

**INVITATION FOR QUOTATIONS FOR CONSTRUCTION OF  
CIVIL WORKS UNDER SHOPPING PROCEDURES**

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Dear Sirs,

Sub : INVITATION FOR QUOTATIONS FOR CONSTRUCTION OF

**1 NO. SECTIONAL OFFICE BUILDING AT NALTI IN DISTT.  
HAMIRPUR (HP)**

1. You are invited to submit your most competitive quotation for the following works:-

<b>Brief Description of the Works</b>	<b><u>Approximate value of work (Rs.)</u></b>	<b><u>Period of completion</u></b>
<b>1</b>	<b>2</b>	<b>3</b>
<b>HYDROLOGY PROJECT-II (SH: - C/O 1 NO. SECTIONAL OFFICE BUILDING AT NALTI IN DISTT. HAMIRPUR (HP)</b>	<b>723364/-</b>	<b>12 months i/c period of monsoon days.</b>

2. Government of India has received a credit loan (Ln. No IBRD LN. No. 4749-IN) from the International Development Association (IDA) towards the cost of the **Hydrology Project-II** Project and intends to apply part of the proceeds of this credit to eligible payments under the contract for which this invitation for quotations is issued.

3. To assist you in the preparation of your quotation, we are enclosing the following :

- i. Layout Drawings of the works;
- ii. Structural Details;
- iii. Detailed Bill of Quantities, ;
- iv. Technical Specifications;
- v. Instructions to Bidders (in two sections).
- vi. Draft Contract Agreement format which will be used for finalizing the agreement for this Contract.

4. You are requested to provide your offer latest by **on or before 14.30 hours on 15.03.2010.**
5. Quotations will be opened in the presence of Bidders or their representatives who choose to attend at **15.00 PM on 15.03.2010.** in the office of **Executive Engineer, Hydrology, Construction & Maintenance Division, Samriti Bhawan Lower Chakkar, Shimla-5 (HP).**
6. We look forward to receiving your quotations and thank you for your interest in this project.

Executive Engineer,  
Hydrology, Construction & Maintenance  
Division, Samriti Bhawan Lower Chakkar,  
Shimla-5, (HP)  
Tel. No: 01772831166.  
Fax. No.01772650312.

## Instructions to Bidders

### SECTION - A

#### 1. Scope of Works

The **Executive Engineer, Hydrology, Construction & Maintenance Division, Samriti Bhawan Lower Chakkar, Shimla-5 (HP)** invites quotations for the construction of works as detailed in the table given below :-

Brief Description of the Works	Approximate value of Works (Rs.)	Period of Completion
<b>HYDROLOGY PROJECT-II (SH :- C/O 1 NO. SECTIONAL OFFICE BUILDING AT NALTI IN DISTT. HAMIRPUR (HP)</b>	723364/-	12 months i/c period of monsoon days.

The successful bidder will be expected to complete the works by the intended completion date specified above.

#### 2. **Qualification of the bidder:** The bidder shall provide qualification information which shall include:-

- (a) total monetary value of construction works performed for each year of the last 3 years i.e. for **2006-07, 2007-08, 2008-09**
- (b) Report on his financial standing; and
- (c) Details of any litigation, current or during the last 3 years **2006-07, 2007-08, 2008-09** in which the bidder is involved, the parties concerned and disputed amount in each case.

#### 3. To qualify for award of the contract the bidder:-

- (a) should have satisfactorily completed as a prime contractor at least one similar work of value not less than **Rs. 500000/-** in the last three years;
- (b) should possess valid electrical license for executing building electrification works (in the event of the works being sub - contracted, the sub-contractor should have the necessary license);

- (c) should possess qualified person for executing the water supply/sanitary works (in the event of the works being sub-contracted, the sub-contractor should have the necessary qualification);

#### 4. Bid Price

- a) The contract shall be for the whole works as described in the Bill of quantities, drawings and technical specifications. Corrections, if any, shall be made by crossing out, initialling, dating and re writing.
- b) All duties, taxes and other levies payable by the contractor under the contract shall be included in the total price.
- c) The rates quoted by the bidder shall be fixed for the duration of the contract and shall not be subject to adjustment on any account.
- d) The rates should be quoted in Indian Rupees only.

#### 5. Submission of Quotations

5.1 The bidder is advised to visit the site of works at his own expense and obtain all information that may be necessary for preparing the quotation.

5.2 Each bidder shall submit only one quotation.

5.3 The quotation submitted by the bidder shall comprise the following :-

- (a) Quotation in the format given in Section B.
- (b) Signed Bill of Quantities ; and
- (c) Qualification information form given in Section B duly completed.

5.4 The bidder shall seal the quotation in an envelope addressed to the **Executive Engineer, Hydrology, Construction & Maintenance Division, Samriti Bhawan Lower Chakkar, Shimla-5 (HP)**. The envelope will also bear the following identification :-

- Quotation for **Hydrology Project-II (SH: - C/O 1 No. Sectional Office Building at NALTI in Distt. Hamirpur (HP))**
- Do not open before **15.00 Hours on 15-03-2010.**

**5.5** Quotations must be received in the office of the **Executive Engineer, Hydrology, Construction & Maintenance Division, Samriti Bhawan Lower Chakkar, Shimla-5 (HP)**.not later than the time and date given in the letter of invitation. If the specified date is declared a holiday, quotations shall be received upto the appointed time on the next working day.

**5.6** Any quotation received by the **Executive Engineer, Hydrology, Construction & Maintenance Division, Samriti Bhawan Lower Chakkar, Shimla-5 (HP)**.after the deadline for submission of quotations will be rejected and returned unopened to the bidder.

## **6. Validity of Quotation**

Quotation shall remain valid for a period not less than 45 days after the deadline date specified for submission.

## **7. Opening of Quotations**

Quotations will be opened in the presence of bidders or their representatives who choose to attend on the date and time and at the place specified in the letter of invitation.

**8.** Information relating to evaluation of quotations and recommendations for the award of contract shall not be disclosed to bidders or any other persons not officially concerned with the process until the award to the successful bidder is announced.

## **9. Evaluation of Quotations**

The Employer will evaluate and compare the quotations determined to be substantially responsive i.e. which

- (a) meet the qualification criteria specified in clause 3 above;
- (b) are properly signed ; and
- (c) conform to the terms and conditions, specifications and drawings without material deviations.

## **10. Award of contract**

The Employer will award the contract to the bidder whose quotation has been determined to be substantially responsive and who has offered the lowest evaluated quotation price and who meets the specified qualification criteria.

**10.1** Notwithstanding the above, the Employer reserves the right to accept or reject any quotations and to cancel the bidding process and reject all quotations at any time prior to the award of contract.

10.2 The bidder whose bid is accepted will be notified of the award of contract by the Employer prior to expiration of the quotation validity period.

**11. Performance Security**

Within 15 days of receiving letter of acceptance, the successful bidder shall deliver to the **Executive Engineer, Hydrology, Construction & Maintenance Division, Samriti Bhawan Lower Chakkar, Shimla-5 (HP)**.the performance security (either a bank guarantee or a bank draft in favour of the Employer) for an amount equivalent of 3 % of the contract price . The Performance Security shall be valid till the expiry of the period of maintenance of the work, specified in clause 12.

**12. Period of Maintenance:**

The “Period of Maintenance” for the work is six months from the date of taking over possession or one full monsoon season whichever occurs later. During the period of maintenance, the contractor will be responsible for rectifying any defects in construction free of cost to the Employer.

13. Purchase of all construction materials including cement and steel as per the specifications (ISI certification marked goods wherever available) shall be the responsibility of the contractor.

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## **SECTION - B**

- 1. Format for Qualification Information.**
- 2. Format for Submission of Quotation.**
- 3. Format of Letter of Acceptance.**

## QUALIFICATION INFORMATION

### 1 For Individual Bidders

1.1 Principal place of business: \_\_\_\_\_

Power of attorney of signatory of Quotation.  
[Attach copy]

1.2 Total value of Civil Engineering construction work performed in the last three years (in Rs. Lakhs)

	2006-07	
	2007-08	
	2008-09	

1.3 Work performed as prime contractor (in the same name) on works of a similar nature over the last three years.

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<u>Project Name</u>	<u>Name of Employer</u>	<u>Description of work</u>	<u>Contract No.</u>	<u>Value of contract (Rs.Lakhs)</u>	<u>Date of issue of work order</u>	<u>Stipulated period of completion</u>	<u>Actual date of completion</u>	<u>Remarks explaining reasons for delay and work completed</u>
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Existing commitments and on-going works:

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Description of Work	Place & State	Contract No. & Date	Value of Contract (Rs. Lakh)	Stipulated period of completion	Value of works* remaining to be completed (Rs. Lakhs)	Anticipated date of completion
(1)	(2)	(3)	(4)	(5)	(6)	(7)

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\* Enclose a certificate from Engineer concerned.



**1.4** Proposed subcontracts and firms involved.

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Sections of the works	Value of Sub-contract	Sub-contractor (name & address)	Experience in similar work
*	*	*	*
*	*	*	*
*	*	*	*
*	*	*	*

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**1.5** Evidence of access to financial resources to meet the requirements of working capital : cash in hand, lines of credit, etc. List them below and attach copies of support documents.

**1.6** Name, address, and telephone, telex, and fax numbers of the Bidders' bankers who may provide references if contacted by the Employer.

**1.7** Information on litigation history in which the Bidder is involved.

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Other party(ies)	Employer	Cause of dispute	Amount involved	Remarks showing present status

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**QUOTATION**

Description of the Works: **Hydrology Project-II (SH: - C/O 1 No. Sectional Office Building at NALTI in Distt. Hamirpur (HP))**

To: **Executive Engineer, Hydrology, Construction & Maintenance Division, Samriti Bhawan Lower Chakkar, Shimla-5 (HP).**

Subject : Construction of .....

Reference : Letter No.....dated.....from.....

Sir,

We offer to execute the Works described in your letter referred to above in accordance with the Conditions of Contract enclosed therewith at ..... percentage above / below the estimated rates, i.e., for a total Contract Price of -

Rs.\*\* \_\_\_\_\_ [ in figures ]  
Rs. \_\_\_\_\_ [ in words ].

This quotation and your written acceptance of it shall constitute a binding contract between us. We understand that you are not bound to accept the lowest or any quotation you receive.

We hereby certify that we have taken steps to ensure that no person acting for us or on our behalf will engage in bribery.

We hereby confirm that this quotation is valid for 45 days as required in Clause 6 of the Instructions to Bidders.

Yours faithfully,

Authorized Signature : \_\_\_\_\_ Date: \_\_\_\_\_

Name & Title of Signatory : \_\_\_\_\_

Name of Bidder : \_\_\_\_\_

Address : \_\_\_\_\_

**LETTER OF ACCEPTANCE  
CUM NOTICE TO PROCEED WITH THE WORK**

**(LETTERHEAD OF THE EMPLOYER)**

Dated: \_\_\_\_\_

To : \_\_\_\_\_ [Name and address of the Contractor]  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Dear Sirs,

This is to notify you that your Quotation dated \_\_\_\_\_ for execution of the \_\_\_\_\_ for the contract price of Rupees \_\_\_\_\_ [amount in words and figures], is hereby accepted by us.

You are hereby requested to furnish performance security for an amount of Rs. \_\_\_\_\_ (equivalent to 3% of the contract price) within 15 days of the receipt of the letter. The Performance Security in the form of Bank guarantee or a Bank draft in favour of .....(Employer) shall be valid till the expiry of the period of maintenance i.e. upto \_\_\_\_\_. Failure to furnish the Performance Security will entail cancellation of the award of contract.

