :**

Colour glazed tiles from an approved manufacturer conforming to IS : 777 shall be used. They shall be of specified size and thickness. All special viz. covers, internal and external angles, corners, beads etc. shall be used wherever directed. Under-layer of specified thickness and mortar of stipulated proportion shall be laid as described in marble mosaic flooring. Tiles shall be washed clean and set in cement grout and each tile being gently tapped with a wooden mallet till it is properly bedded and in level with the adjoining tiles. The joints shall be kept as thin as possible and in straight lines or to suit the required pattern. After the tiles have been laid, surplus cement grout shall be cleaned off.

The joints shall be cleaned off the grey cement grout with a wire brush or trowel to depth of 5mm. (3/16") and all dust and loose mortar removed. joints shall then be flush pointed with white cement. After curing the surface shall be washed with mild hydrochloric acid and clean water. The finished floor shall not sound hollow when tapped with a wooden mallet.

## **Plastering**

### **Scaffolding**

Scaffolding for carrying out plastering work shall be double scaffolding having two sets of vertical supports so that the scaffolding is independent of the walls.

### **Preparation of surface :**

All putlog holes in brickwork and junction between concrete and brickwork shall be properly filled in advance. Joints in brick-work shall be raked about 10mm and concrete surface hacked to provide the grip to the plaster projecting burns of mortar formed due to gaps at joints in shuttering shall be removed.

The surface shall be scrubbed clean with wire brush/coir brush to remove dirt, dust etc. and the surface thoroughly washed with clean water to remove efflorescence. Grease and oil etc. and shall be kept wet for a minimum of six hours before application of plaster.

### **Neeru Plaster :**

Cement mortar of specified proportion sand thickness shall be prepared in small batches and applied to the wall surface/ceiling. To ensure proper thickness, gauged patches shall be made at 1.5 to 2m apart and the surface plastered true to lime level and plumb taking special care to finish jambs of windows, doors,

wall returns, corners, junctions etc. A thin layer of neeru shall then be applied and rubbed into surface and finished by means of trowel until the surface is even and smooth. The surface shall be kept moist for seven days and then give a coat of white wash.

### **Damp Proof Course :**

Shall consist of 1:1.5:3 plain cement concrete with approved water-proofing material such as 'CICO' 'IMPREMO' etc. of specified thickness. Edges of damp proof course shall be straight even and vertical. Side shuttering shall consist of wooden or steel forms and shall be strong and properly fixed so that it does not get disturbed during compaction and mortar or cement slurry does not leak through. When forms are struck the surface should be smooth without any honeycombing. The surface shall be kept wet for 7 days.

Before commencing the superstructure work, the top of concrete course shall be dried and cleaned of all materials. Blown type bitumen shall then be applied uniformly on the surface and the side of the concrete coming in contact with flooring on the inside shall also be painted with bitumen.

### **Water-proofing treatment**

Unless otherwise specified, the contractor shall carry out water-proofing treatment of basements, terraces and water retaining structures through reputed firms having specialized in the line and approved by the Registrar, Guru Nanak Public School Chandigarh. The contractor shall also furnish full details of such treatment to the Registrar, Guru Nanak Public School Chandigarh / Architects and provide all information/proof etc. regarding the effectiveness of the treatment when called upon to do so. All such treatment shall have to be guaranteed in the form approved by the Employer for a minimum period of 10 years. Any defects/leakages noticed during the guarantee period shall have to be rectified free of cost by the contractor including reinstating the surface to its original condition and finish.

Water-proof of sunk, portions of the floor slabs for baths, W.C. and kitchen moieties etc. in residential buildings, unless otherwise specified shall be done as specified in the schedule and shall generally comprise of :

- i) Epoxy coating around pipes apertures
- ii) Brick Bat coba as mentioned in SOQ

The rate for the above treatment shall include drying and cleaning surfaces free of dust etc. and wiping with kerosine before application of bitumen. The vertical faces and returns shall also be treated similarly. The actual area treated including vertical faces and returns shall be measured and paid for. The work should be done in such a way that the finished flooring in bath has a minimum slope of 20 to 25mm.

The waterproofing treatment shall have to be got executed only through the specialist firms in the line as approved by the Registrar, Guru Nanak Public School Chandigarh .

## **Painting**

### **General :**

Wherever scaffolding is necessary, it shall be double scaffolding.

The surface shall be thoroughly brushed free from mortar droppings and foreign matter. All steel work shall be cleaned of loose rust, mill scales etc. so as to expose the original shall be brought up either by patch plaster work or by plaster of paris cornices , fan , mouldings etc.

All materials viz., dry distemper, oil bound distemper oil paint, synthetic enamel paint, plastic emulsion paint, cement primer, red lead and other primers and metallic paints shall conform to respective IS specifications and shall be obtained from approved manufacturers. All paints shall be brought on site in sealed tins in ready mixed form and shall be applied direct with the addition of thinner, if recommended by the manufacturers.

### **White Washing**

White wash shall be prepared from lime slaked on spot, mixed and stirred with sufficient water to make a thin cream. This shall be allowed to stand for 24 hours and shall be screened through clean cloth. 4 kg of gum dissolved in hot water shall be added to each cum. of the cream (115gm per cft.) Blue shall be added to give required whiteness. The approximate quantity of water to be added in making cream shall be 5 lts. per kg. of lime.

White wash shall be applied in specified coats by using flat brushes or spray pumps. Each coat shall be allowed to dry before next coat is applied. IF additional coats then what have been specified are necessary to obtain uniform and smooth finish, it shall be given at no extra cost.

this finished dry surface shall not show any signs of cracking and peeling nor shall it come off readily on the hand when rubbed.

If directed by the architect one coat of chalk and glue shall be applied before application of white colour wash at no extra cost.

### **Dry Distemper**

Shade shall be got approved from the Architects before application of distemper.

The surface shall be prepared as specified earlier. A primer coat using approved primer or sizing shall be applied. Distemper prepared as per manufacturer's directions shall be applied and each coat shall be allowed to dry before subsequent coat is applied. The finished surface shall be free from chalking when rubbed, even , uniform and shall show no brush marks. If additional coats are necessary, they shall be given at no extra cost.

### **Oil bound distemper :**

The surface shall be prepared as specified above. A primer coat of either cement primer or an approved distemper primer shall be applied.

After the primer coat has dried, the surface shall be lightly sand-papered and dusted to make it smooth to receive distemper.

Distemper shall be prepared as per the directions of the manufacturer and conforming to shade approved. It shall be applied in specified coats, taking care to allow for drying of each coat before subsequent coats are applied.

#### **Water proof cement paint :**

The surface shall be prepared as specified above and thoroughly wetted with clean water before water proof cement paint is applied.

The paint shall be prepared strictly as per manufacturer's specifications and in such quantities as can be used up in an hour of its mixing, as otherwise the mixture will set and thicken affecting flow and finish.

The paint thus prepared shall be applied on clean and wetted surface with brush or spraying machine. The solution shall be kept stirred during the period of application. It shall be applied on the surface which is on the shady side of the building so that the direct heat of sun on the surface is avoided. The completed surface shall be watered after the day's work. Number of coats shall be as specified in the item.

#### **Painting - /Oil/Enamel/Plastic emulsion etc.**

Ready mixed oil paint, flat oil paint, aluminium paint etc. shall be brought in original containers and in sealed tins. If for any reason thinner is necessary the brand and quantity of thinner recommended by the manufacturer or as instructed by the Architect shall be used.

The surface shall be prepared as specified above and a coat of approved primer shall applied. After 24 hours drying approved or specified quality paint shall be applied evenly and smoothly. A filler putty coating may be given to give a smooth finish. Each coat shall be allowed to dry out thoroughly and then lightly rubbed down with sand paper and cleaned of dust before next coat is applied. Number of coats shall be as specified in the item and if the finish of the surface is not uniform, additional coats as required shall be applied to get good and uniform finish at no extra cost. After completion no hair marks from the brush or clogging of paint puddles in the corners of panels, angles of mouldings etc. shall be left on the work. The glass panes floor etc. shall be cleaned of stains.

When the final coat is applied, if directed the surface shall be rolled with a roller or if directed, it shall be stippled with a stippling brush.

## **Polishing and Varnishing**

### **French Polishing :**

French spirit polish shall be of an approved make conforming to IS 348:1968. If it has to be prepared on site, the polish shall be made by dissolving 0.7 kg. of best shellac in 4.5 litres of methylated spirit without heating. To obtain required shade pigment may be added and mixed.

Surface shall be cleaned. All unevenness shall be rubbed down smooth with sand paper and well dusted. Knots, if visible, shall be covered with the preparation of red lead and glue. Resinous or loose knots and gaps shall be filled with seasoned timber pieces and made level with rest of the surface. Holes and indentations on surface shall be filled with putty made of whiting and linseed oil. Surface shall be given a coat of filler made of 2.25 kg of whiting in 1.5 lts. of methylated spirit. When it dries surface shall again be rubbed down perfectly smoothed with sand paper and white clean.

Piece of clean cotton cloth and cotton wool made into shape of pad shall be used to apply polish. The pad shall be moistened with polish and rubbed hard on the surface applying a polish sparingly but uniformly sand completely over the entire surface. It shall be allowed to dry and another coat applied in the same way. To give finishing coat, the pad shall be covered with a fresh piece of clean fine cotton cloth, slightly dampened with methylated spirit and rubbed lightly and quickly with a circular motion, till the finished surface attains uniform texture and high gloss.

### **Wax Polishing :**

Wax polish shall either be prepared on site or obtained readymade from the market. Polish made on the site shall be prepared from the mixture of pure bees wax, linseed oil, turpentine oil and varnish in the ratio of 2:1. 5:1. ½ by weight. The bees wax and the boiled linseed oil shall be heated over a slow fire. When the wax is completely dissolved the mixture shall be cooled till it is just warm, and turpentine oil and varnish added to it in the required proportions and the entire mixture is well stirred.

Surface shall be prepared as described under 'French Polishing' except that the final rubbing shall be done with sand paper which has been slightly moistened with linseed oil.

Mixture or polish shall be applied evenly, with a clean cloth pad in such a way that no blank patches are left, and rubbed continuously for half an hour. When a surface is quite dry a second coat shall be applied in the same manner and rubbed continuously for half an hour or until the surface is dry. Final coat shall then be applied and rubbed for two hours or more if necessary, until the surface has assumed a uniform gloss and is quite dry showing no sign of stickiness when touched. Gloss of the polished depends on the amount of rubbing, therefore rubbing must be continuous and with uniform pressure and frequent change in direction.

### **Varnishing :**

Surface shall be prepared as described above. After preparation of surface two coats of clean boiled linseed oil shall be applied at the surface interval of time. After the linseed oil has dried two coats of varnish obtained from approved manufacturer shall be applied at sufficient interval of time. If the surface fails to produce the required gloss an additional coat shall be applied without any extra cost.

## Public Health Specifications

### Pipes and Fittings :

For Internal and concealed water supply CPVC pipes and fittings shall be used and for external water supply and rain water PP-R pipes shall be used .

### Tanks at Terrace :

Triple layered HDPE tanks with control and float valves complete in all respects duly placed RCC slab built over terrace slab as per drawing

### Manholes, Vent, Shaft, Gully, Chamber etc.

#### Size of manholes :

The size specified in the Schedule of quantities shall be internal size of manhole.

The work shall be done strickly as per standard drawing and following specifications.

#### Bed Concrete :

Shall be in 1:4:8 in cement concrete 23 cm (9") thick.

#### Brickwork :

Shall be with locally available best quality bricks in 1:4 cement mortar.

#### Plaster :

Inside of the walls shall be plastered with 12mm thick cement plaster 1:3 and finished with a floating coat of neat cement.

In wet grounds, 20mm thick plaster of the above specifications shall be done on the exterior surface of the walls also and this plaster shall be water proofed with the addition of the approved water proofing compound as per manufacturer's specification.

#### Pointing :

In dry grounds pointing shall be done in 1:2 cement mortar to the outside surface.

#### Benching :

Channels and benching shall be done in 1:2:4 cement concrete rendered smooth with smooth cement. The following size of channels for the bench shall be adopted.

Size of drain		Depth at the centre		Depth at sides i.e. at walls	
In cms	in inches	in cms.	in inches	in cms.	in inches
10	4	15	6	25	10
15	6	20	8	30	12
23	9	28	11	38	15
30	12	35	14	45	18
38	15	43	17	53	21
45	18	50	20	61	24



**Foot Rests :**

C.I. footrests or M.S. square rods of 22 mm (7/8") shall be embedded in masonry if the depth of IC increases more than 3'-0" feet . They shall be fixed 30 cm apart and projecting 11 cm from the wall. Footrests shall be painted with bitumen as directed.

**Manhole covers / Inspection Chambers :**

Manhole covers IC covers shall be of tough homogeneous cast iron of heavy or light type as specified. The sizes specified are the clear mentioned dimensions. Covers for manholes in the road proper shall not weight less than 200 kgs. On footpaths and backyards, lightweight covers of 45 cm diameter having weight not less than 58 kgs. or covers of size 92cm x 45cm x 61 cm x 45 cm having weight of 90 kgs shall be used.

**Drop Connections :**

In case of drop connections C.I. pipes shall be provided with heel rest bend at the bottom and bend with access door at the top for cleaning purposes.

**European type W.C. :**

The closet shall be of coloured vitreous china readily flushed out wash down type , and shall be of the best quality manufacturer by an approved firm, and fixed to the floor by approved means.

Each closet shall be provided with the following accessories and the rates shall be all inclusive.

1. Seat : Heavy coloured Plastic seat of approved quality and seat cover with rubber buffers fixed to the pan with C.P. brass bar hinge.
2. Cistern : Low level flushing tank 12.5 lts. capacity of coloured vitreous china cistern of best quality manufactured by an approved firm with C.P. flush handle overflow pipe of length as per municipal requirement of as per Architect's drawing with mosquito proof bronze cap etc. complete unit including enameled of C.P. flush pipe and bend or specified make as mentioned in SOQ.
3. Necessary length of lead water inlet pipe and 12 mm dia C.P. brass stop cock.
4. Necessary length of porcelain or lead or C.I. connecting pipe 10 cm dia ( plug bend / tee connection to vertical stack shall be paid under appropriate item ).
5. Wherever anti-syphonage pipe connections are required, necessary length of lead pipe 6.25 cm dia shall be provided.

**Painting :**

All fittings and fixtures shall be painted with two coats of enamel paint over one coat of primer.

**Angle valve :**

The cistern shall be fed with 15 mm (1/2") C.P. brass inlet tube angle valve of approved make with the necessary length of lead inlet pipe complete with C.P. brass union unless otherwise specified in the schedule of quantities.

The main and distribution pipe fittings and clamps shall be of C.P. brass unless otherwise specified in the schedule of quantities. Distribution pipes shall feed the urinals with C.P. brass spreaders of approved make.