You are also requested to sign the agreement form and proceed with the work not later than \_\_\_\_\_ under the instructions of the Engineer, \_\_\_\_\_ and ensure its completion within the contract period.

With the issuance of this acceptance letter and your furnishing the Performance Security, contract for the above said work stands concluded.

Yours faithfully,

**Authorized Signature  
Name and title of Signatory**

# **Draft Agreement form for Construction through National Shopping**

## **ARTICLES OF AGREEMENT**

This deed of agreement is made in the form of agreement on \_\_\_\_\_ day \_\_\_\_\_ month \_\_\_\_\_ 2010 \_\_\_\_, between the \_\_\_\_\_ (Employer) or his authorized representative (hereinafter referred to as the first party) and \_\_\_\_\_ (Name of the Contractor), S/O \_\_\_\_\_ resident of \_\_\_\_\_ (hereinafter referred to as the second party), to execute the work of construction of \_\_\_\_\_ (hereinafter referred to as works) on the following terms and conditions.

### **2. Cost of the Contract**

The total cost of the works (hereinafter referred to as the “total cost”) is Rs. \_\_\_\_ as reflected in Annexure - 1.

### **3.1 Payments under its contract:**

Payments to the second party for the construction work will be released by the first party in the following manner -

On signing of agreement	:	0% of the total cost
On reaching plinth level (first stage)	:	15% of the total cost
On reaching lintel level (second stage)	:	30% of the total cost
On reaching roof level (third stage)	:	20% of the total cost
Plastering and completion of whole work (fourth stage)	:	35% of the total cost

### **3.2 Payments at each stage will be made by the first party:**

- (a) on the second party submitting an invoice for an equivalent amount ;
- (b) on certification of the invoice (except for the first installment) by the engineer nominated by the first party with respect to quality of works in the format in Annexure - 2; and
- (c) upon proper and justified utilization of at least 50 % of the previous installment and 100 % of any prior installment.

#### **4. Notice by Contractor to Engineer**

The second party, on the works reaching each stage of construction, issue a notice to the first party or the Engineer nominated by the first party (who is responsible for supervising the contractor, administering the contract, certifying the payments due to the contractor, issuing and valuing variations to the contract, awarding extensions of time etc.), to visit the site for certification of stage completion. Within 15 days of the receipt of such notice, the first party or the engineer nominated by it, will ensure issue of stage completion certificate after due verification.

#### **5. Completion time**

The works should be completed in **twelve** months from the date of this Agreement. In exceptional circumstances, the time period stated in this clause may be extended in writing by mutual consent of both the parties.

**6.** If any of the compensation events mentioned below would prevent the work being completed by the intended completion date, the first party will decide on the intended completion date being extended by a suitable period:

- a) The first party does not give access to the site or a part thereof by the agreed period.
- b) The first party orders a delay or does not issue completed drawings, specifications or instructions for execution of the work on time.
- c) Ground conditions are substantially more adverse than could reasonably have been assumed before issue of letter of acceptance and from information provided to second party or from visual inspection of the site.
- d) Payments due to the second party are delayed without reason.
- e) Certification for stage completion of the work is delayed unreasonably.

**7.** Any willful delay on the part of the second party in completing the construction within the stipulated period will render him liable to pay liquidated damages. @ **Rs.360/-** per day which will be deducted from payments due to him. The first party may cancel the contract and take recourse to such other action as deemed appropriate once the total amount of liquidated damages exceeds 2 % of the contract amount.

**(Note: The amount of liquidated damages per day should be determined at 0.05 % of the contract value of the works and indicated here).**

## **8. Duties and responsibilities of the first party**

- 8.1** The first party shall be responsible for providing regular and frequent supervision and guidance to the second party for carrying out the works as per specifications. This will include written guidelines and regular site visit of the authorized personnel of the first party, for checking quality of material and construction to ensure that it is as per the norms.
- 8.2** The first party shall supply 3 sets of drawings, specifications and guidelines to the second party for the proposed works.
- 8.3** Possession of the site will be handed over to the second party within 10 days of signing of the agreement.
- 8.4** The Engineer or such other person as may be authorized by the first party shall hold meeting once in a month where the second party or his representative at site will submit the latest information including progress report and difficulties if any, in the execution of the work. The whole team may jointly inspect the site on a particular day to take stock of activities.
- 8.5** The Engineer shall record his observations/instructions at the time of his site visit in a site register maintained by the second party. The second party will carry out the instructions and promptly rectify any deviations pointed out by the engineer. If the deviations are not rectified, within the time specified in the Engineer's notice, the first party as well as the engineer nominated by it, may instruct stoppage or suspension of the construction. It shall thereupon be open to the first party or the engineer to have the deviations rectified at the cost of the second party.

## **9. Duties and responsibilities of the second party**

- 9.1** The second party shall:
- a) take up the works and arrange for its completion within the time period stipulated in clause 5;
  - b) employ suitable skilled persons to carry out the works ;
  - c) regularly supervise and monitor the progress of work ;
  - d) abide by the technical suggestions / direction of supervisory personnel including engineers etc. regarding building construction ;
  - e) be responsible for bringing any discrepancy to the notice of the representative of the first party and seek necessary clarification ;
  - f) ensure that the work is carried out in accordance with specifications, drawings and within the total of the contract amount without any cost escalation ;

- g) keep the first party informed about the progress of work ;
- h) be responsible for all security and watch and ward arrangements at site till handing over of the building to the first party ; and
- i) maintain necessary insurance against loss of materials/cash, etc. or workman disability compensation claims of the personnel deployed on the works as well as third party claims.
- f) Pay all duties, taxes and other levies payable by construction agencies as per law under the contract (First party will effect deduction from running bills in respect of such taxes as may be imposed under the law).

## **10. Variations / Extra Items**

The works shall be carried out by the second party in accordance with the approved drawings and specifications. However, if, on account of site conditions or any other factors, variations are considered necessary, the following procedure shall be followed:-

- a) The second party shall provide the Engineer with a quotation for carrying out the Variation when requested to do so by the Engineer. The Engineer shall assess the quotation, which shall be given within seven days of the request before the Variation is ordered.
- b) If the quotation given by the second party is unreasonable, the Engineer may order the Variation and make a change to the Contract Price which shall be based on Engineer's own forecast of the effects of the Variation on the Contractor's costs.
- c) The second party shall not be entitled to additional payment for costs which could have been avoided by giving early warning.

## **11. Securities**

The Performance Security shall be provided to the Employer no later than the date specified in the Letter of Acceptance and shall be issued in an amount and form and by a bank or surety acceptable to the Employer. The Performance Security shall be valid until a date 28 days from the date of issue of the Certificate of Completion in the case of a Bank Guarantee.

## **12. Termination**

- 12.1 The Employer may terminate the Contract if the other party causes a fundamental breach of the Contract.
- 12.2 Fundamental breaches of Contract include, but shall not be limited to the following:
  - (a) the contractor stops work for 28 days and the stoppage has not been authorized by the Engineer;

- (b) the Contractor has become bankrupt or goes into liquidation other than for a reconstruction or amalgamation;
  - (c) the Engineer gives Notice that failure to correct a particular Defect is a fundamental breach of Contract and the Contractor fails to correct it within a reasonable period of time determined by the Engineer;
  - (d) the Contractor does not maintain a security which is required;
- 12.3 Notwithstanding the above, the Employer may terminate the Contract for convenience.
- 12.4 If the Contract is terminated the Contractor shall stop work immediately, make the Site safe and secure and leave the Site as soon as reasonably possible.

### 13. **Payment upon Termination**

- 13.1 If the Contract is terminated because of a fundamental breach of Contract by the Contractor, the Engineer shall issue a certificate for the value of the work done less advance payments received up to the date of the issue of the certificate, less other recoveries due in terms of the contract, less taxes due to be deducted at source as per applicable law.
- 13.2 If the Contract is terminated at the Employer's convenience, the Engineer shall issue a certificate for the value of the work done, the reasonable cost of removal of Equipment, repatriation of the Contractor's personnel employed solely on the Works, and the Contractor's costs of protecting and securing the Works and less advance payments received up to the date of the certificate, less other recoveries due in terms of the contract and less taxes due to be deducted at source as per applicable law.

### 14. **Dispute settlement**

If over the works, any dispute arises between the two parties, relating to any aspects of this Agreement, the parties shall first attempt to settle the dispute through mutual and amicable consultation.

In the event of agreement not being reached, the matter will be referred for arbitration by a Sole Arbitrator not below the level of retired Superintending Engineer, PWD to be appointed by the first party. The Arbitration will be conducted in accordance with the Arbitration and Conciliation Act, 1996. The decision of the Arbitrator shall be final and binding on both the parties. Arbitration proceedings shall be held at **Shimla (HP)**, India, and the language of the arbitration proceedings and that of all documents and communications between the parties shall be English.



## **SPECIFICATIONS**

**CHAPTER (A)**  
**GENERAL SPECIFICATION**

The term, the India standard specification herein after referred to as BIS as used herein means the relevant Bureau of Indian Standard codes with all amendments published up-to the date of submission of tenders. A statement of relevant BIS is applicable to this context is enclosed.

**LIST OF INDIAN STANDARDS**

<b>SL.NO.</b>	<b>SHORT TITLE</b>	<b><u>B.I.S NUMBER</u></b>
(1)	<u><b>CEMENT</b></u>	
1	Specification for ordinary and low heat Portland cement	269-1989
2	Specification for Portland Pozzolana Cement	1489(Part-I &II)-1991
3	Portland stag cement(Third revision)	455-1989
4	Method for Physical tests for hydraulic cement(Reaffirmed 1980)	4031(Part I &XV)latest
5	Method of chemical analysis of hydraulic cement (first revision)	4032-1985
6	Rapid hardening Portland cement	8041-1990
7	Hydrophobic Portland cement	8043-1991
8	High strength ordinary Portland cement	8112-1989
II	<u><b>AGGREGATES</b></u>	
1	Specification for coarse and fine AGGREGATE from natural source for concrete	383-1970
2	Specification for sand for masonry Mortars	2116-1965
3	Method of Tests for aggregates for concrete(Part- 1 to Part-VIV)	2386(Part I & VIII)-1963
4	Standard sand for testing of cement (First revision) with amendment 1&2 reaffirmed 1980.	650-1991
5	Method for sampling of aggregates for concrete.	2430-1986
6	Method of test for determining aggregates impact value of soft coarse aggregates.	5640-1970
III	<u><b>BUILDING STONES</b></u>	
1	Method of test for determination of strength of strength properties of natural building stones	1221-1991
	Part-I Compressive strength	
	Part-II Transverse Strength	
	Part-III Tensile Strength	
	Part-IV Shear Strength	

2	Method of Measurement of Buildings and Civil Engineering works method (Part-IV, Stone masonry)	1200-1976
IV	STEEL	
1	Code of practice for bending and fixing of bars for concrete reinforcement.	2502-1963
2	Specification for cold worked steel Deformed bars for concrete reinforcement.	1786-1985
3	Code of practice for welding of M.S. Bars used for reinforced concrete Construction.	2751-1979
4	Code for practice for use of metal arc welding for general construction in mild steel.	8 8-1950
5	Deformed bars for concrete reinforcement hot rolled mold steel and medium tensile steel (revised)	1139-1966
6	Recommendations for detailing of reinforcement in reinforced concrete works.	5525-1969
7	Specification for Mild steel and medium tensile steel Bars for concrete reinforcement (Part-I)	432-1982
8	Code for practice for safety and health requirement in electric and gas welding and cutting operations.	818-1968
9	Code for practice for fire precautions in welding and cutting operations.	3016-1977
10	Measurement of Building and civil Engineering works, method Part-VIII steel work and iron work.	1200-1993
11	Code of procedure for manual or metal ARC and welding of Mild Steel.	823-1964
12	Specification for filter rods and wires for gas welding.	1278-1972
13	Recommendations for welding cold worked steel bars for reinforced concrete construction.	9417-1989
14	Hard drawn steel wire fabrics for concrete reinforcement.	1566-1982
V	MASONRY	
1	Code of practice for construction of stone masonry Part-I Rubble stone masonry	1597-1992 (Part-I)
2	Code of practice for constructions of stone Masonry Part-II Ashlar masonry	1597-1992 (Part-II)
3	Specification for fly-ash for use as Pozzolana and admixture.	3812-2003 (Part-I)
4	Method of Measurement of building and	1200-1976

	civil engineering works plastering and pointing.	(Part-XII)
VI	<b>BRICK WORK</b>	
1	Code of practice for Brick work	2212-1991
2	Method of measurement of buildings and engineering works	1200-1976(Part-III)
3	Classification of burnt clay solid bricks	3102-1971
VII	Flooring	
1	Code of practice for laying in Situ terrazzo tile floor finish	2114-1984
2	Glazed earth ware wall tiles	777-1988
VIII	<b>CONCRETE</b>	
1	Method of Measurement of building and Civil engineering works Part-II cement concrete works.	1200-1974 (Part-II)
2	Code of practice for plain and reinforcement concrete.	456-2000
3	Specification for Pre-cast concrete coping block.	5751-1984
4	Method of tests for strength of concrete	51601959
5	Code of practice for laying in situ cement concrete lining on canals.	3873-1993
6	Specification for admixtures for concrete	9103-1993
7	Method of Test for autoclaved cellular concrete products.	6441-1972,1973 (Part-1 to IX)
8	Method of Sampling and Analysis of concrete.	1199-1959
9	Specification for Batch type concrete mixtures.	1791-1985
10	General requirements for concrete vibrators immersion type.	2505-1992
11	Specification for concrete vibrating tables.	2514-1963
12	Method of test for permeability of cement mortar and concrete.	3085-1965
13	Specification for flash for use as Pozzolana as admixture for concrete	3812-2003 (Part-I)
14	Specification for Portable swing weigh batch for concrete (single and double bucket type)	2722-1964
15	Code of practice for installation of joints in concrete pavements	6509-1985
16	Code of practice for general construction of plan and reinforced concrete for dams and other massive structures.	457-1957
17	General requirement for concrete vibrator	2506-1985

	screed board type (first revision)	
18	Code of practice for concrete structures for the shortage of liquids.	3370(Part-I-IV)1965-67
19	Code of practice for use of immersion vibrator for consolidating concrete(first revision)	3558-1983
20	Method of testing performance of batch type concrete mixer.	4634-1991
21	Form vibrators for concrete	4656-1968
22	Concrete batching and mixing plant	4925-2004
23	Ready mixed concrete(first revision)	4926-2003
24	Code of practice for sealing joints in concrete lining on canals.	5256-1992
25	Vibrating plate compactor	5889-1993
26	Concrete transit mixer and agitator	7245-1974
27	Concrete stump test apparatus	7320-1974
28	Method of making curing and determining compressive strength of accelerated cured concrete test specimen.	9013-1978
IX	EARTH WORK	
1	Method of Measurement of building and civil engineering works Part-I earth work.	1200-1992 (Part-I)
2	Safety code for piling and other deep foundations.	5121-1972
3	Code of practice for design installation observation and maintenance of uplift pressure pipes for Hydraulic structure on permeable foundation.	6532-1972
4	Safety code for excavation work.	3764-1992
8	Method of test for soils Part-II Determination of water content.	2720-1973 (Part-II)
9	Method test for soils determination of water content Dry density relation using light compaction.	2720-1980 (Part-VII)
10	Method of test for soils determination of dry density of soils in place by the sand replacement method.	2720-1974 (Part-XXVIII)
11	Method of test for soils determination of dry density of soils in place by the core cutter method.	2720-1975 (Part-XXIX)
12	Classification & identification of soils for general engineering purpose(first revision)	1498-1970
13	Safety code for blasting and related drilling operations(with amendment No.1) (reaffirmed 1976)	4081-1986
14	Portable Pneumatic drilling machine(first	5441-1967

	revision)	
15	General requirements for blast hold drilling rigs.	7209-1974
16	Safety code for working with construction machinery.	7293-1974
17	Method of tests of soils (part 1 to X)	2720 Latest
18	Method of load test on soils(second revision)	188-1982
19	Method for standard penetration test for soils(First revision)	2131-1981
20	Glossing of terms and symbolic relating to soil engineering.	2309-1972
21	Method of sampling and preparation of stabilized soils for testing.	4332(Part-I) of 1967
X	OTHER SUBJECTS	
1	Safely code for scaffolds and Ladders Part 1 Scaffolds	3696-1987-91(Part I&II)
2	Safely code for scaffolds and ladders part 2 ladders	3696-1991(Part-II)
3	Recommendations on stacking and storage of construction materials at site.	4082-1996
4	Plywood for general purposes(Second revision Amendment 1 to 3)	303-1989
5	Test sleeves	460-1985(Part I,II &III)
6	Code of practice for under drainage of lined canals(first revision)	4558-1995
7	Code for practice for in situ permeability test.	5529-1985-06 (Part 1 & 2)
8	Structural Steel(standard quality) (with amendment No. 1 to 3)	IS:226-1975
9	Hard drawn steel wires(third revision)	IS-432-1982(Part-II)
10	Concrete pipes (with and without reinforcement) Second revision)	IS:458-2003
11	Code of practice for laying of concrete pipes	IS:783-1985
12	Specification for mild steel types, tubular and other wrought steel fittings Part-1 mild steel tubes(Fourth revision)(with Amendments No. 1 to 5)revision)	IS:1239-1992-04(Part I&II)
13	Hard drawn steel wire fabric for concrete reinforcement(second revision)	IS:1566-1982
14	Structural steel(fusion welding quality)(second revision)	IS:2062-1999
15	Code of practice for laying of cast iron pipes(with amendment No.1)	IS:3114-1994
16	Methods of testing for concrete pipes	IS:3597-1998

17	Centrifugally cast(spun) iron low pressure pipes for water gas and sewage(first revision)	IS:6163-1978
18	Cast iron detachable joints for use with asbestos cement pressure pipes.	IS:8794-1988
XI	STONE PITCHING AND LAUNCHING APRON	
1	Methods of test for determination of strength properties of natural building stones.	IS:1121-1974(Part 1 to 4)
2	Method of test for determination of true specific gravity of natural building stone(first revision)	IS:1122-1974
3	Method of identification of natural building stone(first revision)	IS:1123-1975
4	Method of test for determination of water absorption apparent specific gravity and porosity of natural building stones.(first revision).	IS:1124-1974
5	Method of test for determination of weathering of natural building stones(first revision)	IS-1125-1974
6	Method of test for determination of durability of natural building stones for masonry work(first revision)	IS:1126-1974
7	Recommendations for dimensions and workmanship of natural building stones for masonry work (first revision)	IS:1127-1970
8	Recommendation of dressing of natural building stone(first revision)	IS:1129-1972
9	Sand for plaster(first revision)	IS:1542-1992
10	Code of practice for construction of stone masonry	ISW:1597-1992
11	Rubber stone masonry	IS:1597-1997(Part-I&II)
12	Method for determination of resistance to wear by abrasion of natural building stones(first revision)	IS:1706-1972
13	Sand for masonry mortars(first revision)	IS:2116-1950
14	Code of practice for preparation and use of masonry mortars(first revision)	IS:2250-1981
15	Stone facing	IS:4101-1967(part-IO)
16	Method of test for determination of water transmission rate by capillary action through natural building stones.	IS:4121-1967
17	Method of test for surface softening of natural building stones exposure to acidic atmospheres	IS:4120-1967

18	Method of test for determination of permeability of natural building stones(first revision)	ISL4348-1973
19	Method of test for toughness of natural building stones	IS:5218-1969
20	Gujarat State Section2, Engineering properties of building stones.	IS:7779-1975(Part-1/Sec.2)
21	Recommended practice for quarrying stones for construction purposes.	IS:8881-1978
XII(A)	PIPES AND PIPE LAYINGS:	
1	Centrifugally Cast(spun) Iron pressure pipes For water gas and sewage(second Revision)	1536-2001
2	Cast Iron fittings for pressure pipes for water. Gas and sewage(Second Revision)	1538-1993(part-1-24)
3	Laying cast Iron pipes(3 <sup>rd</sup> Revision)	3114-1994
4	Caulking lead(3 <sup>rd</sup> revision)	782-1978)
5	Mild Steel tubes and other wrought	1239-
6	Steel fitting	Part-I-2004 Part-II-1992
7	Code of Practice for laying of welded Steel Pipes for water supply	5882-1970
8	Anticorrosive to pipes & fittings	1.5-1022
9	Welding of M.S. pipe line	1.5-814-2004
B	FITTINGS;	
1	Full way valves-Check valves	778-1984
2	Self closing taps(2 <sup>nd</sup> revision)N.R.Valves	1711-1984
3	Pillar taps for water supply(2 <sup>nd</sup> Revision_	1795-1982
4	Sluice valves for water works purpose	
5	(Sixth Revision)(50mm to 300mm)	780-1984
6	Installation of sluice valves(Ist Revision)	2685-1971
7	Foot Valves(2 <sup>nd</sup> Revision)	4838-1990
C	PUMPS	
1	Horizontal centrifugal pumps for Water Supply (2 <sup>nd</sup> Revision)	IS:2520-1984
2	Horizontal centrifugal self priming pumps	IS-8418-1999
D	FIRE FIGHTING	
1	Leading valve	IS:5290-1993
2	Hose pipe	IS:492-1954
3	Fire-Hydrant	IS-908-1975
E	PLUMBINGS:	
1	National building code of India-1983 Part-9 Plumbing services sec-1 Water supply	SP-7-2005
2	Handbook on water supply drainage with Special emphasis on plumbing	SP-35-1987
3	Code of Practice for water supply in	2065-1983



	building(second revision)	
4	Code of Practice for Plumbing in multi- Storied building-Part-I-Water supply	12183-1987
F	WHITE/COLOURED GLAZED PORCELAIN PRODUCTS:	
Item	Size	Make
Indian Water closet	580x440x290mm	NEYCER (Vitreous)/PARRY
European Water Closet	100mtx390 depth x 370 width	NEYCER(Vitreous) PARRY WARE(Vitreous)
Wash Hand Basin	550x400x200mm	do
Rectangular		
Wash Hand Basin	470/500 diax200mm	do
Circular		
Standing type lipped	460x380x305mm	Do
Wall Urinal		
Squatting Urinals	600x350x100	Do
Marble Partitions	1000x750x25 to32mm	Of approved quality
Wall Glass Mirror	600x450x5.5mm	Of approved quality NEYCER OR PARRY WARE
White glazed tiles	(30x30,15x15,10x10cm)	As per IS 777-1988
XII	ELECTRICAL INSTALLATION	
1	Low tension air circuit Breakers	IS:2516-1985 Part-I Section-1
2	Switchgear Bus Bars	IS: 375-1963
3	H.R.C Fuse Links	IS:2208-1962
4	Distribution fuse Boards	IS: 2675-1983
5	Faclosures for Low voltage Switchgear	IS: 2147-1962
6	P.V.C. cables	IS: 1554-1988
7	Tabllar fluorescent Lamps for cameral Lighting service.	IS: 32418-1977
8	Tangstone filament lamps for cameral service	IS: 415-2002
9	Ceiling Fans	IS: 374-1979
10	Flood Lights	IS: 1947-1980
11	Wall Glass flame proof Electric light fittings	IS: 2206-1984(Part-I0)