**Painting :**

All brackets etc. shall be painted with two coats of enamel paint over one coat of primer.

**Lavatory Basins :**

They shall be of coloured vitreous china of best quality manufactured by an approved firm and size as specified in the schedule of quantities. They shall be supported on a pair of C.I. brackets of approved design.

i) Fittings : Each lavatory basin shall be provided with a single cold water C.P. brass pillar tap of approved design and make, C.P. brass waste, C.P. brass chain and rubber plug, C.P. brass bottle trap of approved quality and design with C.P. brass stop cock and water inlet pipe of standard length complete.

ii) Waste pipe : Waste pipe beyond bottle trap shall be measured and paid separately under appropriate item.

Where specified, lavatory basins shall be provided with puff pipe with a brass perforated screw cap.

iii) Painting : All brackets, pipes etc. shall be painted with two coats of enamel paint over one coat of primer.

**Sinks :**

They shall be of stainless steel sink or as specified in the schedule of quantities with weir type overflow. The size of sink shall be of approved make. they shall be supported on a pair of C.I. brackets of approved design.

i) Fittings: Each sink shall be provided with 40 mm (1.5") C.P. brass waste of approved pattern with C.P. brass chain and 40 mm rubber plug & 40 mm dia C.P. brass trap and union which shall be connected to 40 mm diameter waste pipe.

Waste pipe beyond the trap shall be measured separately and paid under appropriate item.

Where specified sink shall be provided with puff pipe with a brass perforated screw cap.

iii) **Painting :** All fittings, brackets and pipes shall be painted with two coats of enamel paint over one coat of primer.

**Draining board :**

Draining board of type and size as specified in the schedule of quantities shall be provided. These shall be fixed on strong brackets of approved design and where necessary provided with hinges. Brackets shall be painted with two coats of enamel paint over one coat of primer.

**III TOILET REQUISITES****Mirrors :**

Mirrors shall be of the best quality specified size, approved design and make. It shall be mounted on asbestos sheet backing and shall be fixed in position by means of four C.P. brass screws and cup washer over rubber washers on wooden plug firmly embedded in the wall. Alternative method for fixing could be by using brass clamps with C.P. brass screws. A suitable Teak Wood cover mould of approved design shall be fixed all round as directed.

**Towel Rail :**

The towel rail shall be of C.P. brass with two brass brackets. The size of the rail shall be as specified. The brackets shall be fixed by means of C.P. brass screws to wooden cleats firmly embedded in the wall. Where specified aluminum towel rails may be used of approved quality and design.

**Toilet paper holder :**

Toilet paper holder shall be of white vitreous china or as specified. It shall be recessed in wall.

**Nahani or floor traps :**

The traps shall be self cleansing design deep seal type with a minimum seal of 5 cm (2") . If directed , 25 mm puff pipe shall be provided. The other specifications for these shall be same as those for C.I. soil waste pipes and fittings.

**Painting :**

All exposed C.I. pipes and fittings shall be painted to match the colour of the surroundings with two coats of flat/enamel paint over a coat of approved primer. If directed, additional coats shall be given at no extra cost.

**REGISTRAR  
GURU NANAK PUBLIC SCHOOL  
CHANDIGARH**

**Contractor's signature**

**REGISTRAR GURU NANAK PUBLIC SCHOOL CHANDIGARH**  
**Building Projects - Maintenance of Records**

**A. Registers at the Site Office**

1. Measurement Books
2. Cement Register (Daily Record)
3. Steel Register
4. Steel consumption Register - Bill wise
5. Drawing Register
6. Materials at Site Register
7. Hindrance Register
8. Concrete Cube Test Register
9. File & Register for extra/variation items.
10. Materials Test s Register and File
11. Site Order Book (in triplicate)
12. PVC pipe connector's liquid
13. Labour Reports & Progress Report Register.
14. Site Visit and Instructions Register
15. Certified true copies of the contracts.

These are only the information for the contractors however other documents if required for better control of the works the employer is free to request to contractor for such documents with the contractor's cost .

**CEMENT CONSUMPTION**

The coefficients of theoretical consumption shall be applied as per Delhi Schedule of Rates 2018 & Delhi Analysis of Rates 2018.

**Note :** For any other item of work Site Engineer shall refer to the C.P.W.D. specifications 2019 and norms. In case no coefficient is available for a specific item, the decision of Registrar, Guru Nanak Public School Chandigarh / Architect shall be final and binding on the contractor.

## ANNEXURE - I

### PROFORMA OF BANK GUARANTEE IN CONNECION WITH PAYMENBT OF MOBILISATION ADVANCE TO THE CONTRACTOR.

#### BANK GUARANTEE FOR MOBILISATION ADVANCE

Bank Guarantee No. :

Amount of Guarantee :

Date of Issue :

Valid upto :

This DEED OF GUARANTEE executed at \_\_\_\_\_ on this \_\_\_\_\_ day of \_\_\_\_\_ 2023, by \_\_\_\_\_.

\*Bank of \_\_\_\_\_ a body corporate establishment under the Banking Companies (Acquisition and Transfer of Undertaking) Act, \*1970/1980 and having its Head office at \_\_\_\_\_ and a Regional / Branch Office at \_\_\_\_\_.

(hereinafter referred to as “ the Guarantor which expression shall include its successors and assigns ” ).

In favour of **PRINCIPAL GURU NANAK PUBLIC SCHOOL CHANDIGARH** ( hereinafter referred to as “PRINCIPAL GURU NANAK PUBLIC SCHOOL CHANDIGARH ” which expression shall include its successors and assigns).

#### WHEREAS

1) \_\_\_\_\_ a company registered under the Companies Act, 1958 and having its Registered Office at \_\_\_\_\_ (hereinafter referred to as “Contractor”) which expression shall include its successors and assigns) has been awarded a contract for construction of housing complex (hereinafter referred to as “said contract”). On the terms and conditions contained in letter No. \_\_\_\_\_ dated \_\_\_\_\_ which has been accepted by the contractor (hereinafter collectively referred to as “the said agreement”)

2) In terms of the said agreement, **PRINCIPAL GURU NANAK PUBLIC SCHOOL CHANDIGARH** is required to pay a sum of Rs. \_\_\_\_\_ lakh representing \_\_\_\_ % of the total contract amount i.e. Rs. \_\_\_\_\_ lakh to the contractor towards advance. The advance will be paid by **PRINCIPAL GURU NANAK PUBLIC SCHOOL CHANDIGARH** to the contractor against irrevocable and unconditional scheduled commercial/nationalized bank guarantee to the satisfaction of **REGISTRAR GURU NANAK PUBLIC SCHOOL CHANDIGARH**.

3) Accordingly, the contractor has approached the Guarantor for issuance of Guarantee in favour of PRINCIPAL GURU NANAK PUBLIC SCHOOL CHANDIGARH which the guarantor has agreed to do in the manner hereinafter appearing.

**NOW THIS GUARANTEE WITNESSETH AS FOLLOWS :**

1) The contractor shall execute all the works as per the terms and conditions contained in the said agreement.

2) The Guarantor hereby unconditionally and irrevocably agrees, undertakes and guarantees to PRINCIPAL GURU NANAK PUBLIC SCHOOL CHANDIGARH that in the event of REGISTRAR GURU NANAK PUBLIC SCHOOL CHANDIGARH coming to a conclusion that the Contractor has not performed any of its obligation(s) under the said agreement or has committed a breach of any of the terms and conditions thereof or has not carried out the work for which advance is given, the Guarantor shall, on demand by PRINCIPAL GURU NANAK PUBLIC SCHOOL CHANDIGARH pay without demur or protest, a sum of Rs. \_\_\_\_\_ together with simple interest at the rate of \_\_\_\_ % p.a. or any lower amount that may be demanded by REGISTRAR GURU NANAK PUBLIC SCHOOL CHANDIGARH .

3) The Guarantor also agrees, undertakes and confirms that the notice from REGISTRAR GURU NANAK PUBLIC SCHOOL CHANDIGARH shall be conclusive and binding on the Guarantor and the Guarantee amount as aforesaid shall be paid by the Guarantor within one week from receipt of written demand notice, without asking for any further proof or evidence about the breach or non-performance of the terms and conditions of the said agreement by the contractor. The Guarantor further agrees that REGISTRAR GURU NANAK PUBLIC SCHOOL CHANDIGARH shall be the sole judge as to whether the contractor has committed any default in compliance with the terms and conditions of the said agreement, and the decision of in this regard shall be final.

4) REGISTRAR GURU NANAK PUBLIC SCHOOL CHANDIGARH shall have full liberty, without in any way affecting the liability of the Guarantor in this guarantee from time to time, to vary any of the terms and conditions of the said agreements and/or to extend the time for performance by the contractor or to postpone from time to time any of the powers exercisable by REGISTRAR GURU NANAK PUBLIC SCHOOL CHANDIGARH against the contractor and either to enforce or forebear from enforcing any of the remedies against the contractor and the Guarantor shall not be discharged of its liability under this guarantee by exercise of the liberty by REGISTRAR GURU NANAK PUBLIC SCHOOL CHANDIGARH with reference to the aforesaid right or by reason of time being given to the contractor or any other forbearance, act or omission on the part of REGISTRAR GURU NANAK PUBLIC SCHOOL CHANDIGARH or of any other matter or thing whatsoever which under the law relating to sureties would but for this provision have the effect of so releasing the Guarantor from its liability.

- 5) It shall not be necessary for REGISTRAR GURU NANAK PUBLIC SCHOOL CHANDIGARH to proceed against the contractor before proceeding against the Guarantor and the Guarantee herein contained shall be enforceable against the Guarantor notwithstanding any security which REGISTRAR GURU NANAK PUBLIC SCHOOL CHANDIGARH may have obtained or may obtain from the Contractor and which may at the time when proceedings are taken against the Guarantor hereunder be outstanding or un-realized.
- 6) The Guarantor, undertakes not to revoke this Guarantee during its currency except with the previous consent of REGISTRAR GURU NANAK PUBLIC SCHOOL CHANDIGARH in writing and agrees that any change in the constitution of the contractor or the Guarantor or REGISTRAR GURU NANAK PUBLIC SCHOOL CHANDIGARH shall not discharge the liability of the Guarantor hereunder.
- 7) The obligation(s) of the Guarantor under this Guarantee shall be discharged only by performance by the contractor of its obligation(s) as mentioned hereinabove and in the event of failure to do so, by payment by the guarantor of all the amounts demanded by REGISTRAR GURU NANAK PUBLIC SCHOOL CHANDIGARH . Such obligations shall not be conditional on the receipt of any prior notice or demand by the contractor and the despatch of the notice or demand by REGISTRAR GURU NANAK PUBLIC SCHOOL CHANDIGARH to the Guarantor as provided above shall be sufficient notice to or demand upon, as the case may be, on the Guarantor.
- 8) The absence or infirmity of powers on the part of the Guarantor to give guarantee and/or indemnities or any irregularity in the exercise of such powers shall not affect the liability of the Guarantor.
- 9) REGISTRAR GURU NANAK PUBLIC SCHOOL CHANDIGARH's right to recover the said sum of Rs. \_\_\_\_\_ together with simple interest at the rate of \_\_\_\_% p.a. from the Guarantor will not be affected or suspended because of any dispute or disputes raised / to be raised by the Contractor or any other person claiming through / under the contractor.
- 10) All notices to be served on the Guarantor under this Guarantee shall be deemed to have been duly served on the Guarantor if sent to Guarantor by prepaid post under certificates of posting at its last known address.
- 11) The Guarantor shall remain on full force and effect up-to \_\_\_\_\_ provided that if so desired by SIDBI, this guarantee shall be renewed on the same terms and conditions for further period till the contract allotted to the contractor is completed in accordance with the said agreement.
- 12) The liability of the Guarantor under Guarantee is restricted to Rs. \_\_\_\_\_ which shall remain in force until \_\_\_\_\_ and unless a claim or demand to enforce this Guarantee is made against the Guarantor within a period of three months from \_\_\_\_\_ (Which is the date of expiry of Guarantee), all the rights of REGISTRAR GURU NANAK PUBLIC SCHOOL CHANDIGARH under this Guarantee shall be forfeited and the Guarantor shall be fully relieved and discharged.

IN WITNESS WHEREOF the within named Guarantor has caused to execute these presents by the hand of Shri \_\_\_\_\_ and its authorized Officer on the date and year hereinabove written.

SIGNED AND DELIVERED for an on behalf of the Guarantor

by the hand of Shri \_\_\_\_\_ and its authorized official.

Note : 1. Guarantee to be stamped as security bond as per the Stamp Act applicable in the state where it is executed.

2. Necessary resolution/power of attorney in favour of person executing the guarantee may be furnished to REGISTRAR GURU NANAK PUBLIC SCHOOL CHANDIGARH .

- Delete if not applicable



## ANNEXURE - I

### PROFORMA OF UNDERTAKING IN CONNECTION WITH PAYMENT OF ADVANCE ON MATERIALS BROUGHT BY THE CONTRACTOR TO THE SITE.

This undertaking made this \_\_\_\_\_ days of \_\_\_\_\_ 20 \_\_\_\_\_ between the (hereinafter called the employer) of the other part and (here in after called the contractors) of the other part.

The employer and the contractors have entered into an agreement dated \_\_\_\_\_ (hereinafter called as the said Agreement) and in terms of the said agreement, the employer has agreed that the contractors will be paid an advance of 75% of the cost of non-perishable building materials brought by the contractor to the site for consumption in the works at the discretion of the employer.

The contractors have applied to the employer that they be allowed advances on the security of materials absolutely belonging to him and brought by them to the site of work. The employer has agreed to do so on the terms and conditions hereinafter set out.

Now this letter of undertaking witnesses that in consideration of the said agreement, and in consideration of the amount paid/payable to the contractors by the employer and of any further advances as may be made to the contractors as aforesaid the contractors hereby agree with the employer and undertake as under :-

1. The amount advanced by the employer to the contractors as aforesaid and all or any further sum or sums advanced as aforesaid shall be employed by the contractors in or towards expediting the execution of the said works and for no other purpose whatsoever.
2. That the materials which have been offered to and accepted by the employer as security are absolutely the contractor's own property and free from encumbrances of any kind and the contractors will not make any application for or receive a further advance on the security of materials which are not absolutely his own property and free from encumbrances of any kind and the indemnifies the employer against all claims to any materials in respect of which an advance has been made to them as aforesaid.
3. That the materials on the security of which any further advance or advances may hereafter be made as aforesaid hereinafter called (the said materials) shall be used by the contractors solely in the execution of the said works in accordance with the directions of the employer/architect and in the terms of the said agreement.
4. That the contractor shall make at his own cost all necessary and adequate arrangement for the proper storage, watch, safe custody and protection against all risks of the said materials shall remain at the site of the said works in the Contractor's custody and on their own responsibility and shall at all times be open to inspection by the Employer's/Architect's/Engineers or any office authorized by the Employer. In the event of the said materials of any part thereof being stolen, destroyed or damaged, the contractor will forthwith replace the same with other materials of like quality or repairs and made good the same as required by the Employer/Architect.
5. That the said materials shall not on any account be removed from that site of the said works except with the written permission of the Employer or his authorized representative
6. That the advance shall be repayable in full when or before the contractors receive payment from the Employer of the price payable to them for the said works under the terms and the provisions of the said agreement provided that if any intermediate payments are made to the Contractors on account of work done, then on the occasion of each such payment the employer will be at liberty to make a recovery from the Contractor's bill for such payment by deducting there from the value of the said material then actually used in the construction and in respect of which recovery has not been made previously the value of the said material then actually used in the construction and in respect of which recovery has not made previously the value for this purpose being

determined in respect of each description of materials at the rates at which the amounts of the advances made under presents were calculated.