12	Water Tight Electric Light fittings	IS: 3553-1966
13	Steel Boxes for enclosure of Electrical accessories	IS: 5133-1969
14	Fittings for Rigid Steel conduit	IS: 2667-1988
15	Rigid steel circuits for Electrical wiring	IS: 1653-1972
16	Accessories for Rigid Steel conduits for Electrical Wiring	IS: 3837-1976
17	Switch socket Outlets	IS: 3837-1976
18	Three pin plug and socket outlets	IS:1293-2003
19	Switches for domestic and sillier purpose	IS: 3854-1997
20	P.V.C. Wiring	IS:694-1990
21	Call Bell and Buzzers	IS:2268-1994
22	Straight through joint boxes and leads sleeves for paper insulated cable	ETDC0032-1964
23	Earthing	IS:3043-1987
24	Electrical wiring installation	IS;732-1989
25	Switch gear	IS:3072-1975(Part-I_
26	Lighting protection	IS: 2309-1989
27	Public address system	IS: 1887-1985
28	Low tension switch fuse units	IS: 4064-1978
29	Code of practice for automatic fire alarm system	IS: 2189-1999
30	Specification for heats sensitive fire detectors	IS:2175-1988
31	Guide for safty procedure in electrical works	IS:5216-1982
32	Rubber mat for electrical works	IS:5424-1969

In addition to the relevant BIS code, the specification prescribed and guidelines issued by Central Water Commission standard specification shall also be followed, where BIS specification are not available.

(B) Special conditions for construction materials etc.

1. Accuracy of lines, levels and grades.
2. Testing of materials and works.
3. Supply of material.
  - 3.1 Cement.
  - 3.2 Admixtures.

## Special Condition for Construction Material Etc.

### 1.0 Accuracy of lines, levels and grades:

The various works shall be done true to line level and grade. The periodical checking of these by the government staff shall not absolve the contractor of his responsibility regarding the accuracy. In case of any deviation of, discrepancy in line, level or grade at the meeting faces, the contractor shall make good the discrepancy at his own cost and without any extra compensation for the additional work involved. Whenever such discrepancy is found to arise at the junction of works of different contractors, the responsibility to set right such discrepancy lies with the contractor concerned. The engineer shall further have the unquestioned right if need be to rectify the discrepancies and recover the costs from the contractor or contractors according to proportion as they may consider reasonable.

### 2.0 SECURITY MEASURES

In view of the strategic importance of all the projects and installations, security restriction may be imposed by the Engineer as per directions of the security authorities and the contractor shall abide by all such instructions scrupulously. In case, a system of identity cards is introduced, the contractor shall at his cost provide for his persons all such identify cards with photos, if necessary and get those duly signed by the Engineer or his duly authorized representative. The contractor shall also keep the Engineer informed regarding all visitors and obtain proper permits for their visits. No unauthorized visitors will be allowed on work site.

### 3.0 CHANGE IN DESIGN AND DRAWINGS:

3.1 The estimated quantity arrived at in Bill of quantity for various item is on finalized sections. However, the execution of work is to be carried out as per final design, drawing and. sections, approved by Executive Engineer, HCM Division, Lower Chhaker, Shimla as directed by Engineer-in-charge.

3.2 The drawings given with tenders documents are finalized by Executive Engineer, HCM Division, Lower Chhaker, Shimla on present available data. However, during execution of work, any change in design and drawing that may be warranted on account of strata that may be met with or the materials that may be available or any reasons shall not vitiate the contract and no extra payment shall be made to the contractor.

3.3 Any change in gradation and proportion of course or fine aggregate in mix design of the contract shall not entitle the contractor for any claims on this account.

### 4.0 DEWATERING AND DIVERSION AS AND WHERE NEEDED

The rates of all the items in this bid are inclusive of all arrangement for the dewatering & diversion of water, if any during construction in the fair weather as well as in the monsoon during the entire period of construction. No separate payment shall be made for any type of dewatering and diversion works. Any part of earth work, or any other work or materials washed away or damaged during the monsoon or other period and it shall have to be made good by the contractor at his own expense. It is the responsibility of the contractor to make good or repair any Government property, material or work damaged during construction period due to contractor's fault.

## 5.0 Leads & Lifts :

The leads and lifts where it is not specified may be considered as all leads & lifts.

### CHAPTER-C

#### (C) GENERAL TECHNICAL SPECIFICATION FOR MATERIALS:

##### 1.0 GENERAL:

- 1.1 All materials to be used shall conform to the relevant specification as per the latest revision of Indian Standard.
- 1.2 Where reference to any Indian Standard appears in the specifications it shall be taken to mean as a reference to the latest revision of the standard.
- 1.3 Test for materials shall invariably be got carried out by the contractor when the same are specified in the specifications. Test shall also have to be carried out, even though the same are not specifically mentioned in the specifications, if in the opinion of the Engineer in charge, the same are required to be carried out. All such tests shall be got carried out in Government laboratories and cost thereof shall be entirely borne by the Contractor.
- 1.4 No collection of materials shall be made before it is got approved from Engineer in charge.
- 1.5 Collection of approved materials shall be done at site of work in systematic manner. Materials shall be stored in such a manner as to prevent deterioration or intrusion of foreign materials and to ensure the prevention of their quality and fitness for the work.
- 1.6 Material, if rejected by the Engineer in charge, shall be immediately removed from the site of work, if they are not removed within twenty four hours of receiving such intimation, Engineer in charge shall get the same removed at contractor's cost. The Engineer in charge shall dispose off such materials in a manner as he chosen and the Contractors shall not be entitled to any compensation for the cost of such materials.
- 1.7 Approval to the samples of various materials given by the Engineer in charge will not absolve the contractor from the responsibility of replacing the defective material brought on site of materials used in the work found defective at later date. The contractor shall not claim any payment to compensation what so ever on account of any such materials being rejected by Engineer in charge,
- 1.8 The contractor shall be responsible for observing the laws, rules and regulations imposed under the "Minor Mineral Acts" and such other laws and Rules prescribed by the Government from time to time.

## Chapter- D

### 1. Excavation of Foundation

- 1.1.1 All excavations (in foundation) shall be done as per the profile indicated by the Engineer-in charge.
- 1.1.2 Excavations shall be carried out to the required line and levels, widths and depths so that the dimensions of the permanent works shall not be less than what is indicated.
- 1.1.3 The whole of the excavated materials shall be brought to surface and disposed of as directed.
- 1.1.4 Selected and approved excavated stuff required for filling etc. shall be kept separately for reuse as directed.
- 1.1.5 The phasing and method of excavations for all foundations and Earth works shall be to the approval of Engineer in charge.
- 1.1.6 No permanent construction shall be started over the excavated surface until and unless approved by the Engineer in charge.
- 1.1.7 Excavations taken wider or deeper than that required to contain the permanent work shall be filled in at the contractor's expenses. However exceptions may be specially permitted in certain situations as in the case of sand beds etc.
- 1.1.8 Excavations taken wider than required shall be filled back with selected material thoroughly compacted on layers of 150mm thickness.

### 1.2. Site clearance:-

Before the earth work is started, the area coming undercutting and refilling shall be cleared of shrubs, vegetation grass, brushwood trees and saplings of girth upto 30cm measured at a height of 1 m above ground level and such other things, and rubbish removal upto a distance of 50m outside the periphery of the area under clearance. The rate of such site clearance is deemed to be included in the rate of Earth work.

### 1.3. Earth work in excavation in Trenches for foundation.

- 1.3.1 All excavation shall generally be described as 'Excavate' and 'get out'. Getting out shall include throwing of the excavated earth not less than one metre or less than half the depth of excavated trench clear of the edge of

excavation the subsequent disposal of excavated materials shall either be stated as a separate item or included with the item of excavation stating the lead. Foundation Trenches shall be dug to the Exact dimensions as shown in the drawings or as directed by the Engineer-in-charge.

- 1.3.2 The bed of the trenches shall be made level and finned by watering and ramming soft or otherwise defective spots shall be dug out and filled with concrete of same mix as the foundation concrete or as may be directed by the Engineer-in-charge. The cost of such digging out of soft spots and filling with concrete shall be paid extra. If the excavation is done to a depth greater than that shown in the drawings or as requested by the Engineer-in-charge to the excess depth shall be made good, at the cost of contractor, with concrete of the same proportion as specified for foundation concrete. The trenches shall be inspected and passed by the Engineer in charge, before the foundation concrete is laid or any other permanent work erected.
- 1.4** Protection:- Fencing and/or other suitable measures for protection against risk of accident due to open execution shall be provided, at contractor's cost.
- 1.5** Excavation in disintegrated rock or soft rock in trenches for foundations.
- 1.5.1** Excavation in disintegrated or soft rock shall be carried out by crow bars, pickaxes or pneumatic drills or another suitable means, Blasting operations are not generally successful in this case. If the contractor desires to resort to, blasting he can do so, with the permission of Engineer in charge , but nothing extra shall be paid to his.
- 1.6** Excavation in hard rock in trenches for foundation.
- 1.6.1** Excavation in hard rock shall be done by chiseling only, where blasting operations are prohibited or are not practicable. In trenches and drains, where blasting is not otherwise prohibited the excavation in hard rock shall be carried out by blasting in the first instance and finally by chiseling so as to obtain the correct section of trench as per drawings.
- 1.7** Filling excavated earth in foundation trenches and plinth or under floors.
- 1.7.1** Earth used for filling shall be free from salts, organic or other foreign matter. All clods of earth shall be broken or removed.
- 1.7.2** Filling sides of trenches.  
As soon as the work in foundation has been completed and measured, the sides of foundation shall be cleared of all debris, brick bats, mortar droppings etc. and filled with earth in layers not exceeding 20cm. Each layer shall be adequately watered, rammed and consolidated before the succeeding one is laid. Earth shall be rammed with Iron rammers where feasible and with the butt ends crowbars where rammer can not be used.
- 1.7.3** Plinth Filling: Filling under floors.  
The plinth shall be similarly filled with earth layers not exceeding 20cm adequately watered and consolidated by ramming with iron or wooden rammers. When filling reaches the finished level, the surface shall be flooded with water for atleast 24 hours, allowed to dry and then rammed

and consolidated in order to avoid any settlement at later stage. The finished level of filling shall be kept to slope intended to be given to the floor- Sand shall be clean and free from organic and other foreign matter.

Sand filling shall be done in manner similar to earth filling in plinth. The surface of the consolidated and shall be dressed to required level and lope. Concreting of floor shall not be started till the engineer in charge has inspected and approved the filling.