7. That if the contractors shall at any time make any default in the performance or observance in any respect of any of the terms and provisions of the said agreement or of these presents, the total amount of the advance or advances that may still be owing to the Employer shall immediately on the happening of such default be repayable by the contractors to the Employer together with interest thereon at twelve percent per annum from the date of repayment and with all costs, charges, damages and expenses incurred by the employer in or for the recovery thereof or the default of the contractor and the contractor hereby covenants and agrees with the employer to repay and pay the same respectively to him accordingly.

8. That the contractor hereby charges all the said materials until the repayment to the Employer of the sum or sums advanced as aforesaid and all costs, charges, damages and expenses payable under these presents PROVIDED ALWAYS and it is hereby agreed and declared that notwithstanding anything in the said agreement and without prejudice to the powers contained therein if and whenever the covenant for payments repayment here in before contained shall become enforceable and the money owing shall not be paid in accordance therewith, the Employer may at any time thereafter adopt all or any of the following courses as he may deem best.

a) Seize and utilize the said materials or any part thereof in the completion of the said works on behalf contained in the said agreement, debiting the contractor with the actual cost of effecting such completion and the amount due in respect of advances under these presents and crediting the contractor with the value of work done as if he had carried it out in accordance with the said agreement and at the rates thereby provided. If the balance is against the contractor, he is to pay to the employer on demand.

b) Remove and sell by public auction the seized materials or any part thereof and out of the moneys arising from the said retain all the sums aforesaid repayable or payable to the Employer under these presents and pay over the surplus (if any), to the contractor.

c) Deduct all or any part of the money owing of the security deposits or any sum to the contractor under the said agreement.

9) That except in the event of such default on the part of the contractor as aforesaid, interest on the said advance shall not be payable.

10) That in the event of any conflict between the provisions of these presents and the said agreement the provision of these presents shall prevail and in the event of any dispute or difference arising over the construction of effect of these presents the settlement of which has not been herein before expressly provided for the same shall be referred to the Employer's Engineer-in-charge whose decision shall be final and no appeal shall lie against his decision before any court, arbitrator or authority.

11) The provision of this undertaking shall be deemed to be supplemental to the said agreement.

In Witness Whereof The contractors have set their hands to these presents the day and year first herein above written.

SIGNED, SEALED AND DELIVERED BY THE SAID CONTRACTOR

IN THE PRESENCE OF \_\_\_\_\_

WITNESS

SIGNATURE

NAME

ADDRESS

WITNESS

SIGNATURE

NAME

ADDRESS

### **NIT WEIGHTS OF REINFORCING BARS TO BE ADOPTED :**

<b>S. No.</b>	<b>Nominal dia. of the bar in mm.</b>	<b>Unit Weight of Kg. per Meter Run.</b>
1)	6	0.222
2)	8	0.395
3)	10	0.617
4)	12	0.888
5)	16	1.579
6)	20	2.467
7)	25	3.855
8)	28	4.836
9)	32	6.316
10)	36	7.994
11)	40	9.869

It is clarified that advance against the following non-perishable material when directly purchased and brought to site by the Contractor for permanent incorporations into the works shall only be allowed .

- i) Cement OPC 43 and white cement
- ii) Rolled Mild Sections for Grills and railings
- iii) 1<sup>st</sup> class Bricks
- iv) Vitrified tiles , glazed tiles, anti skid ceramic tiles, Granite tiles , wooden floor tiles
- v) Timber for door frames and paneled door shutters.
- vi) Flush door shutters, factory made
- vii) UPVC windows
- viii) Paints
- ix) Sanitary ware, pipe and fittings, stoneware pipes and fittings, cisterns, taps and valves, toilet requisities, manhole cover
- xi) Hardware fittings of brass
- xiii) “Plastic Laminate”

xiv) Any other material on prior approval of the REGISTRAR GURU NANAK PUBLIC SCHOOL CHANDIGARH / Architects .

The capacity of flushing cistern and size of the flush pipe for the number of urinals shall be as follows :

No. of urinals	Capacity of flushing cisterns		Mains		Size of Distribution	
	in ltrs.	in Gallons	in mm	in inch	in mm	in inch
1	5	1	-	-	15	½
2	10	2	20	¾	15	½
3.	10	2	25	1	15	½
4.	12.5	3	32	1 ¼	15	½

**Predetermined rates of materials supplied to the contractor**

S.N.	Description of Material	Predetermined rates (Rs.)
1.	Steel Reinforcement	.....
2.	Ready Mixed Concrete	.....

Any other materials if supplied by the REGISTRAR GURU NANAK PUBLIC SCHOOL CHANDIGARH

1	.....	.....
2.	.....	.....
3.	.....	.....
4.	.....	.....
5.	.....	.....

### **Recoveries of Materials**

S.N.	Description of Material	Rate of Recovery ( Rs. )
1.	Reinforcement Steel	.....
2.	Ready Mixed Concrete	.....

Any other materials to be recovered if supplied by the REGISTRAR

GURU NANAK PUBLIC SCHOOL CHANDIGARH :

1	.....	.....
2.	.....	.....
3.	.....	.....
4.	.....	.....
5.	.....	.....

S.No.	Description of work	Unit	Qty. of cement per unit qty of work in quintals
(1)	(2)	(3)	(4)
<b>1.</b>	<b><u>Plain cement concrete work</u></b>		
	a) Cement concrete (1:2:4)	Cum	3.20
	b) Cement concrete (1:4:8)	Cum	1.70
	c) Cement concrete (1:5:10)	Cum	1.30
<b>2.</b>	<b><u>Damp Proof Course</u></b>		
	a) 40 cm thick in C.C. (1:2:4)	Sqm.	0.13
<b>3.</b>	<b><u>Reinforced cement concrete work :</u></b>		
	a) R.C.C. Work in C.C. (1:2:4)	cum	3.20
	b) R.C.C. Work in C.C. (1: 1½:3)	cum	4.00
	d) Providing and fixing pre-cast R.C.C. (1:1½:3) set in position in cement mortar including finishing with cement plaster 1:3 of thickness not exceeding 6mm		
	i) Kerb, Step, and the like	Cum	4.00
	ii) Coping, bed plates, anchor blocks, windows sills and the like	Cum	4.00
	iii) Small lintels not exceeding 1.5 m clear, coping, shelves and the like	Cum	4.00
<b>4.</b>	<b><u>Brick Work</u></b>		
	a) Brick work (all classes in cement mortar 1:4)		
	i) With F.P.S. brick	Cum	0.95
	b) Brick work (all classes in cement mortar 1: 6)		
	i) With F.P.S. brick	Cum	0.625
	c) Half brick (all classes) in cement mortar 1:4		
	i) With F.P.S. brick	100 sqm	14.28
	d)Honey comb brick work half brick thick in cement mortar (1:4)		
	i) With F.P.S. brick	100 sqm	6.56
	e)Brick drip course at junction of roofs and walls in C.M. (1:4)		
	i) With F.P.S. brick	100 sqm	0.83
	f)Brick drip course at junction of roofs and wall in CM (1:6)		
	i) 10cm thick modular brick	100 sqm	0.55
	ii) 7.6cm thick 5 cm projected with F.P.S. brick	100 sqm	0.54
	Providing brick band 5 cm projected from wall face in CM (1:4)		

	i) 10cm thick modular brick	100 sqm	0.42
	ii) 7.6cm thick 5.7 cm projected with F.P.S. brick	100 sqm	0.41
<b>5.</b>	<b>Flooring</b>		
a)	Brick on edge flooring in 1:6 ( 1 Cement : 6 Coarse Sand )	sqm.	0.1285
b)	40mm thick cement concrete flooring 1:2:4 finished with a floating coat of neat cement.	sqm.	0.17
c)	52mm thick cement concrete flooring 1:2:4	sqm.	0.231
d)	Cement concrete pavement (25mm to 50mm thick) with 1:2:4 including finished complete.	Cum.	3.20
e)	52 mm thick cement concrete flooring with metallic concrete hardener topping, under layer of 40mm thick cement concrete 1:2:4 and top layer 10mm thick metallic cement hardener consisting of mix 1:2 by volume with metallic hardening compound of approved quality in the ratio of 4:1.	Sqm.	0.231
f)	Pre-cast tiles 20mm thick with of sizes upto 6mm in skirting or on walls, laid on 12mm thick cement plaster (1:3) jointed with neat cement slurry.		
	i) Light shades using white cement	sqm.	0.1783*(white cement)
	grey Cement	sqm.	0.1783
	ii) Medium shades using 50% white cement with pigment and 50% grey cement		
	White Cement	sqm.	0.0289*
	Grey Cement	sqm.	0.1494
k)	Vitrified tile flooring over 20mm thick base of cement mortar (1:4 and jointed with grey cement slurry)		
	i) 8 mm thick	100 sqm.	13.51
	ii) 10 mm thick	100 sqm.	13.63
	iii) 40mm thick	100 sqm.	13.87
l)	Extra if white cement slurry used instead of grey cement slurry in joints of stone flooring		
	White cement	100 Sqm.	0.76
q)	Granite tiles 12.5mm thick in risers of steps, skirting and pillars laid on 12mm thick cement mortar (1:3) and jointed with grey cement slurry.	100 sqm.	12.34
<b>6.</b>	<b>FINISHING</b>		
a)	12mm cement plaster 1:3	100 Sqm	7.34
b)	12mm cement plaster 1:4	100 Sqm	5.47
c)	12mm cement plaster 1:5	100 Sqm	4.46
d)	12mm cement plaster 1:6	100 Sqm	3.60
e)	15mm cement plaster 1:3	100 Sqm	8.77
f)	15mm cement plaster 1:4	100 Sqm	6.54
g)	15mm cement plaster 1:5	100 Sqm	5.33
h)	15mm cement plaster 1:6	100 Sqm	4.30
i)	20mm cement plaster 1:3	100 Sqm	11.42
j)	20mm cement plaster 1:4	100 Sqm	8.51
k)	6mm cement plaster 1:4	100 Sqm	3.67
l)	12mm cement plaster 1:4	100 Sqm	2.74



m) Neat cement punning	100 Sqm.	2.20
n) 18mm cement plaster in two coats under layer 12mm cement plaster 1:5 finished with top layer 6mm thick cement plaster 1:6.	100 sqm.	6.26
o) 18mm thick cement plaster in two coats under layer 12mm thick cement plaster 1:5 and top layer 6mm thick cement plaster 1:3.	100 Sqm.	8.13
p) 12mm cement plaster 1:2 ( 1 cement : 2 stone dust)	100 Sqm.	9.79
q) 18mm thick or artificial red stone plaster of 12mm thick under layer of cement plaster 1:4 with 6mm thick finishing coat of cement mortar 1:1:3 mixed with red oxide. (1 cement : 1 marble dust : 3 stone dust)	100 sqm.	9.47
<b>7. POINTING</b>		
a) Flush or ruled or cut or weather pointing on brick work with cement mortar 1:3.	100 sqm.	1.53
b) Raised and cut pointing on brick work with cement mortar 1:3	100 sqm.	2.35
c) Flush or ruled pointing on stone work with cement mortar 1:3	100 sqm.	1.17
d) Raised and cut pointing on stone work with cement mortar 1:3.	100 Sqm.	1.94
<b>8. MORTAR</b>		
a) Cement Mortar 1:1	Cum.	10.20
b) Cement Mortar 1:2	Cum.	6.80
c) Cement Mortar 1:3	Cum.	5.10
d) Cement Mortar 1:4	Cum.	3.80
e) Cement Mortar 1:5	Cum.	3.10
f) Cement Mortar 1:6	Cum.	2.50

The following multiplying factors for obtaining equivalent areas shall be adopted.

S.No	DESCRIPTION OF WORK	HOW TO MEASURED	MULTIPLYING FACTOR
1.	2.	3.	4.
1.	Panelled or framed and braced or ledged and battened or ledged battened and braced joinery.	Measured flat (not Girthed), including Chowkhat or frame, edges, chocks, cleats, etc. shall be deemed to be included in the item.	1.30 (for each side)
2.	Flush Joinery	Measured flat (not girthed including Chowkat or Frame, Edges, chocks or cleats etc. shall be deemed to be included in the item	1.20 (for each side)
3.	Fully glazed or gauzed joinery	Measured flat (not girthed) including	0.80 (for each side)

		chowkat frame, edges chocks, cleats shall be deemed to be included in the item.	
4.	Partly panelled and partly glazed or gauzed joinery	Measured flat (not girthed) including Chowkat or frame, edges, chocks cleats etc. shall be deemed to be included in the item.	1.00 (for each side)
5.	Fully vented or louvred joinery	-do-	1.80 for each side.
6.	Weather Boarding	Measured flat (not girthed) supporting frame work shall not be measured separately	1.20 for each side.
7.	Wood shingle roofing	Measured flat (not girthed)	1.10 (for each side)
8.	Boarding with cover fillets and match boarding.	Measured flat (not girthed)	1.05 (for each side)
9.	Tile on slate battening	Measured flat overall no deduction shall be made for open spaces.	0.80 (for painting all over)
10.	Trellis (or Jaffri) work one way or two way	Measured flat over all, no deduction shall be made for open spaces, supporting members shall not be measured separately.	2.00 for painting all over.
11.	Guard bars, balus trades, gates, gratings grills expanded metal and railings.	Measured flat over all, no deduction shall be made for open spaces, supporting members shall not be measured separately.	1.00 (for painting all over)
12.	Gates and open palisade fencing including standards braces, rails stays etc.	-do-	1.00 for painting all over.
13.	Carved or enriched work	Measured flat	2.00 for each side.
14.	Steel rollers shutters	Measured flat (size of opening) overall, jamb guides, bottom rails and locking arrangement, etc. shall be measured separately.	1.10 for each side
15.	Plain sheet steel doors and windows	bottom rails and locking arrangement etc. shall	1.10 for each side

- be measured separately)  
measured flat not  
girthed
16. Fully glazed or gauzed steel door and windows Measured flat (not girthed) including side. 0.80 for each frame, edges, etc.
17. Partly panelled and partly glazed or gauzed steel doors Measured flat (not girthed) including frame side edges. etc. 0.80 for each
18. Collapsible gate Measured flat (size of opening) 1.50 (for painting all over)

Note : The height shall be taken from the bottom of the lowest rail if the palisades do not go below it (or from the lower end of palisades, but not up-to the top of the standards, if they are higher than the palisades, similarly for gates, depth or roller shall not be considered while measuring the height.