### 3. BRICK WORK

#### 3.1 Laying

- 3.1.1 Brick used for masonry in cement mortar shall be thoroughly soaked in clean water for atleast an your immediately before use. (The absence of buddling when the soaked brick is immersed in water is the test for through soaking). The soaked bricks shall be kept on a platform free from dirt, mud or any foreign element. Bricks shall be laid in English bond with frogs upward normally. Half or cut bricks shall not be used except for closes which may be required to complete the bond. It shall be ensured that horizontal and vertical bonds are completely filled with mortars without any void in brick work.
- 3.1.2 Brick work shall be raised truly plum. All courses shall be laid truly horizontal. Vertical joints shall be truly vertical and those in alternate courses shall be in the same vertical line. The thickness of brick courses shall be uniform(slight difference in the dimension of bricks being adjusted in joint thickness). The levels of window sills, soffit levels of lintels and such other levels shall be kept as shown in the drawing or otherwise specified and courses shall be so adjusted as to get complete number of courses upto these levels.
- 3.1.3 In case of one brick thick or half brick thick wall at least one face should be kept smooth and plane even if the other side is slightly rough (due to variation in size of bricks). In case of walls of thickness greater than that of one brick both the sides shall be smooth and plane.
- 3.1.4 All connected brick work shall be raised uniformly and no portion of brick work shall be left more than one metre below the rest of work. Where this is not possible the work shall be raked back according to the bond(and not left toothed) at an angle no9 steeper than 45.
- 3.1.5 All iron fixtures, pipe outlets of water, hold fasts of doors and windows etc. which are required to be built in wall shall be embedded in cement mortar or in cement concrete as specified in their correct position as the brick work is raised.(Such cement concrete shall be paid for separately by nothing extra shall be paid for cement mortar used for embedding the fixtures.

#### 3.2.0 JOINTS:

- 3.2.1 The face joints shall be raked to a minimum depth of 15mm by raking tool during the progress of the work, while the mortar is still green so as to provide proper key for the

plaster or to facilitate pointing to be done at a later date. When plaster or pointing is not required to be done, the joints shall be struck flush and finished side by side with the laying of brick work.

3.2.2 The face of brick work shall be cleared on the same day it is laid and all mortar droppings removed.

3.3.0 Protection and curing:

3.3.1 Green work shall be protected from rain by suitable covering. Masonry in cement mortar shall be kept constantly moist over all the faces for minimum period of 7 days. The top of the masonry work shall be left flooded at the close of the day.

3.4.0 Scaffolding:-

3.4.1 For exposed brick work double scaffolding having two sets of vertical supports shall be provided. Only minimum no. of holes shall be formed by omitting a header brick shall be left in brick work for supporting horizontal scaffolding poles. No holes shall be permitted in pillars under one metre width or near the skew back of arches. The holes left in masonry shall be made good by fixing full bricks into the holes before plastering. The scaffolding shall be strong and shall be maintained during construction.

3.5 Measurement:

3.5.1 All brick work shall be measured net, in decimal system as fixed in its place subject to tolerance mentioned below. Any work done extra over the specified dimension shall be ignored.

3.5.2 Dimension shall be measured corrected upto 0.02metres. areas shall be worked out correct to .01Sq. metres. Volume shall be worked out correct upto .02cubic metre.

3.5.3 The thickness of brick walls upto and including 75cm thickness shall however be measured in multiples of half brick viz

(a) For brick work with modular brick it shall be multiples of 10cm.

(b) For brick work with conventional FPS bricks it shall be multiples of 11.2cm.

(c) For brick works with FPS large size bricks it shall be multiples of 12.5cm.

Beyond 75cm. Thickness actual thickness of wall shall be measured.

3.5.4 For any reason the thickness of wall is required to be a specific thickness not being a simple multiple of half brick, the thickness of wall shall be taken as next higher multiple of half brick thickness, provided that the actual thickness exceeds such multiples of half brick by more than 2cm. In the later case actual specified thickness shall be measured.

3.5.5 Wall of half brick thickness or less shall be described as half brick wall stating its thickness and measured separately IN SQUARE METRES. The following shall be taken as half brick measurement.

For bricks 19x9x9cm 10cm

For bricks 9"x4,4/8"x2,3/4" 4,1/2" or 11.5cm.

For bricks 10"x4,7/8"x3" 5" or 12.5cm.

3.5.6 Corbels stringcourses, projecting pilasters, aprons, sills, cornices, drip courses and other



- projections etc. shall be fully described starting dimensions of each and measured in running meters.
- 3.5.7 Reinforced brick work shall be kept separate from plain brick work reinforcement shall be measured separately unless specifically included in item of brick work as in the case of half brick masonry wall with reinforcement.  
Brickwork in the following situation shall be measured separately.
- a) between foundation level and plinth level.
  - b) Between plinth level and floor two level but no exceeding a height of 3m from plinth level.
  - c) Between floor two level to floor three level (but not exceeding a height of 6m from plinth level) and so on.
- Brickwork in parapet shall be included in the corresponding masonry item of the storey immediately below the floor above which the parapet is built.
- 3.5.8 No deductions shall be made from the quantity of a brick work, not any extra payment made for embedding in masonry of making holes in respect of the following items.
- (i) Ends of joists, beams, rafters, purlins corbel steps etc whose cross sectional area does not exceed 500 sqm.
  - (ii) Opening not exceeding 1000sqcm.
  - (iii) Wall plates and bed plates, bearing of slabs chajjas and the likes, whose thickness does not exceed 10cm and bearing does not exceed to the full thickness of wall.
  - (iv) Drainage holes and recesses for cement concrete Blocks to embedded holdfasts for doors and windows.
  - (v) Iron fixtures, pipe upto 300mm dia, hold fasts for doors and windows built into masonry.
- 3.5.9 Half Brick masonry: work shall be measured in square meters.  
Moulding and cornices. The sectional periphery of mouldings and cornices shall be measured in centimeters along the curve (excluding the portion in contact with the wall). The length shall be measured in meters. The unit for payment shall be per cm of periphery by meter length of mouldings and cornices measured as above.
- 3.5.10 Work in foundation and plinth.  
For purpose of measurement of masonry work in foundation and plinths shall be determined as follows.
- (i) For Building- Masonry work below ground floor (floor-1) level or 1.20m above found level whichever is lower.
  - (ii) For abutments piers and retaining walls of culverts, bridges walls of water reservoirs and basements entire masonry work shall be considered as work in foundation and plinth.
- 3.5.11 Work in superstructure:  
For Building-Masonry work above found floor level or above 1.20m level above found whichever is lower.  
The Rate for Brick work- general shall include the following operations also.
- (i) Fair face of brick work with bricks selected from the lot.
  - (ii) Raking out joints, for plastering or pointing does as a separate item, or finishing joints flush as the work proceeds.
  - (iii) Preparing tops and sides of existing walls for raising and extending.
  - (iv) Rough cutting and waste for forming gables cores, sker backs and all rough

cuttings unless otherwise specified.

At least on set of tools comprising of wooden straight edge, mason's spirit level, square half meter rule, line and pins, string and plumb line shall be available for each group of three masons working on a job for regular checking as the work progress.

Following Indian Standards shall be follows.

1. Code of practice for brick work IS 2212-1962
2. Methods of measurements of Civil Engg. Works-Brick works. IS1200 (Part-III)-1976
3. Classification of Brunt clay solid bricks. IS 3102-1971

#### 4 GENERAL TECHNICAL SPECIFICATION FOR MATERIALS FOR STONE MASONRY WORK :

##### 4.0 STONE QUALITY ;

- 4.1 All stones to be used on the works under these specifications shall be obtained from quarries approved by the Engineer and shall be of sound, hard, durable quality, free from veins, flows, cracks, earth-cover, zeolite, etc. stone with permissible stained surface shall be allowed in the masonry. Such stains shall mean oxide coatings which can be washed off or removed by wet scrubbing.

Weathered skin maximum up to 1/16" thickness shall be allowed on only one face of stones which shall not more than 33% of total number of stones used in the masonry. Such stones with skins on one face shall be stacked separately. The water absorption of stone should not exceed 5% as specified in 1.8. Code No. 1124 (1974) after being kept under water for 24 hrs.

- 4.2 The contractor shall also be allowed to use the stones obtained from excavation for which the engineer may direct and approve of. The contractor shall pay to the Govt. for such stones at Rs.153.64 (Rs. One hundred Fifty Three & Paisa Sixty Four only) per cum. based on gross stack measurements. The selection and sorting shall be done according to the direction of the engineer, free of charge by the contractor.

##### 4.3 STONE SIZE:

The dimensions of the stones to be used shall not be less than 15 cm on any face. No stone shall weight less than 25 kg. Stones and spauls shall be stacked separately as directed by the engineer- in- charge, percentage of spauls shall not exceed more than 10% of the volume of stone masonry. Item No. shall be seen that spauls are not concentrated at one place only.

##### 4.4 SAND:

- 4.4.1 The sand shall be as per Para 1.4 Section-2).

#### 4.5 CEMENT:

Cement shall be as per Para 1.1 of Section-1)

#### 4.6 MORTAR:

4.6.1 The cement mortar shall be obtained by thoroughly mixing cement, sand and water in mechanically operated mixer in the required proportion by weight batching.

#### 4.6.2 SPECIFICATION FOR INGRADIENTS:

The ingredient going to form the finished product of mortar shall comply individually with the specifications separately laid down in details for each of time as per I.S.

#### 4.6.3 PROPORTION OF INGRADIENTS:

Mortar shall consist of the cement and sand in the proportion as specified by weight. Weight batching alone would be permitted. Suitable weight scale of required capacity and measuring steel boxes, with adjustable bottom shall be used in weighing sand corresponding to the weight of cement as approved by the Engineer. However, the Engineer - in - charge may allow volume batching after conversion depending upon the circumstances for unavoidable locations of work. 10% stock of the cement bags on site will be weighed on the weight scale in advance and any short fall in the standard weight of 50 kg. is found, all the stock on site shall be weighed and short fall shall be corrected suitably by addition of the cement by the contractor in each bag after such weighing at free of cost.

#### 4.7 MIXING:

4.7.1 The mortar shall be mixed in a suitable type of mixer required for the job. The use of same mixer for mixing different proportion of mortar consecutively shall be avoided. The first batch of mortar at the commencement of work shall be made richer by adding of extra cement over and above that required for the batch of particular mix. Mixing time shall commensurate with the R.P.M. and capacity of mixer used as per I.S. 2250 - 1981.

4.7.2 Mixing shall be continued till proper mix is done as desired and minimum mixing time shall be as specified in the I.S. 8605-1977.

4.7.3 Over mixing is objectionable because the grinding action increases fineness which required more water to maintain consistency of mortar. Also over mixing may drive out entertained air, it is recommended that mixing time should not exceed, three times the normal times. Engineer's decision regarding normal time for particular mixer shall be final and binding to the contractor. Mixing equipment should be so designed that mixing can be discontinued and resumed with a full load in the mixer.

4.7.4 In mixing following points shall be carefully attended to :

- i. The ingredients are fed into mixer simultaneously.
- ii Five to ten percent of the total quantity of water required for mixing, shall be introduced before the other ingredients and there after all dry ingredients shall be simultaneously

rebounded in to the mixer in such a manners that the period of flow of each ingredient is about the same. Eighty to ninety percent of the total quantity of water required for mixing shall be added along with the dry ingredient. The remaining quantity of water shall be added after all the ingredients are in the mixer. Addition of water must be made by mechanical devise with calibrations attached to each mixer or as directed by the engineer - in - charge.

- iii In order to obtain the required workability during construction, water cement ratio and to other proportion of mix shall be changed as desired by the Engineer - in - charge.

#### TIME OF USE:

- 1.8.1 Mortar shall be used in masonry within 30 minutes from the time of adding water. Wherever mixing is done at higher elevation chutes formed of plain G.I. sheets shall be provided. Inclination of the chute should be so adjusted that segregation does not take places. Baffles and hoppers shall be washed and cleans as and when necessary.

#### 4.9 COMPRESSIVE STRENGTH.

- 4.9.1 At least one set of test cubes of every 100 Cum. of masonry laid or for part of it per day shift per mixer shall be taken. The set of test cubes shall consist of 3 cubes each for crushing strength at 7 days & 28 days.

- 4.9.2 The strength of the test cubes 5cm x 5cm x 5cm shall be examined as under:

Preliminary mortar cubes for testing from the design mortar mix at suitable intervals using the approved material will be cast in the laboratory and their strength find out. These strengths will be deemed as the standard strength for the mortar. The compressive strength of the preliminary test cubes cast in laboratory should be such 80% strength of the test results of these preliminary cubes at 28 days will not be less that the strength required for that mix, as per I.S. 8505-1977 and I.S. 2250-1981. In the filed mortar cubes, the compressive strength should not less than 80% of the above compressive strength of preliminary test cubes at 28 days. However, the strength of test cubes at 7 days shall be taken into consideration to watch the gain in the strength of mortar with respect to time. Here the comparison of test cube strength shall be with respect to the standard strength obtained for the age in the laboratory. All laboratory testing work be carried by the department as per relevant Indian standards and contractor will be permitted to watch tests, if he so desire. The cost of testing shall be governed by the contractor.

- 4.9.3 In case the results fail to fulfill the above strength requirements, the respective portion of the work shall be got removed and redone by the contractor at his own cost as directed by the Engineer-in-charge. If it is impossible to remove the sub standard work as per prevailing circumstances, the rate for such class of work shall be reduced suitably by the Engineer-in-charge which shall be binding on the contractor.

- 4.10 Preliminary tests to be carried out in advance.

- 4.10.1 Preliminary tests for mortar shall be carried out in laboratory. Results of experiments (if any) so far carried out in this connection can be seen from the Executive Engineer-in-charge of the project. The department is in no way bound for any conclusions that may be drawn by the contractor from a study of these results.

## .11. MASONRY (GENERAL)

4 :11.1 Masonry shall to be done as per approved working design. The work shall be done square, plumb, curved or batter as may be required to meet the design requirements and shall be carried out in a workman like manner with the aid of moulds, templates, centering scaffolding etc. preparing of masonry on all the faces of masonry is also includes in work without any extra cost.

4.11.2 All stones, chips etc. shall be cleaned and shall be free from dust or mud to ensure bond with mortar and shall be wetted before being laid for this purpose the stones that are immediately to be used shall be kept sprinkled with good clean water. There shall be adequate collection of stones and spauls within the reach of each mason to enable proper selections of stones for the individual locations, while laying and the stones shall be continuously replenished.

### 4.11.3 MODE OF LAYING:

The stone shall be laid carefully in mortar on their natural flat bed so as to break joints as much as possible. The stone shall be pressed and hammered down by a mallet so as to bring out all excess water and locked air, from mortar insides and beds. If it is required to move stones after it is placed in position it shall be lifted clearly and then placed. No joints shall exceed 20mm in thickness not shall it be less than 12 mm in thickness. The joint shall be filled well with mortar and suitable chips and spauls driven into them so as to avoid thick beds of joints. The smaller stones used in the filling shall be carefully selected to fit smoothly into the interstices between the longer ones. Mortar to be added to the intervening places be well worked by trowels and the light hand bar 12 mm dia and sufficiently long to assure proper mixing and blending with the bottom mortar. Care shall be taken to see that joints in masonry already laid are not disturbed. While handling or moving stones. The masonry surfaces shall be kept as rough as possible to secure a good bond between successive layers and shall be wire brushed on the next day to remove all excess mortar etc.

4.11.4 Limit on height or masonry to be done in a day.No fresh course shall be laid over masonry previously laid before 24 hours of the laying. The maximum height of masonry allowed to be constructed at a time shall be 0.6 mt in one or more layers. Thickness of each layer of masonry shall not be more than 20 cm. average.

4.11.5 Masonry surfaces which remained exposed for more than 28 days due to delays in construction or any other reasons shall be prepared in the same manner as the rock foundation after racking the mortar joints to a depth of 15mm including applying cement slurry as mentioned. except that only 1<sup>st</sup> layer of masonry should be done in rich mortar.

### 4.12 Precautions to obtain dense masonry.

In order to obtain dense masonry, the following precautions shall be taken.

- (i) Under pinning shall be avoided once a stone is laid as it tends to lift the stones and create the air pockets.
- (ii) Insertion of spauls and chips in the intervening space before filling in with mortar shall not be permitted.
- (iii) Leveling of masonry on the top of the course by use of spauls and chips shall not be permitted. All chips will be driven as embedly which will help to squeeze and compact at the joints.

#### 4.13 GENERAL RULES FOR BETTER WORKMANSHIP

4.13.1 General rules for better workmanship will be as under. Decision of Engineer-in-charge will however be final.

- (i) Clean the previous days masonry surface by wire brush prior to starting masonry. Chipping should be resorted to only in extreme cases.
- (ii) Do not place mortar which bleeds excessively.
- (iii) Thoroughly and efficiently broom into the old surface a layer of mortar and build the masonry course on it immediately.
- (IV) Shakes the mortar well by vibrating the stone by hand bar to ensure that the excess mortar water and the entrapped air come out and are not trapped at the bottom before driving in chips. The stones shall then be hammered down by a wooden mallet (10 to 12% lbs.) or as directed in weight and press towards the adjacent stones at the same time without touching it.
- (V) Inadequate supply of spalls in different sizes would lead to excessive use of mortar.
- (vi) Avoid under pinning. After a stone is laid as it tends to lift the stones and leave air pockets etc.
- (vii) Keep the masonry surface as rough as possible to secure good bond between successive layers.
- (viii) After the masonry is done once, do not permit it to be disturbed until it has attained sufficient strength to withstand traffic and omit the initial clean up consisting of cutting the surface layer and exposing a clean surface before the final set is attained. Hammering or breaking of stone on fresh masonry shall not be permitted.
- (ix) Wire brush the masonry surface after the mortar has set finally after 8-12 hrs. to remove all laitance excess mortar etc. Too much delay may lead to difficulty in cleaning as mortar sets with time.
- (x) Keep the surface continuously moist until the next layer is placed after the necessary time interval. Layers and the exposed surface shall be kept moist for a period up to 21 days as per I.S. 8605-1977.
- (xi) Notwithstanding about general rules, the instructions for attaining better workmanship, issued by the authorities from time to time during the execution of the work in different stages, shall be attended to by the contractor without any extra claim.

#### 4 QUANTITY OF MORTAR:

4.14.1 Full efforts shall be put into ensure that sufficient quantity of *mortar* is used in the masonry. The quantity of mortar used shall be not less than 40% and not more than 48 percent by volumes of the masonry laid.

#### 4.15 CURING OF MASONRY:

4.15.1 All masonry, as in progress, shall be kept well watered on the top and sides and both the faces for a period of not less than 21 days from the date of building. At the close of the days work or for other period of recess of work, the top of all masonry is to be kept well watered. The masonry shall be kept moist during the period of initial and final setting of mortar. Curing by way of ponding shall be started only after the period of final set of mortar.

#### 4.16 WEAK OF DEFECTIVE MASONRY:

4.16.1 Any portion of masonry found to be weak or defective in construction, shall be removed and rebuilt by the contractor at his own cost. As a alternative and at the discretion of the engineer such masonry shall be sufficiently grouted by the contractor at his cost in a manner specified by the engineer in his entire satisfaction.

#### 4.17 SCAFFOLDING:

4.17.1 The cost of providing and maintaining scaffolding required for the work shall be considered to have been included in the rates quoted for the item of masonry.

#### 4.18 WORK DAMAGE DUE TO FLOODS GOVT. IS NOT RESPONSIBLE:

4.18.1 When restarting the work of masonry after monsoon, the surface of all masonry work shall be cleaned thoroughly as specified in Para above by racking out joints to depth as directed by engineer. All loose and doubtful patches of masonry shall be removed. Damages done to masonry by floods passing over the work shall be set right by the contractor at his own cost and extra claims shall be entertained in this account.

#### 4.19 FACE WORK FOR CONTRACTION JOINT:

4.19.1 The face of contraction joints shall be formed by plastering over one of the face with 20mm thick cement sand plaster of proportion 1:3 by weight. The plastered surface for this purpose the construction of the masonry block with plastered face shall be so planned as to be higher than the adjacent face at least 1.0 m to 1.20 m. The plaster of cement and sand mortar (1 :3) shall be applied as per the detailed specification under section V(I). The work of such plaster construction joints is to be paid separately as per respective tender item.

#### 4.20 U.C.R. MASONRY:

##### 4.20.1 DRESSING OF STONES:

The stones shall be set in the work received from quarry after knocking off weak corners and edges with a massive hammer and after cleaning scales of foreign matter if any. For information of the contractor, it may be stated that suitable stones quarries are available as shown on respective drawing.

4.20.2 For ensuring good bond masonry shall be constructed uneven at the top.

##### 4.21 BOND STONES:

For good bond stones having a tail of not less than 0.45 m (1.6") shall be used at the rate of one no per square meter of the face work except where the header stones themselves tail into masonry more than 5 to 20 cm.

##### 4.22 JOINTS:

The joints in the face work shall not be more than 20 mm and the stones shall be arranged to break joint as much as possible. Long vertical lines of joints shall be avoided.

#### 4.23 POINTING:

- 4.23.1 All pointing shall be done with cement sand mortar of (1 :2) proportion by weight. The sand to be used shall be fine. It shall pass through A.S.T.M. mesh or 120 I.S.S. mesh. The sand shall conform in all other respects to specifications under relevant Para 1.05, 1.06 and 1.07 above.

#### 4.24 RACKING JOINTS:

The racking of joints in masonry to be carried out for pointing for a minimum depth of 20 mm. within 24 hours when mortar is firm but not set. The refilling and pointing shall be done as early as possible so as to ensure good adhesion between the two mortars.

#### 4.25 CLEANING THE JOINTS:

Before starting to pointing the racked joints shall be thoroughly cleaned off dirt, dust or any loose cement mortar & shall be washed properly & thoroughly wetted.

#### 4.26 FILLING JOINTS:

The joints shall be filled with cement sand mortar of (1:2) prop. (by weight) as specified above which shall be thoroughly pressed by trowel and caulked into joints. The mix shall be neither too dry nor too wet when used. The mortar shall have just enough water to stick together on being moulded into a ball by light pressures of hand but not too much as to exclude free water when so pressed. Pointing shall be carried out as rapidly as possible and shall not be touched again after the mortar has once started to set.

### 5. PLASTERING AND POINTING

#### 5.0 Plastering with cement mortar.

##### 5.1.0 Sequence of operations.

- 5.1.1 General:- For external plaster, the plastering operation shall be started from top floor and carried downwards. For internal plaster, the plastering operations may be started whenever the building frame and cladding work are ready and the temporary supports of the ceiling resting on wall or floor have been removed.

The surfaces to be plastered shall first be prepared. The surfaces shall be thoroughly cleaned of all dirt, dust, mortar droppings and other foreign matters.

##### 5.2.0 Application of plaster.

- 5.2.1 One coat plaster work- The plaster about 15cm x15cm shall be first applied, horizontally and vertically not more than 2m intervals over the entire surface to serve as gauges. The surfaces of these gauged areas shall be truly in the plane of the finished plaster surface. The mortar then shall be laid on the wall between the gauges with trowel. The mortar shall be applied in a uniform surface slightly more than the specified thickness and then brought to the true surface by working a wooden straightedge reaching across the gauges with small upward and side ways movements at a time. Finally the surface shall be finished off true with a trowel or wooden float according as a smooth or sandy granular texture is required. Excessive troweling or overworking the float shall be avoided. All corners, arrises, angles and junctions shall be truly vertical or horizontal as the



case may be and shall be carefully finished, rounding or chamfering corners, arrises, junctions etc. shall be corned out with proper templates to the size required.