2.3.2 The natural sand shall have grading conforming to the Zone – I out of the 4 grading limits given in the following table :

#### GRADING LIMITS FOR FINE AGGREGATE

IS Sieve Designation	Percentage Passing			
	Grading Zone I	Grading Zone II	Grading Zone III	Grading Zone IV
10 mm	100	100	100	100
4.75 mm	90-100	90-100	90-100	95-100
2.36 mm	60-95	75-100	85-100	95-100
1.18 mm	30-70	55-90	75-100	90-100
600 micron	15-34	35-59	60-79	80-100
300 micron	5-20	8-30	12-40	15-50
150 micron	0-10	0-10	0-10	0-15

(when grading falls outside the limits of any particular grading zone of sieves, other than 600 micron sieve, by a total amount not exceeding 5%, it shall be regarded as falling within the grading zone)

2.4.2. Coarse aggregate shall be obtained in single sizes conforming to the grading given in the following table in the respect of each nominal size. Single size aggregate shall be blended in suitable proportions to obtain a desired grading of coarse aggregate. At the discretion of the REGISTRAR GURU NANAK PUBLIC SCHOOL CHANDIGARH use of graded aggregates shall be allowed provided the grading confirms to the limits specified in the following table under column B.

IS sieve designation	A % passing for single sized aggregate of nominal size						B % passing of graded aggregate of nominal size			
	63 mm	40 mm	20 mm	16 mm	12.5 mm	10 mm	40 mm	20 mm	16 mm	12.5 mm
80 mm	100	-	-	-	-	-	100	-	-	-
63 mm	85-100	100	-	-	-	-	-	-	-	-
40mm	0-30	85-100	100	-	-	-	95-100	100	-	-
20 mm	0-5	0-20	85-100	100	-	-	30-70	95-100	100	100
16 mm	-	-	-	85-100	100	-	-	-	90-100	-
12.5 mm	-	-	-	-	85-100	100	-	-	-	90-100
10 mm	-	0-5	0-20	0-30	0-30	85-100	10-35	25-55	30-70	40-85
4.75 mm	-	-	0-5	0-5	0-5	0-20	0-5	0-10	0-10	0-10
2.36 mm	-	-	-	-	-	0-5	-	-	-	-

a) For heavily reinforced concrete members as in the case of ribs of main beams, the nominal maximum size of the aggregate shall usually be restricted to 5 mm less than the minimum clear distance between the main bars or 5 mm less than the minimum cover to the reinforcement whichever is smaller.

b) Where reinforcement is widely spaced as in solid slabs, nominal maximum size of the aggregate shall be  
20 mm.

c) For reinforced concrete work, aggregate having a maximum size of 20 mm shall be used.

The water shall conform to the standard given in IS 456 – 2000.

a) To neutralize X 200 ml. sample it should not require than 2 ml. of 0.1 normal NaOH.

b) To neutralize 200 ml. sample it should not require more than 10 ml. of 0.1 normal HCL.

c) Percentage of solids should not exceed the following:

Organic	0.02%	or	200mg/
Inorganic	0.30%	or	3000mg/
Sulphates	0.05%	or	500 mg/
Alkali chlorides	0.10%	or	1000mg/
Suspended matter	0.20%	or	2000mg/

**B. Registers at Office of REGISTRAR GURU NANAK PUBLIC SCHOOL CHANDIGARH**

1. Project Register - Trades wise
2. Subsidiary Project Register showing the recoveries
3. Cement Register
4. Steel Register
5. Variation order Register
6. EMD Register
7. Security Deposit Register
8. Sundry Deposit Register
9. Printed Tender Book Register
10. Quotation Register
11. Sanction Register
12. Limit Register
13. Order Book for purchase and Repairs
14. Bill Register
15. Taxes Deduction Register
16. Measurement Book Issue Register
17. Certified True copies of the contractors

## **ELECTRICAL INSTALLATION WORK SPECIFICATION**

### **1.0.0 Scope of Contract :**

The works covered under this contract comprise of design, supply (wherever called for), install, connect, test and commission the electrical installation commencing from point to sub distribution Board (SDB ) and from SDB to Main Distribution Board , Meter Board , DG back up board and make provision to connect the same from the external feeder pillar . within the project site to various points as mentioned in drawing of Auditorium Guru Nanak Public School Chandigarh .

The work is broadly divided in following categories :

### **1.1.0 Lighting Installation comprises of :**

- 1.1.1 Wiring for light points, fan points, plug points 5/15 Amp, buzzer points , 15-32 Amps AC points etc.
- 1.1.2 Exhaust fans/Fluorescent fittings/Luminaires, Lamps,Fixtures, Fns, regulators shall be supplied at site by the Registrar, Guru Nanak Public School Chandigarh and the same shall be fixed/connected/tested by the firm/ Contractor.
- 1.1.3 Lighting Distribution Boards.
- 1.1.4 Lighting Mains.
- 1.1.5 Main Control Switch and DG backup board
- 1.1.6 Earthings
- 1.2.0 Telephone , TV Points
- 1.2.1 Computer network Points , CCTV points for security purposes

## **2.0.0 LIGHTING INSTALLATION**

### **2.1.0 SCOPE :**

- 2.1.1 This section relates to specifications for supply, install, connect, test and commission of wiring for light points, fan points, plug points, buzzer points, etc. including supply of all such necessary materials/accessories to installation.
- 2.1.2 Scope of Work, also, include supply (wherever called for), install, connect, test and commission of luminaries, lamps, fans, fixtures etc. but the supply of all such necessary materials, accessories to complete the installation of said luminaries, lamps, fans etc. which will be made available at site.
- 2.1.3 The section, also, describes specifications for supply (wherever called for), install, connect test and commission of electrical power distribution installation pertaining to the lighting installation.

- 2.1.4 The power distribution installation comprises of supply (wherever called for), install, connect, test and commission of lighting distribution boards and sub boards, lighting mains, main control switches, earthing, etc. and including supply of all such other materials/accessories to complete the said power distribution installation.

## **2.2.0 SYSTEM OF ELECTRIFICATION**

- 2.2.1 Individual three phase power supply shall be arranged for each apartments, Separate three phase power supply shall cater to common facilities viz-a-viz campus lighting, water pumps, fire fighting pumps etc.
- 2.2.2 Sub-Distribution within the flat shall operate on 240 volts, single phase and neutral, 50 cycles per second, A.C. Supply system.
- 2.2.3 All branch circuits for lighting installation shall be controlled by miniature circuit breaker. The branch circuit shall operate on single phase, 2 wire, 240 volt 50 cycle per second, A.C. supply system.

## **2.3.0 WIRING FOR LIGHTS, FANS, BUZZER, PLUGS ETC.**

### **2.3.1 GENERAL**

This section relates to specifications, for design supply (wherever called for) install, connect, test and commission of electrical accessories required for point wiring, including supply (wherever called for), buzzers, fixtures etc.

### **2.3.2 Point Wiring**

The point wiring shall be carried out in an under mentioned manner and shall conform to the specification and requirements of relevant Indian Standard Specifications, State Government Electrical inspectorate and the Licensee :

- a) To supply and fix in concealed manner rigid PVC conduits, conduit accessories or PVC moulded/Junction/switch boxes etc. complete as required.
- b) To supply and draw electric cables/wires including earthing wires, etc. complete as required.
- c) To supply and fix flush type accessories like piano type switches and sockets, cover plates for switch boxes and outlet boxes, screws etc complete.
- d) The point wiring shall be complete with branch circuit wiring commencing from the respective lighting distribution board, conduit with accessories.

Wires, switch box, outlet boxes, ceiling roses connectors, switches and sockets, cover plates earthing wires and all fixing accessories such as clips nails, screws, raw plug wooden plug, etc. as required to complete the said point wiring installation.

### **2.3.3 Concealed Conduit Wiring**

#### **a) Scope :**

This section relates to specifications for supply and installation of all electrical conduits with accessories, outlets in concealed manner, for light points, fan points, plug points, buzzer points etc. including wires, hardware and all such other material necessary to complete the above mentioned work.

#### **b) Material of Construction :**

- i) All conduits shall be 1.5mm wall thick, rigid PVC and conforming to latest edition of Indian Standard Specification IS : 2509.
- ii) All conduit accessories such as bends, tees, elbows, inspection and draw boxes, coupler, saddles, etc. shall be of rigid PVC material, conforming to latest edition of Indian Standard specification IS : 3419.
- iii) All switch boxes, outlet boxes shall be made either out of 16 gauge wall thick good quality mild steel duly painted on all sides for electrical insulation modular type box and conforming to latest edition of Indian Standard Specification IS : 5133 (Part II) or latest any
- iv) Cover plate of the outlet boxes shall be flat in case, where lighting fixtures are to be fitted flushed to the ceiling or walls. Cover plate of the outlet boxes shall be suitable for ball and socket type, in case where the lighting fixtures are to be suspended from the ceiling by means of down rods.
- v) Cover plate for all the boxes shall be 3.0mm thick of approved shade PVC sheet or other equal approved material as per the architects. In case, cover plate length/width required beyond 300mm size, then the plate of 5mm thick shall be used.
- vi) All switches of ISI approved make shall be flush mounted piano type and shall be of 5 amps/250 volt grade one way or two way conforming to latest edition of IS : 3854 as shown in the drawing, unless otherwise specified elsewhere.
- vii) All sockets outlets shall be flush mounting 2 pin and earth type rated at 5 amp. volt grade as the case may be.
- viii) All sundry materials and consumables such as connectors, fixing screws and nuts, lugs crimped sockets, insulating tapes etc shall be of an approved make and quality. Make of materials shall be approved before their use in the installation.
- ix) All electric cables/wires to be used shall be of 1100 volt grade, standard/aluminium conductor, PVC insulated. The cables/wires shall be of ISI approved make conforming to the latest edition of Indian Standard Specifications Is : 649.
- x) Minimum size of conductor shall be 1.5 sq.mm. copper unless otherwise specified elsewhere.
- xi) All earthing wires shall be copper conductor as per latest ISI specifications.



### **C. Installation:**

1. The PVC conduits, M.S/steel sheet fan outlet boxes, junction boxes etc. shall be installed in position as per the requirements of their location and shall be bound with steel reinforcement of the slab/beam/column before they are being concreted. The contractor will have to depute the senior qualified personnel at site. During concreting of such slab, column/beams etc. The contractor shall ensure that the conduits, boxes, etc. remain in their position during such concreting work.
2. The conduits to be installed for the point wiring shall be of adequate cross section area to facilitate drawing of electric cables/wires in the conduit. Size of the conduit shall be selected as per recommendations given in the latest edition of IS : 732 (Part II) such that the conduit can take one additional pair of cables / wires at future date.

However, size of the conduit shall in no case, be less than 25mm dia, unless otherwise stated elsewhere .

3. The contractor shall submit conduit layout, circuit diagram and detail of branch distribution board showing all MCB , RCCB , MCCB and other controls up to the meter & DG board for the approval of the Architects /Engineer in Charges of REGISTRAR GURU NANAK PUBLIC SCHOOL CHANDIGARH a drawing of conduit lay out on basis of the lighting layout. On receipt of approval from the architects / REGISTRAR GURU NANAK PUBLIC SCHOOL CHANDIGARH in charge, the contractor will commence the conduiting work.
4. Entire conduit layout shall be carried out so as to avoid additional junction boxes other than for electrical outlet points, switch boxes etc. as far as feasible. However, in case of more than three right angles bends, it is required to provide an interposition draw in box for ease of wire drawing. Similarly when straight run of conduits are more than 10 mtr, it is recommended to provide draw in box for ease of wire drawing. Location of such draw in boxes shall be approved by the Architects / REGISTRAR GURU NANAK PUBLIC SCHOOL CHANDIGARH .
5. Length of conduits shall be joined by means of plain couplers duly press fitted and then be sealed with PVC solvent cement
6. Use of elbows and short beds and short bends shall be avoided as far as feasible. It is recommended that the conduit shall be given a required smooth bend suiting to the site condition. But in no case radius of the bend shall be made/selected less than 12 times the diameter of the respective conduit.
7. Conduit to be concealed in wall shall be done with making a clean and neat chase in the wall. The chase in the wall shall be of adequate size to in the chase such that adequate thickness to persuit the conduits to be fixed in the chase such that adequate thickness is available in front of the conduit for finishing the chase of the wall. The conduit pipe shall be fixed by means of saddles not more than 600mm apart.

The contractor after laying the conduit shall get, the chase be filled up neatly with use of rich, sand cement mixture and fine wire mash. The filled up chase surface shall be brought to original finish of the wall.

8. Exposed conduits, if any, shall properly be clamped with mechanical supports or directly to main body of the equipment or structure at an interval not exceeding 750 mm in length. They shall not in any case, be clamped with any cover or any removable part of the building structure.
9. IN case of conduit to be laid over the false ceiling, the said conduit shall firmly be clamped with members of the false ceiling frame work in a suitable manner.
10. In case of conduit to be laid over the false ceiling, the said conduit shall firmly be clamped with members of the false ceiling frame work in a suitable manner.
11. The cover plate shall be fixed to the boxes with counter sunk round headed brass cadmium plated machine screws and cup washers of same material.
12. All the switch boxes shall be of adequate size to accommodate number of switches, regulators, socket outlets, wiring etc. and shall have suitable arrangement for fixing the switches, sockets etc. to the switch box cover plate.
13. All splicing in wiring shall be done by means of terminal blocks or connectors and no twisted connections between two conductors shall be allowed.
14. All the live wires at the terminal shall be wrapped with red, yellow or blue PVC insulating tape depending on the phases to which they are connected with. Otherwise wires shall be of red yellow, blue and black colours, Neutral wire shall be wrapped with black insulating PVC tape.
15. Switch shall be connected to the live wires while neutral shall be continuous everywhere having no fuse or switch installed in line except in the lighting distribution board.
16. Unless a written permission is obtained from the Architects / REGISTRAR GURU NANAK PUBLIC SCHOOL CHANDIGARH the contractor shall carry out wiring installation such that wires of two different phases are not pulled through a common section of conduit. In case a situation arises to pull through a common section.
17. Insulated copper conductor earth wire (herein after referred to as earth wire) of recommended size shall be pulled through the conduit. One end of the earth wire shall be connected to the earthing terminals of the boxes, luminaries, fans, fixtures, socket outlet, etc. and other end of the earth wire shall be connected to the earthing terminals of the boxes, luminaries, fans, fixtures, socket outlet, etc. and other end of the earth wire shall be connected to the nearest electrical distribution board.
18. All electrical wire connections with switches, socket outlets, luminaries fans, fixtures etc. shall be done with use of crimped socket, such that the said connections are mechanically strong and electrically firm.

### **2.3.6. Lighting Distribution Boards**

**a) Scope:**

This sections to specifications for supply (wherever called for) install, connect, test and commission of lighting distribution board (LDB) using miniature circuit breaker (MCB) 9 KA rupturing capacity. Earth leakage circuit breaker (ELCB) or RCCB copper bus Neutral ling earthing terminals, control switch terminals, cubical CRCA sheet 1.6 mm thick housing having 30 mm sensitivity duly stove enamel painted and connected accessories to complete the item installation.

**b) System:**

The lighting distribution board shall be suitable for operation on 400/440 volts , 3 phase, 4 wire, 50 cycle per second. A.C. supply system or 220/250 volt. 1 phase, 2 wire 50 cycle per second, A.C. supply shall be capable of withstanding short circuit current of 9 KA

**c) Construction:**

- i) The LDBs shall be factory made and of those manufacturers whose MCBs ELMCBs are to be used. In no circumstances fabricated board of any associate or sister concern or equivalent of any local manufacturer/ remshakle workshop shall be utilized. General arrangements layout of the LDBs shall be approved by the Architect/ Engineer Incharge before manufacture.
- ii) The LDB shall be metal clad duly fabricated from 2mm thick high quality CRCA sheet steel.
- iii) The LDBs shall be cubical, floor/wall mounted and dead front operated.
- iv) The LDB shall totally be enclosed and made dust, varmin and weather-proof such that it meets to IP 54 protection classification.
- v) A detachable cover plate of 2mm thick CRCA sheet to be provided on front of the board such that all live parts of the electrical accessories mounted on the board can be accessible only on removal of the said cover plate.

Further, the cover plate shall also have suitable cut out so that dolly of the MCBs can be operated even when the cover plate is in position.

The cover plate shall also, provide right above the respective cut outs a suitable arrangement to label the electrical circuit details of the MCBs mounted on it as well as, it should be affixed with a Danger plate in legible manner.

The cover plate shall be fixed to the Board with adequate size Zinc Passivated machine screws.

Above the detachable cover plate, one additional hinged door of 2mm thick CRCA sheet covering the MCBs, Etc. shall be provided with a suitable locking arrangement.

The hinged door shall be provided with a suitable gasket of withstanding corrosive and humid atmosphere and to maintain degree of enclosure protection to IP 54 as per IS : 2147

- vi) The LDB shall have top entry arrangement for incoming and outgoing cables/conduits.
- vii) All hardware to be used in manufacture of the LDB shall either be of Mild steel Zinc Passivated or otherwise be treated to prevent corrosion due to humid atmosphere prevailing at the project site.
- viii) All internal electrical connections shall be carried out using 600/1100 volts grade PVC insulated, copper conductor of ISI approved make, having rated current carrying capacity to carry continuous full current of respective switch/MCB rating at operating conditions prevailing at the project site.
- ix) The LDB internals shall be earthed with use of copper wires/strips running throughout the length. Size of the earthing strip/wire shall be as shown in the respective drawing.
- ix) The LDB internals shall be earthed with use of Copper wires/strips running throughout the length. Size of the earthing strip/wire shall be as shown in the respective drawing.
- x) The earthing strip/wire shall be brought out on two sides of the LDBs with bolted type earth termination arrangement, for connecting to the building earthing grid. The earth terminal shall be of either Brass or Zinc Passivated Mild steel.
- xi) All non current carrying metal surface of the LDBs shall adequately be treated with seven tank pre-treatment process to render it free from grease, oil, oxide, dirt, etc. to make them ready to receive and hold coats of Zinc Chromate primer.
- xii) The surface imperfection shall then be rectified with application of Putty and then rectified portion of the surface shall be covered with tough primer and be finished by spraying two coats of stove enamel paint of approved shade.
- xiii) The finished painted surface then shall be dried in stoving oven, in dust free atmosphere.
- xiv) The LDBs shall be provided with electric components and accessories as per the detail shown in the drawing for the respective electric distribution board.

**d) Inspection**

- i) The LDBs shall be inspected and checked as per inspection manual of the LDB manufacturer.
- ii) Various electrical components and accessories of the LDBs shall be checked as per drawing for the respective LDBs.
- iii) The LDBs shall be checked for rigid mounting, earthing, connection proper rating and size of components , internal wiring etc.

- iv) All mechanical fasteners and electrical connections shall be checked and tightened before installation,

**e) Installation :**

- i) the LDBs shall be assembled and aligned together and be installed at site as per installation manual/instruction of the LDB manufacturer.

The installation shall conform to relevant Indian Standard Specification and requirement of local site conditions.

- ii) The LDBs shall be installed in surface/concealed manner at the locations as shown in the respective drawing.
- iii) All minor electrical and mechanical work required to be attend to on the LDBs shall be completed in an approved manner after installation but before energizing the LDBs.

**f) Test :**

Prior to commissioning of the LDBs following tests shall be carried out

- i) A mechanical endurance test shall be carried out by closing an opening of all MCBs, Switches etc.
- ii) Insulation resistance test shall be carried out between phases and phase to earth bus, keeping the isolating switch in open position. Similar test shall be carried out keeping the isolation switch in closed position.
- iii) All the interlocks, controls and tripping mechanism of the switch gears shall be tested for their proper functioning.

### **2.3.7 Lighting Mains**

**a. Scope**

This section relates to specifications for supply (wherever called for). Install, connect, test and commission of lighting mains comprising of electrical wires/cables earthing wires, mild steel, PVC rigid conduits cable trays, conduit accessories, materials required including electrical and mechanical connections at both ends, etc. to complete the Lighting Mains Installation.

**b. System :**

- i. The mains shall either be of 220/250 volt, 1 phase, 2 wire or 400/440 volt, 3 phase, 4 wire, 50 cycles per second, A.C. Supply system .
- ii. The lighting Mains shall run between the main control switch as located at Ground Floor of the multi-building and lighting distribution board located at respective floors.

- iii. The lighting mains shall be installed in surface manner at the vertical shaft provided near the lift, The said lighting mains then shall be installed in concealed manner at the respective floor slab upto the lighting distribution board.
- iv) The electric wire/cables earth wires and conduits shall be of the size and type as mentioned in the drawings.

**c. Material of Construction**

- i) All conduits to be used shall be 1.6mm wall thick black stove enameled mild steel confirming to the latest edition of Indian Standard Specifications IS : 1653. Rigid steel conduits for electrical wiring.
- ii. All conduit accessories such as bends, tees, elbows, inspection and draw boxes, saddles, etc. shall be black stove conforming to latest edition of Indian Standard Specifications IS 0837 Accessories for rigid steel conduits for electrical wiring.
- iii. All junction boxes shall be fabricated from 2mm thick mild steel sheet which shall be pretreated for painting and then be given two coats of Red Oxide (metal primer) followed by 2 coats of white enamel paint.

All the boxes shall be provided with earthing terminals for external earth connections.

- iv. All sundry materials and consumable such as porcelain connectors fixing screws and nuts, lugs, crimped sockets, insulating tapes, etc. shall be of an approved make and quality. Make of materials shall be approved by Architects/Engineer In charge before their use in installation.
- v. All electric cables wires to be used shall be of 1100 volt. grades standard/Solid Aluminum conductor. PVC insulated. The cables and wires shall confirm to the latest edition of Indian Standard Specifications IS : 694. PVC insulated cables for working voltage up to and including 1100 Volt A.C.

**C. Installation**

- i) The lighting mains layout/installation shall follow the specification given in clause no. 2.3.7 (b) (ii) and 2.3.7 (b) (iii) of this tender document.
- ii. The conduits, junction boxes etc. shall be installed in position and be bound them with steel reinforcement of the slab/beam/column before they are being concreted. The contractor will have to depute the senior qualified personnel at site during concreting of such slabs, columns or beams and shall as certain that the conduits the boxes etc. remaining their positions during concreting.
- iii. The conduits to be installed shall have adequate cross section area to facilitate drawing of electric cables/wires in the conduit as per recommendations given Table 2 of IS ; 732 (Part II : 1983).

However, size of the conduit shall in no case be less than 25mm dia unless otherwise stated elsewhere.

- iv. Entire conduit lay out shall be carried out so as to avoid additional junction boxes as far as feasible. However, in case of more than three right angle beds, it is required to provide an interposition draw box for ease of wiring. Similarly when straight run of conduits are more than 10 Mtrs. It is recommended to provide draw box for ease of wiring. Location of such draw boxes shall be approved by the Architect/Engineer In charge at site.
- v. Length of conduits shall be joined by means of threaded coupling. Remaining threaded portion of the conduit shall be applied with Black paint to protect the threads against corrosion.
- vi. Use of elbows and short bends shall be avoided as far as feasible. It is recommended that the conduit shall be given a required smooth bend suiting to the site condition. But in no case, radius of the bend shall be made/selected of less than 12 times the diameter of respective conduit.
- vii. Conduits to be concealed in the wall shall be done by making a clean and neat chase in the wall. The chase in the wall shall be of adequate size to permit the conduits to be fixed in the chase such that adequate thickness is available in front of the conduit for finishing the chase of the wall.

The contractor after laying the conduit shall get the chase be filled up neatly with use of rich sand cement mixture and fine wire mesh. The filled up chase surface shall be brought to the original finish of the wall.

- viii. Exposed conduits, if any, shall properly be clamped with mechanical supports or directly to main body of equipment or structure at an interval not exceeding 750 mm in length. They shall not in any case, be clamped with any cover or any removable part of the building structure.
- ix. In case of conduit to be laid over the false ceiling, the said shall firmly be clamped with members of the false ceiling frame work in a suitable manner.
- x. The entire conduit system including boxes shall thoroughly be cleaned after completion of conduit erection and before drawing of wires.
- xi. All splicing in wiring shall be done by means of terminal blocks or connectors and no twisted connections between two conductors and shall be allowed.
- xii. All the live wires at the terminal shall be wrapped with red, yellow or blue PVC tape depending on the phases to which they are connected with. Otherwise wire shall be of Red, Yellow blue and black colours. Off wire of the system shall be of grey colour only. Neutral wire shall be wrapped with black insulating PVC tape.
- xiii. Bare hot dip galvanized iron wires (hereinafter referred to as earth wire) of recommended size shall be pulled through the conduit. One end of the earth wire shall be connected to the lighting distribution board while other end shall be connected to the main control switch/earthing grid at ground floor.

- xiv All electrical wires/cables connections at the main switch and at the lighting distribution board shall be done with use of crimped socket such that the said connections are mechanically strong and electrically firm.

### **2.3.8 Main Control Switch/Branch Distribution Board :**

#### **a) Scope**

This section relates to specifications for supply (wherever called for), install connect test and omission of the main control switch to receive electric power from one main for T. Distribution panel to respective floors.

#### **b) Material of Construction**

1. The main control switch shall be 2 pole, 250 volt grade or 4 pole, 500 volt grade miniature circuit breaker (/M.C.P.) having 9 KA fault current with standing capacity and with ELCB of 30/100 MA sensitivity.
2. The MCB shall be housed in a sheet metal clad enclosure being manufactured by the MCB manufacturer only.
3. The MCB shall have bimetallic thermal overload and instantaneous short circuit protection circuits.
4. The MCB enclosure shall provide suitable arrangement for cable/pipe enrg. both at top and bottom of the enclosure.
5. Rating of the MCBs shall be as per the details given in the tender drawings and as per the description given in schedule of quantities of this tender document.
6. The MCB shall of ISI approved make and shall hold an ISI mark.
7. A name plate of adequate size in black colour on which name/identification be engraved in white colour.

#### **Installation**

1. The main control switch shall be installed as near as practicable to the termination of service line.
2. The main control switch shall be located such that it can easily be accessible.
3. The main control switch shall be fixed on a 30mm thick teak wood duly double varnished or on an able iron frame. The teak wood shall be fixed on wall wood screws to the Rawl/phil plugs.
4. All electrical connections to the main control switch shall be carried out with crimped method.



5. The main control switch shall be earthed to the building earthing grid with the help of hot dip galvanized steel as per drawing.

### **2.3.9 Earthing :**

#### **a) Scope :**

This section relates to specification for supply, install, connect, test and commission of earthing system for lighting, installation, including supply of earthing wires and other such similar accessories for earthing installation.

#### **b. System**

1. Lighting installation of the building shall be earthed by a series of earthing wires running along with the lighting circuit wires. One end of the earth wire shall be connected to the respective electric point while the other end of the earth wire shall be connected to earthing terminals installed in the respective lighting distribution boards.
2. The earthing terminals shall be internally connected to 2 bolted type earthing studs of the lighting boards which are to be earthed with earthing grid of the building with use of appropriately sized earth wires.
3. The earthing installation shall be carried out in accordance with relevant Provisions under section 33, 61 and 67 of Indian Electricity Rules, 1956 and shall meet the requirements of the latest edition of Indian Standard Specifications IS 3043 code of Practice for Earthing installation.

#### **C. Material Installation Testing :**

1. The materials to be used for the installation shall be as per the detailed specifications given in later part of this document under title Earthing Material.
2. Size of earth connections for earthing various components of lighting installation such as lighting fitting, fillings and fixtures, the lighting distribution boards etc. shall be as per the drawings and meeting the requirement of IS : 3043 code of Practice for Earthing Installation.
3. Methods of earth connections testing of the installations etc. shall be carried out as per detailed specifications given in later part of this document under title "Earthing Installation Testing" and shall conform to the requirement of IS : 3043, Code of Practice for Earthing.

### **Specified Make**

The tenderers shall provide and install all the materials for the electrical installation works of only those approved manufacture/brands as specified in the list given in the tender /document and the employer reserves the right to select the manufacture/ brand from the list mentioned above. The contractor shall obtain in writing from the employer the brand/make/type of all the electrical materials and shall procure materials of the approved brand/make/type only the re-after. Equivalent ISI approved make will be considered only if the specified makes are proved to be not available and in such cases it shall also be entirely to the discretion of the employer to select

The type/ brand / make and the rates/prices of item of work, therefore, will be adjusted accordingly.