In suspending the work at the end of the day, the plaster shall be left, out clean to line both horizontally and vertically. When recommencing the plastering, the edge of the old work shall be scraped clean and wetted before the plaster is applied to the adjacent areas to enable the two to join together. Plastering work shall be closed at the end of the day on the body of the wall and nearer than 15cm to any corners or arrises. It shall not be closed on the body of features such as plaster ,bands, cornices nor at the corners or arrises. Horizontal joints in plaster works shall not also occur on parapet tops and copings as these are invariably lead to leakages. No portion of the surface shall be left out initially to be patched up later on.

Cement plaster shall be used within half an hour after addition of water. Any mortar or plaster which is partially set shall be rejected and removed forthwith from the site.

#### 5.2.0 Curing:

This shall be started 24 hours after finishing the plaster. The plaster shall be kept damp continually for a period of 7 days soaking of walls shall be avoided and only as much water as can be readily boobed shall be used. Excessive evaporation on the sunny or wind ward sides of the buildings in hot air weather shall be prevented by hanging mattings or gunny bags on the outside of the plaster and keeping them wet.

#### 5.3 Cement Mortar.

5.3.1 Proportioning:- Cement mortar for plastering shall be prepared by mixing cement and sand in specified proportion. It convenient to take the amount of measurement for cement as a bag of cement weighing 50 Kgs. And this shall be taken as 0.035 cum. Sand in specified proportion shall be measured in boxes of suitable sizes(40x35x25). It shall be measured on the basis of its dry volume. In case of damp sand its quantity shall be increased suitably to allow for bulkage. Following table gives the relation between the moisture content and percentage of bulking which may be used a guide.

<u>Moisture content</u> % by weight	<u>Bulking percent</u> (Volume)
2	15
3	20
4	25
5	30

Dry and saturated sands almost have the same volume.

5.3.2 Mixing: The mixing of mortars shall be done in Mechanical mixer. The engineer in charge may however, release, the condition at his discretion taking into account the nature, magnitude and location of the work, Practicability of the use of these machines etc. or where items involving small quantities are to be done or if in his opinion, the use of these mixers is not otherwise feasible. In case, where mixers are not to be used, the contract shall take prior permission of the Engineer in charge.

#### 5.3.3 (a) Mixing by mech. mixer:

Cement and sand in the specified proportion shall be fed into the mixer and mixed thoroughly in the mixer. Water shall then be added gradually and wet mixing continued

at least minutes after the addition of water. Care shall be taken not to add more water than that which shall bring the mortar to consistency of a stiff paste. Only that quantity of mortar that can be used which in 30 minutes of its mixing shall be prepared at any time. When mixing is stopped, the stages of the machine shall be cleaned each time.

- 5.3.4 (b) Hand Mixing: The requisite and measured quantity of sand shall be leveled on clean water tight masonry platform and cement bags emptied on top. The cement and sand shall be thoroughly mixed dry to a homogeneous mixture of uniform colour by using turned over and over, backwards and forward several times.
- 5.3.5 Retampering of mortar: In case of mortar using cement, the mortar that has stiffened because of evaporation of water from the mortar, may be retampered by adding water as frequently as needed to restore the requirement of consistency but this retampering shall be permitted only up to two hours from the time of addition of cement.
- 5.3.6 Mortars not formed in accordance with the specification above or laying unused after the periods as mentioned above, or found partly set or dried or otherwise spoilt shall be rejected and removed from site of work at the contractor's risk and cost.
- 5.3.7 For opening having door frames equal to or projecting beyond the thickness of the wall, full deductions for opening shall be made for each plastered face of wall. In case of openings of area above 3sqm. Each, deductions shall be made for opening but jambs and still shall be measured.  
Plastering on ceilings and walls shall be measured separately.

Ceiling plasters shall be measured under the following classifications.

- a) These shall be measured between the walls or partitions and dimensions before plastering shall be taken.
  - b) Ceiling at a height greater than 5m shall be so described and shall be measured separately stating the height in stages of 1m or part thereof.
  - c) Ceiling with projected beams shall be measured over beams and plastered side of beam shall be measured and added to plastering on ceiling.
  - d) Soffits of stairs shall be measured as plastering on ceilings.
  - e) Ribs and mouldings on ceilings shall be measured as for cornices, deductions being made from the plastering on ceiling in case of width/girth of the mouldings exceed 150mm.
- 5.4 Measurements and Rates.
- 5.4.1 Preparation of background i.e. cleaning of masonry/concrete surface of all dust, loose mortar dropping, traces of algae, efflorescence and other foreign matters and roughening by wire brushing or hacking, as may be required unless otherwise stated is included in the items and shall not be measured and paid for Raking out of joints and trimming off projections on brick/concrete surface before plastering where necessary shall not be measured and paid for separately.
- 5.4.2 All plastering shall be measured in square metres unless otherwise specified. Length, breadth and height shall be measured correct to 0.01meters.
- 5.4.3 Thickness of plaster shall be exclusive of thickness of the key i.e. grooves or open joints in brickwork, stone work etc. or space between laths. Thickness of plaster shall be measured the minimum thickness at any point on a surface. Dubbing out shall not be measured and paid for in the case of

new work not for rough surfaces of old brick/ stone masonry where the face is in plumb as the rates for plastering includes for the necessary dubbing to such surfaces.

The measurement of wall plastering shall be taken the walls or partitions(dimensions before plastering being taken) for length and from the top of floor of skirting to ceiling for height.

**a)** 300mm or below in width/girth in running meters.

**b)** Width/girth above 300mm in square meters.

Plastering at a height greater than 10 meters above the ground/datum level shall be measured separately in stages of 5 meters height except interior plastering in case of building which shall be measured for each storey.

Soffits of stairs shall be measured as plastering on ceilings.

A co-efficient of 1.63 shall be adopted for the measurement one side plastering on honey comb brick having 6cmx10cm opening.

Sides of plasters, projections etc. shall be added to plaster on walls.

Mouldings, architraves, ceiling ribs cornices and the like, on plasters and around openings etc shall be measured separately. Length shall be measured at the centre of girth. Girth shall be measured along curve of moulding.

#### 5.5 Deductions:

For jambs, soffits, sills, for opening not exceeding 0.5 sqm. Each in area for ends of joints, beams, posts, girders, steps etc. not exceeding 0.5sqm. each in area and for opening exceeding 0.5sqm. and not exceeding 3 sqm. In each area, deductions shall be made in the following manner.

- a)** No deduction shall be made for ends of joints, beams, posts etc. and opening not exceeding 0.5sqm. each and no addition shall be made for reveals, jambs, soffits, sills etc. for these openings nor for finish to plaster around ends of joists, beams posts etc.
- b)** Deductions for opening exceeding 0.5sqm. But not exceeding 3 sqm. Each shall be made as follows and no addition shall be made for reveals, jambs, soffits, sills etc. of these openings.
  - 1.** When both faces of wall area plastered with same plaster, deductions shall be made for one face only.
  - 2.** When two faces of wall are plastered with different types of plaster or if one face is plastered and other pointed, deductions shall be made from the plaster or pointing on the side of frame for door, window etc. on which width of reveals is less than that on other side but no deduction shall be made on the other side. Where widths of reveals on both faces of wall are equal, deduction of 50% of area of opening on each face shall be made from areas of plaster and/or pointing as the case may be.
  - 3.** When only one face is plastered and other face is not, full deductions shall be made from plaster if the width of reveal on plastered side is less than the on unplastered. Side but if width of reveal on both sides are equal or width of reveal on un plastered side is more no deductions shall be made.

## 6. FLOORING:

### 6.1.0 Cement concrete Flooring

Or

### Artificial Stone Flooring (A.S. Flooring)

6.1.1 Material: Cement concrete of specified mix/portion shall be used and shall generally conform to the specification given under cement concrete work.

6.1.2: Workmanship: The flooring shall be laid on concrete sub grade (Gleam concrete) where so provided. The sub grade in some work are also specified as 1-Cm. dry rammed khoa. The slopes of floors in places like verandah, kitchen baths water closets and courtly and shall be provided with adequate slopes for proper drainage of washings and rain water. Where sub grade is not provided earth below shall be properly sloped, gathered rammed and consolidated. Before laying the flooring. It shall be moistened.

If the sub-grade is lean concrete, the flooring shall be commenced within 48 hrs. of laying of the laying the sub-grade, falling which the surface of the sub-grade shall be roughened with steel wire brushes without disturbing the concrete, wetted and smeared with a coat of cement slurry at 2.75Kg. of cement per square metre so as to give a good bond between sub-grade and flooring.

Plinth masonry offsets shall be depressed so as to allow the sub-grade concrete to rest on it.

If the cement concrete flooring is to be laid directly on the RCC slab the surface of RCC slab shall be roughened with brushes, which concrete is agree. This shall be done carefully without disturbing the concrete.

A large unbroken areas of cement concrete are liable to create, it is advisable to divide the Floor either into strips or into square or rectangles called panels.

6.1.3. Panels: Flooring of specified thickness (25mm) shall be laid in accordance with approved pattern or as directed by the Engineer-in-Charge. The border shall have a mitered joints at corners of the room and intermediate joints shall be in straight line with the panel joints. The Panels shall be uniform in size length of panel shall not exceed ½ times its breadth. Alternate panels shall be laid on different lays.

6.1.4 Finishing : Finishing operations shall start shortly after cessation of beating the laid concrete and shall be spread over a period of one to six hours depending upon the temperature and atmospheric condition. The surface shall be left for sometime till moisture disappears from it. Use of dry cement or concrete and sand mixtures sprinkled on the surface to stiffen the concrete or absorb excessive moisture shall not be permitted.

Fresh quantity of cement of 2.2Kg. per Sqm. Of flooring shall be mixed with water to form a thick slurry and spread over the surface while the concrete is still green. The cement slurry then the properly pressed twice by means of Iron Floats, once when the slurry is applied and second time when cement starts setting and finished floated smooth. Floor finish over ramps stairs and other similar situations specially they are liable to get wet shall be finished in chequed pattern to make them non slip.

The junctions of floors with wall plaster, date oil skirting shall be rounded no where so required to 25mm radius.

- 6.1.5 Curing: After 24 hours of laying of concrete, the surface shall be cured by flooring water upto 25mm depth by cooling there with wet absorbent. The curing shall be done for 7 days, unless other wise specified.
- 6.1.6 Precautions: Flooring Lavatories and bath rooms shall be laid after of water closed and squatting pairs and floor traps which shall be plugged, while laying the floors and opened after the floors are complete. Any damage done to water supply and sanitary fittings during execution of work shall be made good.

No concrete shall be laid within half an hour of the closing time of the day, unless permitted by the Engineer-in-Charge.

- 6.1.7 Measurement: Flooring shall be measured as laid in square metre correct to two places of decimal. For length and breath dimension correct to a cm before laying skirting dado or wall plaster shall be taken. No deductions shall be made or Extra paid for any opening upto 0.1Sq.m. in area in the floor. Nothing extra shall be paid for laying the floors at different levels in the same room.

The thickness of flooring shall be specified in the description of the item and shall be measured correct to 1mm. Flooring laid in borders, margins and treads of steps shall be measured under flooring in respective of width.

- 6.1.8 Rate: Rate shall include the cost of all materials and labour involved in all operations described above. Applications of cement slurry on RCC slab or on sub-grade shall be paid for separately unless otherwise specified. Nosing of steps are included in flooring and shall not be paid separately.