**LIST OF MATERIAL OF APPROVED MAKES/BRANDS**

S.No.	MATERIALS	BRAND NAMES
<b>1. CIVIL WORKS:</b>		
1(a)	Cement (OPC 43 Grade)	ACC, UltraTech, Ambuja
1(b)	Cement White	JK, Birla Plus
2	Bricks (1 <sup>st</sup> Quality)	Bharat Bricks, KKK, PBT
3	Steel	Tata, Sail, Jindal Panther
4	Wood	Salwood
5	Door	Flush Doors, Pre Laminated/Post Laminated
6	Ply	Green Ply, Century Ply, Duro
7	Glass	Triveni, Saint Gobian, Modi Float
8	Tiles (Full body Vitrified Tile)	Kajaria, Orient, Spenza
9	Granite	South Indian Granite of Approved Colour
10	Precast Paver	NTC, Sham Tiles
11	Paint	Asian, Dulux
12	Water Proofing Compound	Dr. Fixit, Fosroc, Seiko
<b>2. SANITARY:</b>		
1	Pipe	Jindal C-class, TATA B-class
2	Chinaware	Jaquar, Hindware
3	CP Fittings	Jaquar, Kohler
4	Water Tanks (Triple Layer)	Sintex PUF
<b>3. ELECTRICAL WORKS:</b>		
1	Conduit Pipe & Accessories	Cannon, Diplast
2	Wires	KEI, Polycab, Finolex
3	Switches	Legrand, Simon, Havells
4	MCB	Havells, ABB

N/W CONSTRUCTION OF AUDITORIUM AT GURU NANAK PUBLIC SCHOOL, SECTOR 36, CHANDIGARH								
Sr. No	Item CSR 2020	Description	Qty	Unit	Rate	Amount	Percentage	Net Amount
1	4.1	(A) Stone (building or pitching) Sand, Earth, Fly Ash, Bajri, Shingle, Spalls, Brick bats, Brick ballast and Stone metal.						
	5.1	Surkhi, Sand, Earth, Fly Ash, Bajri, Ballast, Stone Boulders, Kankar and Building Rubbish.	794.00	cum	49.65	39422.10		
		Earth, Surkhi, Sand, Earth, Fly Ash, Bajri, Ballast, Stone boulders, Kankar and building rubbish, Earth.	794.00	cum	182.00	144508.00		
		5.0 km						
2	6.6	Earth work in excavation in foundations trenches etc. in all kinds of soil where Pick-Jumper work is not involved and not exceeding 2.0 metres depth including dressing of bottom and sides of trenches, stacking the excavated soil clear from the edge of excavation and subsequent filling around masonry in 15 cm, layers with compaction including disposal of all surplus soil as directed within lead of 30 metres.						
		All kinds of soil.	990.00	cum	182.00	180180.00		
3	6.8	(a)(i) Earth filling under floors with surplus ordinary soil or soil containing gravel or kankar upto 40% excavated from foundation and taken only from outside the building plinth in 15 cm layers including ramming, watering and consolidating lead upto 30 metres	594.00	cum	63.00	37422.00		
4	2.26	Extra for every additional lift of 1.5 m or part thereof in excavation / banking excavated or stacked materials.				0.00		
	2.26.1	All kinds of soil	198.00	cum	104.50	20691.00		

5	14.107	Sand filling under floor and in wells of bridge foundation including handling withing 100 metres	152.00	cum	1005.00	152760.00		
6	10.9	Cement concrete 1:5:10						
	ii	mixing by mechanical means using concrete mixer volumetric type	288.00	cum	3791.00	1091808.00		
7	4.13	Providing & applying a coat of residual petroleum bitumen of grade of VG-10 of approved quality using 1.7kg per square metre on damp proof course after cleaning the surface with brushes and finally with a piece of cloth lightly soaked in kerosene oil.	51.00	sqm	113.85	5806.35		
8	4.17	Making plinth protection 50mm thick of cement concrete 1:3:6 (1 cement : 3 coarse sand derived from natural sources : 6 graded stone aggregate 20 mm nominal size derived from natural sources) over 75mm thick bed of dry brick ballast 40 mm nominal size, well rammed and consolidated and grouted with fine sand, including necessary excavation, levelling & dressing & finishing the top smooth.	68.00	sqm	631.25	42925.00		
9	9	Centering and shuttering including strutting, propping etc. and removal of form for						
	9.1	Shuttering for faces of concrete foundations and foundation beam & plinth beam (vertical or battering)	637.00	sqm	210.00	133770.00		
	9.2	Centering and shuttering for faces of walls, partitions, retaining walls and the like (vertical or battering including attached pilasters buttresses etc.	270.00	sqm	405.00	109350.00		
	9.8	Centring and shuttering for flat surfaces such as suspended floors, roofs, landings, chajjas, shelves etc	439.00	sqm	532.00	233548.00		
	9.8	Shelves (Cast in situ)	12.43	sqm	532.00	6615.39		

	9.6	Centring and shuttering for sides and soffits of beam, beams launchings girders bressumers, lintels	1039.00	sqm	380.00	394820.00		
	9.4	Centring and shuttering for columns (Square or rectangular or poly gonal in plain)	762.00	sqm	477.00	363474.00		
	9.9	Centring and shuttering for stair cases with sloping with soffits including risers and stringers.	25.00	sqm	446.00	11150.00		
	9.5	Centering and shuttering for columns (circular or curved	1039.00	sqm	482.00	500798.00		
	5.9.16	Edges of slabs and breaks in floors and walls						
	5.9.16.1	Under 20 cm wide	203.00	metre	181.90	36925.70		
10	5.11	Extra for additional height in centering, shuttering where ever required with adequate bracing, propping etc., including cost of de-shuttering and decentering at all levels, over a height of 3.5 m, for every additional height of 1 metre or part thereof (Plan area to be measured).				0.00		
	5.11.1	Suspended floors, roofs, landing, beams and balconies (Plan area to be measured)	439.00	sqm	319.25	140150.75		
11	18.19	Cold twisted detormed (Ribbed/ Tor steel) Bars (Fe 550 grade as per IS 1786-2008) , for R.C.C works, where not including in the complete rate of RCC including binding, bending and placing in position complete						
		Thermo-Mechanically Treated bars of grade Fe-500D or more.	29771.76	kg	68.58	2041747.30		
12	18.19	Cold twisted detormed (Ribbed/ Tor steel) Bars (Fe 550 grade as per IS 1786-2008) , for R.C.C works, where not including in the complete rate of RCC including binding, bending and placing in position complete						
		Thermo-Mechanically Treated bars of grade Fe-500D or more.	57731.20	kg	68.58	3959205.70		

	9.3	Centering and shuttering for faces of walls, partitions, retaining walls and the like (vertical or battering) including attached pilasters, buttresses etc when curved	139.72	sqm	445.00	62175.40		
13	10.17	Reinforced cement concrete M-30 mechanically batch mixed using batch type concrete mixer as per IS:1791 and vibrated by needle vibrator but excluding steel reinforcement centring and shuttering in foundation and plinth	249.00	cum	5676.00	1413324.00		
	10.22	Reinforced cement concrete M-30 mechanically batch mixed using batch type concrete mixer as per IS:1791 and vibrated by needle vibrator but excluding steel reinforcement centring and shuttering in superstructure.	383.00	cum	6426.00	2461158.00		
		RCC M30 for inclined RCC wall thickness of 6" exposed from outside(188*4*.50) =377.16 or 10.67 cum	10.67	cum	6426.00	68565.42		
	10.42	Extra for using batch type concrete mixer as per IS : 1791 where not included in the rates	632.00	cum	216.00	136512.00		
	10.43	Extra for using concrete mixer volumetric type where not included in the rates	632.00	cum	136.00	85952.00		
	10.46	Extra for pumping charges of Batch Mix Concrete / Ready mix concrete work (RMC	632.00	cum	97.00	61304.00		
14	11.8	Brick work with common burnt clay modular bricks of class designation 7.5 in founFirst class burnt brick work laid in cement sand mortar 1:4 in foundation and plinthdation and plinth in:	110.00	cum	5109.00	561990.00		
15	11.1	First class burnt brick work laid in cement sand mortar 1:4 in first storey upto 4 metres above plinth level.	365.00	cum	5246.00	1914790.00		

16	11.22	115mm brick wall laid in cement, lime sand mortar 1:1:6 (one cement, one lime and Six sand) in super structure (up to 4 metre height) above plinth level.	182.00	sqm	626.00	113932.00		
17	11.34	115 mm thick brick wall with every fourth course reinforced with hoop iron laid in 1:4 cement mortar in						
		Cement mortar 1:4 (1 cement :4 coarse sand)	198.00	sqm	695.00	137610.00		
18	14.125	Providing and fixing 1st quality ceramic glazed wall tiles Matt/Semi Matt/Glosy/Highly Gloss finish/Highlighter/emboss conforming to IS : 15622 (thickness to be specified by the manufacture of approved make in all colours, shades except burgundy, bottle green, black of size 200 x 300 mm, 100x200mm, 200x200mm as approved by Engineer-in-Charge in skirting, risers of steps and dados over 12 mm thick bed of cement Mortar 1:4 (1 cement: 4 fine sand) and jointing with grey cement slurry @ 3.3kg per sqm including pointing in white cement mixed with pigment of matching shade complete.	253.00	Sqm	699.00	176847.00		
19	9.9	Providing and fixing glazed shutters for doors, windows and clerestory windows using 4 mm thick float glass panes, including ISI marked M.S. pressed butt hinges bright finished of required size with necessary screws.						
	9.9.3	Kiln seasoned selected planks of sheesham wood	5.00	Sqm	3951.85	19759.25		
	9.9.3.1	35 mm thick						
20	17.25	Providing & Fixing glass panes with nails and putty or wooden strip complete in all respect						
	iii	5.0mm thick Plate glass (INDIAN)	28.00	Sqm	772.00	21616.00		



21	17.27	Factory manufactured flush door fixed in position iron hinges, etc (excluding the cost of any fittings other than specified above but including labour for fixing the same in position (Code : II Revision IS-2191 Part-I) 1973						
	17.27a	Commercial with elm or gurjan facing on both \ Sides with laminated core and lipped edges:						
		35mm thick	59.00	Sqm	2307.00	136113.00		
22	9.23	Extra for providing lipping with 2nd class teak wood battens 25 mm minimum depth on all edges of flush door shutters (over all area of door shutter to be measured).	59.00	Sqm	401.40	23682.60		
23	17.43	Providing and fixing hydraulic door closer ISI mark with necessary screw etc. complete						
	17.43c	I.S.I Designation No. III (size of door 851mm to 1000mm)	28.00	Each	1310.00	36680.00		
24	17.49	Providing and fixing aluminum sliding door bolts ISI marked anodized (anodic coating not less than grade AC 10 as per IS : 1868) transparent or dyed to required colour or shade with nuts and screws etc. complete :						
	17.49b	250x16 mm	21.00	Each	183.00	3843.00		
25	17.86	Providing & fixing 200 X 10 mm anodized aluminum Mat Finish tower bolts ISI marked on door & window frames complete in all respect as per the directions of Engineer-in-charge						
		200x10 mm	28.00	Each	61.00	1708.00		
26	17.88	Providing & fixing 100 X 10 mm anodized aluminum Mat Finish tower bolts ISI marked on door & window frames complete in all respect as per the directions of Engineer-in-charge	10.00	Each	41.00	410.00		

27	17.82	Providing & fixing 125mm with Plate 175mm X 32 mm anodized aluminum Mat Finish handles ISI marked on door & window frames complete in all respect as per the directions of Engineer-in-charge	42.00	Each	84.00	3528.00		
28	17.83	Providing & fixing 100mm with Plate 150mm X 32 mm anodized aluminum Mat Finish handles ISI marked on door & window frames complete in all respect as per the directions of Engineer-in-charge.	20.00	Each	64.00	1280.00		
29	9.101	Providing and fixing aluminium hanging floor door stopper, ISI marked, anodised (anodic coating not less than grade AC 10 as per IS : 1868) transparent or dyed to required colour and shade, with necessary screws etc. complete.						
	9.101.2	Twin rubber stopper	28.00	Each	62.25	1743.00		
30	18.52	Steel work in built up tubular (round, square or rectangular hollow tubes etc. ISI Marked) trusses etc., including cutting, hoisting, fixing in position and applying a priming coat of approved steel primer, including welding and bolted with special shaped washers etc. complete having span above 15.00 mt. Span including the cost for machinery i.e. Hydra cranes etc. for hoisting in position.	15996.00	Kg	112.11	1793311.56		
31	14.26	40mm thick grey terrazo topping rubbed and polished to a granolithic finish under layer 31 mm thick cement concret 1:2:4 and top layer 9mm (4mm to 7mm thick) with the gauge white marble makrana chipping from indigenous marble laid in 1:1½ (50 Kg of ordinary grey cemetn and 0.05 cum of white marble chippings)	745.00	Sqm	898.00	669010.00		

32	14.59	Precast chequered tiles of 20mm minimum thickness in ordinary grey cement without chips laid on 20mm thick bed of cement mortar 1:3 with neat cement slurry between joints and over the base for floors, treads of steps and landings	157.00	Sqm	788.00	123716.00		
33	14.113	Providing and laying vitrified floor tiles in different sizes in light colour shades made using Full Body Technology (thickness to be specified by the manufacturer) with water absorption's less than 0.08% and conforming to IS : 15622 of approved make in all colours and shades, laid on 20mm thick cement mortar 1:4 (1 cement: 4 fine sand), complete. ( Full body vitrified tiles have pigment in entire body / thickness of tile which makes chips and scratches less noticeable and make na ideal choice for high traffic zones						
		Size of Tile 600 x 600 mm	506.00	Sqm	1421.00	719026.00		
34	14.112	Providing and laying vitrified floor tiles in different sizes in light colour shades made using Full Body Technology (thickness to be specified by the manufacturer) with water absorption's less than 0.08% and conforming to IS : 15622 of approved make in all colours and shades, laid on 20mm thick cement mortar 1:4 (1 cement: 4 fine sand), complete. ( Full body vitrified tiles have pigment in entire body / thickness of tile which makes chips and scratches less noticeable and make na ideal choice for high traffic zones						
		Size of Tile 600 x 600 mm	108.00	Sqm	1421.00	153468.00		

35	14.85	Kotah stone rough dressed 40mm to 50mm thick slabs, set to pattern in pavements over 20mm thick base of cement mortar (1 cement, 3 Sand) laid and jointed with neat cement slurry, mixed with pigment to match the shade of stone	5.00	Sqm	1185.00	5925.00		
36	13.74a	Providing and fixing on wall face unplasticised Rigid PVC rain water pipes single socketed (working pressure 4 kgf / cm <sup>2</sup> ) conforming to IS : 4985, including fixing with MS clamps						
	iii	U-PVC pipes (working pressure 4 kgf. / sqcm) pipe 110 mm dia.	62.00	mtr	252.00	15624.00		
37	13.75	Providing and fixing 110 mm dia. U.P.V.C bend for Rain water pipe as per IS:14735 including jointing complete as per specifications and to the entire satisfaction of Engineer- in- charge.						
	13.75	110 mm benda UPVC 110 mm bend	10.00	each	135.00	1350.00		
38	15.11	12.5 mm thick cement plaster 1:6	1845.15	sqm	175.00	322901.25		
39	15.17	16mm thick cement plaster 1:5 in two coat work	1569.00	sqm	212.00	332628.00		
40	16.17	Painting with synthetic enamel paint of approved brand and manufacture to give aPainting two or more coats excluding priming coat with synthetic enamel paint in all shades on wood work, metallic or plastered, concrete surface to give an even shaden even shade :	500.00	Sqm	66.00	33000.00		
41	16.6	Preparation of plastered surfaces for distempering including surface, applying filling with approved quality filler consisting of plaster of paris and chalk mitti including finishing the surface to the required finish complete	1608.81	Sqm	61.00	98137.41		

42	16.10	Distempering with Acrylic washable oil bound distemper (of approved manufacture) two or more coats over one priming coat to give an even shade	1608.81	Sqm	71.00	114225.51		
43	DSR 2023 22.7	Providing and laying integral cement based water proofing treatment including preparation of surface as required for treatment of roofs, balconies, terraces etc consisting of following operations: (a) Applying a slurry coat of neat cement using 2.75 kg/sqm of cement admixed with water proofing compound conforming to IS. 2645 and approved by Engineer-in-charge over the RCC slab including adjoining walls upto 300 mm height including cleaning the surface before treatment. (b) Laying brick bats with mortar using broken bricks/brick bats 25 mm to 115 mm size with 50% of cement mortar 1:5 (1 cement : 5 coarse sand) admixed with water proofing compound conforming to IS : 2645 and approved by Engineer-in-charge over 20 mm thick layer of cement mortar of mix 1:5 (1 cement :5 coarse sand) admixed with water proofing compound conforming to IS : 2645 and approved by Engineer-in-charge to required slope and treating similarly the adjoining walls upto 300 mm height including rounding of junctions of walls and slabs. (c) After two days of proper curing applying a second coat of cement slurry using 2.75 kg/ sqm of cement admixed with water proofing compound conforming to IS : 2645 and approved by Engineer-in-charge. (d) Finishing the surface with 20 mm thick jointless cement mortar of mix 1:4 (1 cement :4 coarse sand) admixed with water proofing compound conforming to IS : 2645 and approved by Engineer-in-charge including laying glass fibre cloth of approved quality in top layer of plaster and finally finishing the surface with trowel with neat cement slurry and making pattern of 300x300 mm square 3 mm deep. (e) The whole terrace so finished shall be flooded with water for a minimum period of two weeks for curing and for final test. "All above operations to be done in order and as directed and specified by the Engineer-in-Charge":						
	22.7.1	With average thickness of 120 mm and minimum thickness at khurra as 65 mm.	119.00	Sqm	1684.60	200467.40		

44	NS	Providing 12 mm thick toughened glass sheet roofing including vertical / curved surface fixed with bolts and nuts , excluding the cost of purlins and including cutting to size and shape wherever required at any height.						
		12 mm thick toughened glass	89.00	sqm	2353.00	209417.00		
45	NS	Extra for circular cutting in C.G.S. sheet roofing for making opening of area exceeding 40 sq. decimeter:						
		12 mm thick toughened glass	183.00	Rmt	326.00	59658.00		
46	NS	Providing, hoisting and fixing in super structure for first storey precast reinforced cement concrete work in string courses, of size 2'x4'x4" thick including the cost of required centring & shuttering, cost of 1:2:4 hand mixed (1 cement: 2 coarse sand: 4 graded stone aggregate 20mm nominal size) including the cost of steel reinforcement also include the cost of silicone to filling the joint between each other slab gap as per architectural drawing and the entire satisfaction of engineer-in-charge 100 mm thick (752x.10) =75.20cum	75.20	cum	14900.00	1120480.00		
47	NS	Providing WPC frames of doors, windows, clerestory windows and other frames of size 5"x2½" of density 1gm per cm <sup>3</sup> , wrought framed and fixed in position with hold fast lugs or with dash fasteners of required dia & length as directed and specified by the Engineer-in-Charge/Architect .	145.00	mtr	985.35	142875.75		
48	NS	Providing and fixing M.S. tee frame of 25x25x5mm@ 1 metre apart fixed with rawl plugs and welding as per site requirment and 12 mm thick cladding to be fixed in this frame with rawl plugs or any other means i.e. clamps etc. as directed and specified by the Engineer-in-Charge/Architect.	452.00	sqm	2787.75	1260063.00		

						24466883.84		
		Difference cost of material as Anexure A				3422064.34		
						27888948.18		
		Say				27888950.00		
			Estimate cost	Quoted Percentage		Quoted rate in Figures and Words		

N/W CONSTRUCTION OF AUDITORIUM AT SECTOR-36 CHANDIGARH SH:- PUBLIC HEALTH (SOQ)									
S.No.	CSR 2020	Description	Qty	Unit	Rate	Net Rate	Amount	Percentage	Net Amount
1	28.2	Excavation by mechanical means(JCB or Hydraulic excavator) in trenches for pipe lines with straight or open cutting in streets or open area including trimming and dressing sides levelling of beds of trenches to correct grade, cutting joint holes, refilling consolidation,watering , including the cost of dewatering of rain water, diversion for traffic, night signals. providing & fixing caution boards, crossing over trenches for access to the houses, watching, fencing, etc. and removal of surplus soil out side/inside the town involving lead upto 15 meter complete in all respect.							
		All kinds of soil							
	a	Earth work upto 1.5 m. Depth							
	(i)	All classes of soil except rocky	100.00	cum	99.10	99.10	9910.00		
2	2.10.1.2	Pipes, cables etc. exceeding 80 mm dia. but not exceeding 300	100.00	metre	293.40	293.40	29340.00		
3	10.9	Cement concrete 1:5:10							
	(b)	With stone aggregate 40mm	10.00	cum	6050.65	6050.65	60507.00		
	ii	mixing by mechanical means using concrete mixer volumetric	0.00	cum	6050.65	6050.65	0.00		



4	30.61	Providing & Fixing in position 5mm thick bevelled edge mirror of superior glass (of approved make) complete with 4mm thick hard board backing fixed in with rawl plugs 50mm, C.P. brass screws and washers and S/S Studs on top complete in all respect (as required by the Engineer-in-Charge							
	(a)	Size 600mmx450mm	7.00	each	1199.00	1199.00	8393.00		
5	30.74(i)	Providing and fixing in position H.C.I. soil waste vent or antisiphonage pipes to I.S.I. specification of E.D.C manufacture or of any other reputed firm including cutting, jointing, wastage, but excluding cost of lead jointing.							
	b	100mm i/d H.C.I. pipe lines laid complete	50.00	metre	1206.00	1206.00	60300.00		
	c	75mm i/d H.C.I. pipe lines laid complete	50.00	metre	1012.00	1012.00	50600.00		
6	30.78	Providing & Fixing in position M.S or heavy flat iron clamps made out of M.S flat iron not less than 5 mm of the approved design for fixing C.I. soil waste, vent or antisiphonage pipes to walls complete in all respects including cutting and making good the walls and floors etc. and painting.							
	(a)	M.S. Holder bats clamps for 100mm i/d H.C.I. pipes	13.00	each	206.15	206.15	2680.00		

7	17.56	Providing and fixing terminal guard :							
	17.56.1	100 mm							
	17.56.1.2	Sand cast iron S&S as per IS - 3989	4.00	each	439.75	439.75	1759.00		
8	30.81(ii)	Providing and fixing in position Centrifugally cast iron special for soil waste vent or anti syphonage pipes to I.S.I specifications of E.L.C manufacture or any other reputed firm including cutting and wastage etc. cutting holes in walls roofs or floors etc. and making good to its original condition but excluding cost of lead joining.							
	vii	100mm i/d Collars	5.00	each	431.17	431.17	2156.00		
	Bvii	75mm i/d Collars	5.00	each	327.75	327.75	1639.00		
9	17.60	Providing and fixing trap of self cleansing design with screwed down or hinged grating with or without vent arm complete, including cost of cutting and making good the walls and floors :							
	17.60.2	100 mm inlet and 75 mm outlet							
	17.60.2.1	Sand cast iron S&S as per IS - 3989	13.00	each	1296.40	1296.40	16853.00		

10	28.35	Providing ,laying, jointing, fixing and testing ISI Marked G.I. Pipe (as per IS 1239) BClass including cost of specials (such as tees, bends, sockets, elbows etc.) ,painting with anti corrosive bitumastic paint, testing, cutting, threading Inside building complete.							
	a	15mm i/d	25.00	metre	205.07	205.07	5127.00		
	b	20mm i/d	50.00	metre	249.19	249.19	12460.00		
	c	25mm i/d	50.00	metre	317.79	317.79	15890.00		
	e	40mmi/d	50.00	metre	457.69	457.69	22885.00		
11	28.35	Providing ,laying, jointing, fixing and testing ISI Marked G.I. Pipe (as per IS 1239) BClass including cost of specials (such as tees, bends, sockets, elbows etc.) ,painting with anti corrosive bitumastic paint, testing, cutting, threading Inside building complete.							
	e	40mm i/d	50.00	metre	457.69	457.69	22885.00		
12	28.45	Making connection with the existing G.I. branch main up to 40mm size pipe including cutting of existing pipe line, threading of pipe lines from both ends and fixing of G.I Tee etc. in the pipe line (including cost of G.I Tee) complete in all respects.					0.00		
		25 to 40 mm nominal bore	1.00	each	375.31	375.31	375.00		

13	28.43	Providing, fixing and jointing ISI Marked GunMetal peet valves (Heavy Pattern) as per IS 778 with hand wheels, on G.I. Pipe lines laid in the ground or inside buildings including all carriages complete.					0.00		
	c	25mm i/d Gun Metal peet valve heavy pattern	4.00	each	772.96	772.96	3092.00		
	e	40mm i/d Gun Metal peet valve heavy pattern	2.00	each	1564.53	1564.53	3129.00		
14	28.44	Providing, fixing and jointing Brass Ball valves screwed with SS/BRASS ball & spindle & Teflon seats, on G.I. Pipe lines including all carriages complete							
	c	25mm i/d Brass Ball valves	4.00	each	526.83	526.83	2107.00		
15	28.4	Providing, fixing and jointing G.I Union Couplings(of approved make with the approval EIC) as per IS 1879 in G.I. Pipe lines complete in all respect.							
	a	15mm i/d G.I. Union	2.00	each	91.00	91.00	182.00		
	b	20mm i/d G.I. Union	5.00	each	150.83	150.83	754.00		
	c	25mm i/d G.I. Union	5.00	each	190.38	190.38	952.00		
	e	40mm i/d G.I. Union	2.00	each	326.66	326.66	653.00		

16	30.97A	Providing & placing in position on terrace (at all floor levels) HDPE water storage tanks of approved make (to the approval of Engineer-in-charge) with cover with suitable locking arrangement and making necessary holes for inlet, outlet and over flo pipes but without fittings and base support for tank.							
	(i)	Triple Layer Tanks	4000.00	per litre	10.80	10.80	43200.00		
17	19.1	Providing, laying and jointing glazed stoneware pipes class SP-1 with stiff mixture of cement mortar in the proportion of 1:1 (1 cement : 1 fine sand) including testing of joints etc. complete :							
	19.1.1	100 mm diameter	52.00	metre	375.75	375.75	19539.00		
	19.1.2	150 mm diameter	91.00	metre	591.40	591.40	53817.00		
18	19.2	Providing and laying cement concrete 1:5:10 (1 cement : 5 coarse sand : 10 graded stone aggregate 40 mm nominal size) all round S.W. pipes including bed concrete as per standard design :							
	19.2.1	100 mm diameter S.W. pipe	52.00	metre	895.50	895.50	46566.00		
	19.2.2	150 mm diameter S.W. pipe	91.00	metre	1095.15	1095.15	99659.00		

19	19.4	Providing and fixing square-mouth S.W. gully trap class SP-1 complete with C.I. grating brick masonry chamber with water tight C.I. cover with frame of 300 x300 mm size (inside) the weight of cover to be not less than 4.50 kg and frame to be not less than 2.70 kg as per standard design:							
	19.4.1	100x100 mm size P type							
	19.4.1.1	With common burnt clay F.P.S. (non modular) bricks of class designation 7.5	4.00	each	2453.55	2453.55	9814.00		

20	29.56	Constructing brick masonry manhole in cement mortar 1:5 ( 1 cement : 5 coarse sand ) R.C.C. top slab 20cm thick using M-20 mix by using mixer and vibrator, TMT Fe500 @ 80.00 kg/per cum, foundation concrete 1:4:8 mix (1 cement: 4 coarse sand : 8 graded stone aggregate 40mm nominal size) inside plastering 12mm thick with cement mortar 1:3 (1 cement: 3 coarse sand) finished with floating coat of neat cement and making 40mm thick benching in cement concrete 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 20mm nominal size) finished with a floating coat of neat cement, Orange coloured PVC steps including RCC cover with frame complete as per standard design complete in all respects							
	a	Inside size 75x120 cm and 120 cm dee		ach	23066.00	23066.00			
21	19.7.1.1	With common burnt clay F.P.S. (non modular) bricks of class designation 7.5	9.00	each	11687.10	11687.10	105184.00		
22	19.8	Extra for depth for manholes :							
	19.8.1	Size 90x80 cm							
	19.8.1.1	With common burnt clay F.P.S. (non modular) bricks of class designation 7.5	2.00	metre	8127.45	8127.45	16255.00		

23	29.48A	Making soak pit 2.5 m outer Diameter 3.0 metre deep 230mm thick 1:5 brick work honey comb with bricks of Ist Class and S.W. drain pipe 100 mm Diameter, 1.8 m long complete as per standard design.							
		With F.P.S. bricks	1.00	each	22331.00	22331.00	22331.00		
24	30.5	Providing and fixing in position Chinaware extended wall mounted E. W.C. type suite (size 66 x 46 x 77.5 cm ) with P trap or S trap of approved make (to the approval of the Engineer-in-charge) with or without 10 ltr. chinaware matching flushing cistern and seat cover complete in all respect and to the entire satisfaction of Engineer-in-charge.							
	a	Chinaware extended wall mounted E W.C. with matching chinaware cistern and seat cover complete in all respect.	4.00	Each	13199.00	13199.00	52796.00		
25	NSR	Providing and fixing Jaquar Continental Cat No. FSS-WHT-29601 wash basin table top size 545x545x180 mm complete in all respect as per approved by EIC.	4.00	Each	8891.00	8891.00	35564.00		



26	30.45	Providing and fixing PTMT Bottle trap 31mm single piece moulded with height of 270mm, effective length of tail pipe 260mm from the centre of the waste coupling 77mm breadth with 25mm minimum water seal, weighing not less than 260gms of approved make (to the approval of Engineer-in-charge) for wash hand basin and sink complete in all respect	4.00	Each	542.00	542.00	2168.00		
27	NSR	Providing and fixing Jaquar Continental Cat No. ALD-083 Regular body of concealed stop cock suitable for 15mm pipe line with protection cap with exposed parts complete in all respects approved by the EIC.	4.00	Each	1273.00	1273.00	5092.00		
28	18.21	Providing and fixing uplasticised PVC connection pipe with brass unions :							
	18.21.2	45 cm length							
	18.21.2.1	15 mm nominal bore	12.00	Each	85.20	85.20	1022.00		
29	30.66	Providing & Fixing in position stop cock / Angle valve of approved make (to the approval of Engineer-in-charge ) complete in all respect.							
	(d)	C.P.brass 20mm concealed stop cock with flange	15.00	Each	1399.00	1399.00	20985.00		

30	30.57	Providing and fixing in position paper holders of approved make (to the approval of Engineer-in-charge ) fixed in to wall with C.P brass screws complete in all respect							
	a	C.P. brass toilet paper holder	4.00	Each	1084.00	1084.00	4336.00		
31	30.59	Providing and fixing in position C.P. Acrylic shelf with C.P.bracket and guard rails of approved make (to the approval of Engineer-incharge ) fixed in with rawl plugs and C.P brass screws complete in all respect.							
	a	CP brass Acrylic Shelf size 560mmx130mm	4.00	Each	1669.00	1669.00	6676.00		
32	NSR	Providing and fixing Jaquar Continental Cat. No. ALD-709L130 waste coupling 32mm size full thread complete in all respect as per make approved by EIC (Sink and WHB)							
			4.00	Each	542.00	542.00	2168.00		
33	30.17A	Providing and fixing in position vitreous Chinaware white Senso urinal size 37 x 39 x 61 cm of approved make (to the approval of Engineer-in-charge) consisting of C.P. brass Urinal waste Coupling dome type 32mm outer length 75 mm complete in all respect.							
			4.00	Each	19356.00	19356.00	77424.00		

34	30.38	Providing and fixing in position C.P brass basin mixer without pop-up waste system with 450 mm long flexible hose of approved make (to the approval of Engineer-in-charge) instead of C.P. brass pillar tap complete in all respect	4.00	Each	2007.00	2007.00	8028.00		
35	30.56A	Providing and fixing in position C.P. brass overhead shower 1 flow with shower arm with 15mm i/d inlet of approved make (to the approval of Engineer-in-charge) complete in all respect.	2.00	Each	1025.00	1025.00	2050.00		
36	30.17B	Providing and fixing in position Vitreous Chinaware white urinal with concealed or in built P-trap (size 310x370x640 mm) with built in water seal, outlet to wall and water inlet from back of approved make (to the approval of Engineer-in-charge) complete in all respect.	3.00	Each	10544.00	10544.00	31632.00		
37	30.15	Providing & fixing in position vitreous Chinware white Indian make flat back or angular lipped front small urinals size 265x315x440mm approved make (to the approval of the Engineer-in-charge) with C.P. brass tube connection 300 mm long complete in all respect	3.00	Each	2987.00	2987.00	8961.00		



**ESTIMATE OF E.I WORK FOR CONSTRUCTION OF AUDITORIUM AT GURU NANAK PUBLIC SCHOOL, SECTOR 36, CHANDIGARH**

S.No.	Description	Qty	Unit	Rate	Amount	Percentage	Net Amount
1)	<b>CSR Item No. 34.02</b>						
	RECESSED PVC CONDUIT PIPE WIRING SYSTEM WITH MODULAR SWITCHES:						
	Wiring in PVC insulated copper conductor single core FR cable (ISI marked) overall 1.5sq. mm, 1100volts grade to be laid in heavy gauge PVC conduit pipe 20mm/ 25mm dia. (ISI Marked) recessed in wall etc., complete with powder coated/anodized concealed metal boxes (1.6mm thick with Brass lugs) required for suitable number of modules (Modular accessories) for having Step type electronic fan regulators (two module) 100watts, bell push, 6Amp. 2/3 universal socket (shuttered), 16/20Amp. combined/ universal Socket (shuttered), 6/10Amp. Switches, 16/20Amp. switches with indicator etc. and covered with Frame Plate etc., PVC connector (For Fan Box and Call Bell), Steel Hooks, Sheet metal fan box (1.6mm thick shape hexagonal), Circular junction Boxes (Four way PVC 1½" deep for walls and CI 3" deep for ceiling), bonding to earth with PVC insulated copper conductor single core FR cable (ISI marked) 1sq. mm, 1100volts grade (For 6Amp. wall socket & plug control point) and other petty material etc., including the cost of above material, cutting and filling up of chases (with finishing the surface):-						
i	Wiring light point	60	Each				
ii	Wiring fan point (With fan box)	6	Each				
iii	Wiring call-bell point	52	Each				
iv	Wiring 6Amp. wall socket point	40	Each				
v	Wiring 6Amp. Plug control comprising wall socket point	494	Each				

vi	Wiring 16/20Amp. power plug control point	30	Each				
vii)	Wiring light point with double control switches.	4	Each				
2)	<b>CSR Item No. 34.01</b>						
	RECESSED AIR CONDITIONER SUPPLY TERMINAL POINT (USED FOR HGW, PVC CONDUIT & HDPE PIPE WIRING SYSTEM WITH MODULAR ACCESSORIES):						
	Wiring air conditioner supply terminal point recessed in wall etc., complete with powder coated/anodized concealed metal boxes required for suitable number of modules (Modular accessories) for having 25Amp. combined/ universal Socket (shuttered) and modular motor starter 25Amp. (2Module), covered with Frame Plate and other petty material etc. including the cost of above material, cutting and filling up of chases (with finishing the surface):-						
i	Wiring AC supply terminal point having 1No. 25Amp. universal Socket (shuttered) erected at AC height and 1No. Motor starter 25Amp. erected at switchboard height.	10	Each				
3)	<b>CSR Item No. 34.01</b>						
	RECESSED TV, TELEPHONE & NETWORKING SOCKETS OUTLET POINTS (USED FOR HGW, PVC CONDUIT & HDPE PIPE WIRING SYSTEM WITH MODULAR ACCESSORIES):						
	Supply and erection of TV socket, Telephone socket and Networking socket points in powder coated/anodized concealed metal boxes recessed in wall required for suitable number of modules (Modular accessories) for having TV sockets, Telephone sockets RJ11 & Networking socket RJ45 (one module), covered with Frame Plate and other petty material etc., including the cost of above material, cutting and filling up of chases (with finishing the surface):-						
i	Wiring TV socket point (one module)	2	Each				
i)	Wiring Telephone socket point RJ11 (one module)	8	Each				

4)	<b>CSR Item No. 34.15</b>						
	SUPPLY AND ERECTION OF WIRING ACCESSORIES:						
	Supply and erection of switches, sockets and other accessories (flush piano type/ modular accessories) in the existing bakelite/ modular cover frame including fixing & connections and petty material etc.:-						
i	Modular Blanking Plate (One Module)	6	Each				
ii	Ceiling Rose (Flush Piano type)	18	Each				
iii	Bakelite Batten Holder (Large size)	18	Each				
5)	<b>CSR Item No. 34.17</b>						
	SHEET METAL DOUBLE DOOR DISTRIBUTION BOARD FOR MCB's/ RCBO's/ RCCB's:						
	Supply and erection of sheet metal Double Door Distribution Boards IP 43-1K09 metal door (dust protected) as per IS 8623-1&3, IEC 61439-1&3 suitable for flush mounting with fully insulated copper busbars, shrouded neutral bars, earth bars, cement spill protector, color-coded interconnecting wire set, cable ties, blanking plates and circuit identifications label and of required no. of ways for mounting miniature circuit breakers/ RCBO's/ RCCB's in the distribution board (For SP&N distribution board with provision DP MCB's/ RCCB's/ RCBO's as incomer and SP MCB's as outgoings and for TP&N horizontal distribution board with provision TPN/ FP MCB's/ RCCB's/ RCBO's as incomer and SP MCB's as outgoings) as per PWD General specifications including connections with suitable size of thimbles and bonding to existing earth etc.:-						
i	TP&N Horizontal Double Door Distribution Board 8 way each	4	Each				
ii	SP&N Double Door Distribution Board 8 way each	4	Each				
6)	<b>CSR Item No. 34.16A</b>						
	MINIATURE CIRCUIT BREAKERS:						

	Supply and erection of Miniature Circuit Breaker MCB's for circuit protection against overload and short circuit current fault suitable for 240/ 415 volts 50cycles AC supply with breaking capacity of 10kA, Curve-C and low watt losses as per IS/IEC 60898-1, energy limitation class-3, true contact indication, label holder facility in the existing MCB distribution board as per PWD General Specifications including connections with suitable size of thimbles/lugs:-						
i	MCB Single Pole 6-32amp. (10kA, Curve-C)	38	Each				
ii	MCB Four Pole 50, 63amp. (10kA, Curve-C)	12	Each				
iii	MCB Single Pole 6-32amp. (10kA, Curve-C) <b>(in Lift DB)</b>	4	Each				
iv	MCB Four Pole 40amp. (10kA, Curve-C) <b>(in Lift DB)</b>	4	Each				
7)	<b>CSR Item No. 34.16C</b>						
	<b>RCCB's</b>						
	Supply and erection of RCCB (Residual Current Circuit Breaker) for Earth leakage protection suitable for 240/415 volts 50 cycles AC supply with breaking capacity of 10kA as per IEC 61008-1 in the existing MCB distribution board as per PWD General Specifications including connections with suitable size of thimbles/lugs:-						
i	RCCB Four Pole 32/40amp., Sensitivity 300mA <b>(For Each House in DB)</b>	4	Each				
II	RCCB Four Pole 32/40amp., Sensitivity 300mA <b>( In Lift DB )</b>	4	Each				
8)	<b>CSR Item No. 34.09</b>						
	<b>PVC INSULATED FR COPPER CONDUCTOR CABLES:</b>						
	Supply and erection of PVC insulated FR single core Unsheathed copper conductor cable (ISI marked) suitable upto 1100 volts grade confirm to IS:694/1990 left bare in pipe or casing of suitable size complete in all respect as desired by the Engineer-in-charge:-						



i)	Overall size 1.5sq.mm (Un-sheathed) <b>(1 No. House = 150 mtr x 3wire= 450 mtr x 52 nos)</b>	300	P.mtr				
ii)	Overall size 2.5sq.mm (Un-sheathed) <b>(1 No. House = 200 mtr x 3wire= 600 mtr x 52 nos)</b>	200	P.mtr				
iii)	Overall size 4sq.mm (Un-sheathed) <b>(1 No. House = 80 mtr x 3wire= 240 mtr x 52 nos)</b>	100	P.mtr				
iv)	Overall size 10sq.mm (Un-sheathed) <b>(From Metering panel to BDB 8 way , 4 wires)</b>	100	P.mtr				
v)	Overall size 6sq.mm (Un-sheathed) <b>(From Metering panel to BDB 8 way, 2 wires for earth)</b>	100	P.mtr				
vi)	Overall size 6sq.mm (Un-sheathed) <b>(From GF Lift DB to third floor DB lift) (20 mtr x 4 wires =80 mtr x 4 Nos Lift)</b>	50	P.mtr				
vii)	Overall size 2.5sq.mm (Un-sheathed) <b>(20 mtr x 1 wire for earth = 20 mtr x 4 nos lift)</b>	40	P.mtr				
9)	<b>CSR Item No. 34.12</b>						
	<b>PVC, HDPE PIPES &amp; PVC FLEXIBLE PIPES:</b>						
	Supply & erection of PVC Conduit Pipes (ISI marked) as per IS9537:Part-III & HDPE pipes (ISI marked) as per IS:4984:1995 for wiring purposes including bends, junction boxes, Steel hooks, M.S. saddle clamps and other petty materials etc., as per PWD General Specifications:-						
i)	Medium Gauge PVC Conduit Pipe 20mm dia. (Flushed) (For Ligh circuit , Telephone and co axial cable	400	P.mtr				
ii)	Medium Gauge PVC Conduit Pipe 25mm dia. (Flushed) (For power circuits)	200	P.mtr				
iii)	Medium Gauge PVC Conduit Pipe 32mm dia. (Flushed)(From metering panel to BDB)	60	P.mtr				
iv)	Heavy Gauge PVC Conduit Pipe 50mm dia. (Flushed) <b>(From GF Lift DB to third floor DB lift)</b>	30	P.mtr				
10)	<b>CSR Item No. 34.10A</b>						
	<b>XLPE INSULATED ARMOURED CABLES (UNDERGROUND):</b>						

	Supply, laying and erection of aluminium conductor XLPE insulated PVC sheathed armoured and served cable 1100 volts grade as per IS:7098 (Part-1)1988 to be laid 1metre below ground level including excavation, sand cushioning, covering with sand & First Class bricks and back filling the trench etc., of the required size as per PWD General Specifications:-						
i)	Overall size 400 sq.mm (3½ Core) Armoured (Underground)		P.Mtr			Quote rate only	
ii)	Overall size 240 sq.mm (3½ Core) Armoured (Underground)		P.Mtr			Quote rate only	
iii)	Overall size 95sq.mm (3½ Core) Armoured (Underground)		P.Mtr			Quote rate only	
iv)	Overall size 70sq.mm (3½ Core) Armoured (Underground)		P.Mtr			Quote rate only	
11	Supplying and fixing cable end box of following sizes (nominal size) in recess made with CRCA sheet steel duly powder coated etc as required. The cable end box shall be of the same make of the Distribution board.						
ii)	Cable End box for 8 way TPN DB ( <b>above DB in Each house for loose wiring</b> )	1	Each				
12	Supplying and drawing following pair 0.5 mm dia FRLS PVC insulated annealed copper conductor, unarmored telephone cable in the existing recessed steel/ PVC conduit as required.						
i)	1 pair	60	Metre				
13	Supplying and drawing 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 existing recessed steel/ PVC conduit as required.	30	Metre				

14	Supplying and making end termination with brass compression gland and aluminium lugs for following size of PVC insulated and PVC sheathed / XLPE aluminium conductor cable of 1.1 KV grade as required						
i	3½ X 400 sq. mm (82mm)	1	Each				
15	Supply, erection, fabrication and testing of 3 phase meter Enclosure having space to install 8 nos 3 phase electricity meter. The enclosure should be made from 16 guage sheet duly powder coated. The meter enclosure should consist of Suitable size 250A 3 phase aluminium busbar , 63 Amp MCB TPN for each meter, 6 mm bakelite sheet for mounting 3 phase meter, meter glass for clear view for meter reading. the job includes cost of 10mm2 copper for interconnections and all the petty material required to complete the job. The enclosure shall be of size 1400 mm x 1100mm x 200 mm. the panel shall be grouted on the existing wall with the help of fastners.	7	Each				
	<b>Total</b>					<b>5,00,000.00</b>	
	Say					5,00,000.00	
		Estimate cost	Quoted Percentag			Quoted rate in Figures and Words	

**DETAIL ESTIMATE COST FOR CONSTRUCTION OF GURU NANAK AUDITORIUM**  
**AT GNPS SECTOR 36, CHANDIGARH**

S.NO.	WORK	COST (Rs.)
1.	CIVIL WORK COST	RS 2,78,88,950.00 /-
2.	PUBLIC HEALTH COST	RS 10,23,627.00 /-
3.	ELECTRICAL WORK COST	RS 5,00,000.00 /-
	TOTAL	RS 2,94,12,577.00 /-