- 6.2.0 Terrazzo Flooring: Ordinary Terrazzo is a concrete with a marble chippings aggregate, with a surface ground to a smooth finish. The terrazzo flooring shall consist of all under layer of cement concrete and a topping layer of terrazzo which shall be laid monolithically.

- 6.2.1 Cement Concrete: Specifications same as cement concrete works.

- 6.2.2 Aggregates for terrazzo toppings: The aggregate used in topping shall be marble aggregate unless otherwise specified. It shall be hard, sound dense and homogeneous in texture with crystalline and coarse grains. It shall be uniform in colour and free from stains, cracks, decay and weathering. The minimum thickness of top layer for various sizes of chips shall be as under.

Grade No.	Size of chips Mm	Thickness of top layer(m)
00	1.2	5
<b>0</b>	2.4	
<b>1</b>	4-7	
<b>2</b>	7-10	
<b>3</b>	10-15	8
<b>4</b>	15-20	
<b>5</b>	20-25	10

- 6.2.3 Cement: Cement used for the floor finish work shall be ordinary cement, white cement/ coloured cement or cement with admixture of pigments to give desired shade confirming to IS: 455-1967/IS-269-1967

6.2.4 Pigments: Pigments incorporated in terrazzo shall be permanent colour and shall conform to requirement in Appendix A in IS 2114-1962.

6.2.5 Water: Specification.

Water used for mixing and curing shall be free from injurious amounting of deleterious materials such as oils, acids, alkalis and vegetable growth.

Potable water are generally considered satisfactory for mixing and curing.

6.2.6 Dividing strips: The material for dividing strips shall be such that it has similar resistance to wear as flooring. The dividing strip shall be of copper brass. Aluminum, plastic or glass as specified in the description of items or as directed by Engineer in charge. The thickness of metallic strips shall be not less than 1.5mm and width not less than 25mm. For glass the thickness shall not be less than 5mm.

6.2.7 Workmanship: Terrazzo finish shall be laid over a layer of base concrete in the case of ground floor. When the terrazzo floor is laid over RCC slab an under layer of cement concrete shall be laid. The under layer shall of cement concrete mix(1:2:4). The maximum size of aggregate used shall not exceed 10mm.

Terrazzo topping shall have a mix cement marble powder, marble aggregate and water. Cement and marble powder shall be mixed in the ratio of 3:1 by weight. Proportion in which aggregate shall be mixed to cement marble powder mix shall depend upon the size of aggregate and shall be given below.

6.2.8 Size of aggregate	Proportion of aggregate to binder Mix to binder
For grade 00,0 and 1	1-3/4 parts
2 and 3	1-1/2 parts
4 and 5	1-1/4 parts.

6.2.9 Thickness: The thickness of base concrete and cushioning layer shall not be less than 10cm and 5cm respectively. Minimum thickness of the under layer and topping shall be 40mm.

Pannels: The floor both while laying the under layer and topping shall be divided into panels not exceeding 2sqm in area so as to reduce the risk of cracking due to differential shrinkage and expansion. Between the terrazzo and the sub floor. The joints shall be so located the longer dimension of any panel does not exceed 2m. Panels shall preferably be separated by means of dividing strips. However, where the but joints are provided the bays shall be laid alternately allowing for an interval of at least 24 hours of laying adjacent bays.

6.2.10 Measuring of materials: With a view to avoid variation in colour, mixing shall be done in a stronger or tube and the complete quantities of cement and pigment shall be mixed at the beginning of the work. Colour cement or cement and pigment mix shall be dry mixed with marble powder. The mix thus obtained shall be with aggregates. Care shall be taken not to get the materials into a heap as this would result in coarse aggregate moving on to the sides and cement to the centre.

To drymix prepared, water shall be added in small quantities while materials are being worked to get a mix of proper consistency. The mixture shall be plastic but not so wet as to flow. The wet mix shall be used within half an hour of addition of water during preparation.

#### 6.2.11 Laying: Laying of under layer:

The base shall be divided in panels with the help of dividing strips including the strips required for decorative design upto finished surface level of the floor. Screed strips shall be used where dividing strips are not used. The base shall be cleared of all dust, dirt laitance and any loose materials. It shall there be wetted with water, mopped and smeared with cement slurry of 2.75 Kg./Sqm. Under layer shall then be spread and leveled with screening board. The top surface shall be left rough to provide a good bond to the terrazzo.

Laying of terrazzo topping: Terazzo topping shall be laid with the under layer is still plastic but has handed enough to prevent cement from raising to the surface, this is normally achieved between 18-24 hours after laying of the under layer. A cement slurry preferably of the same colour as the topping shall rushed on the surface immediately before laying the topping. The terrazzo mix shall be laid to a uniform thickness (slightly more than the specified in order to get the specified thickness after rubbing) on the screed bed and be compacted thoroughly by tamping or rolling and towed smooth excessive toweling or rolling at early stage shall be avoided as it result in working up cement to the surface which will produce a surface able to cracking and will require grinding to expose marble chips. The terrazzo surface shall be tamped, trowel edge and steel floats in such a manner that maximum number of marble chips come up and spread uniformly over the surface and no part of the surface is left without ships.

6.2.12 Curing: The surface shall be left dry for air curing for a period of 12-18 hours. Thereafter water shall be allowed to stand overnight in pools for a period of minimum four days.

6.2.13 Grinding & Finishing: Grinding and polishing shall be done either by hand or by machine in case of manual grinding, the process of grinding shall being after two days, while in case of machine grinding the process shall start after seen days after completion of laying.

First grinding shall be done with carborandum stone of 60 grit size. The surface shall thus be washed clean and grouted with grout of cement of colouring matter in the same mix and proportion as the topping in order fill any pin holes that appear. It shall there be allowed to dry for four days in the same manner as above.

The second grinding shall be done with carborandum stone of 80 grit size. The surface shall thus be washed clean and grouted with grout of cement of colouring matter in the same mix and proportion as the topping in order fill any pin holes that appear. It shall there be allowed to dry for four days in the same manner as above.

The second grinding shall be done with carborandum stone 80grit size. The surface shall then be prepared as after the first grinding. The third grinding shall b done with carbrandum stone of 120 to 150 grit size. The surface shall then be washed again and allowed to dry for 12 hours and wet cured our four days as before. The forth grinding shall be done with carborandum stone 320 to 400 grit size. The surface shall then be washed clear and rubbed hard with felt and slightly moistened oxaic acid powder at 5 grams per sqm. Of floor surface. After the finishing works are over the surface shall be used with delite oxatic acid solution and dried. Floor polishing machine fitted with felt or hession bods shall then be run over it until floor shines.

In case wax polished surfaced is required, wax polish shall be applied on the surface with the help soft liner over a clean dry surface. There the polishing machine fitted with bolns shall be runover it clean saw dust shall be spread over the floor surface and polishing machine again operated which will be remove excess wax and leave a glossy surface. Floors shall not be left slippery.

6.2.14: Thickness: The thickness of the under layer and topping shall be specified in the item Tarrazzo Flooring shall be measured as laid in square meters correct to two places of decimal.

6.3.0 Marble stone flooring:

6.3.2.1 Dressing of slabs: Every stone shall be art to the required size and fine chisel dressed to give a smooth and even surface on all sides to the full depth. A straight edge laid along the side, of the stone shall be fully in contact with it. Chaise dressing shall also be done on top surface to remove any waviness. The sides and top surface of marble slabs shall be machine rubbed or table rubbed with coarse sand before using. All angles and edges of the slabs shall be true, square and free from chippings.

6.3.2.2 Thickness: Thickness shall be 25,30 or 40mm as specified in the item. While allowable tolerance in thickness shall be 2mm, it shall be + 5mm in height and breadth.

6.3.2.3 Sub-grade- Base concrete or RC slab shall serve as sub-grade.

6.3.2.4 Bedding: Bedding for marble slabs shall be of cement mortar (1:6) of average thickness 20mm. Minimum thickness at any place shall to be less than 110mm.

6.3.2.5 Laying: Sub-grade shall be cleaned, wetted and moped. Mortar of the specified mix and thickness shall then be spread on area sufficient to receive one marble slab. The slab shall be washed clean before laying. It shall be laid on top, pressed, tapped gently to bring it in level with other slabs. It shall then be lifted and laid aside. Top surface of the mortar shall then be corrected by adding fresh mortar at hollows or depressions. The mortar is then allowed to harden a bit over this surface. Cement slurry of honey like consistency at 4.4Kgs. of cement per square metre. The edges of slab already paved shall be buttered with grey or white cement with or without pigment to match the shade of marble slabs as given in the description of item. The slab shall then gently placed in position and tapped with wooden mallet till it is properly bidden in level with and chose to the adjoining slabs. This slabs fixed in the floor adjoining the walls shall enter not less than 10mm under the plaster, skirting or Dodo. The junction between wall and dodo shall be finished neatly. The finished surface shall be true to levels and slopes as instructed by the engineer-in-Charge.

6.3.2.6 Curing: The floors shall be cured for a minimum period of seven days.

6.3.2.7 Polishing and Finishing: Unevenness at the meeting edges of slabs shall be removed by chiseling. Finishing, etc. shall be done as below. Grinding shall normally be commenced after 14 days of laying the slabs. Except for skirting or small areas machine shall be used for the purpose.

First grinding shall be done with carborandum stone of 48 to 60 gri9t size fitted in the machine. Water shall be properly used during grinding. When the floor has been



uniformly rubbed, it shall be cleaned with water barring all pin holes. It shall then be covered with a thin coat of gray or white cement to match the colour of the marble slab. Pin holes, if any shall thus be filled. This grout shall be kept moist for a week. Thereafter second grinding shall be started with carborandum stone of 120 grit curing shall follow again. Final grinding shall be done when other works are finished. The machine shall be fitted with carborandum stone of grit 220 to 350 using water in abundance. The floor shall then be washed clean with water. Oxalic acid powder shall then be dusted at 33 gms. Per sq. metre on the surface and rubbed with machine fitted with Hessian bobs or rubbed hard with pads of woolen rugs. The floor shall then be washed clean with water and desired with soft cloth or linen. The finished floor shall not sound hollow, when tapped with a mallet. Polishing shall be done manually.

6.3.2.8 Measurements: Marble stone flooring shall be measured correct to two places of decimal. Length and breadth shall be measured correct to a centimeter between the finished face of skirting dado or wall plaster.

6.3.2.9 Rate: Rate shall include all materials labour required for all operations involve and described above.

6.4.0 White Glazed Tile work.

6.4.12.0 Materials:

6.4.1.0 White glazed tiles shall conform to the requirements of IS-777-1970 in all respects. The tiles shall be of approved manufacturer or as specified in the description of works in the item. These shall be free from cracks, creasing spots chipped edges and corners. Glazed shall be of uniform shade.

Tiles shall be of nominal sizes such as 30x30,15x15,10x10cm or other standard sizes of equal sides. The sizes of tiles to be used will be as shown in drawing or as required by the Engineer-in-Charge. The maximum variation instated sizes, other than thickness of tiles shall be + 15mm. The thickness of tiles shall be 110mm unless otherwise specifically mentioned in the work.

6.4.2.0 Workmanship:

6.4.2.1 Sub-grade- Shall be of concrete of RCC slab.

6.4.2.3 Mortar The thickness shall not be less than 10mm at any place.

6.4.2.4; Laying: Sub-grade shall be cleared wetted and moped. The bedding shall then be laid evenly over the surface, tamped and corrected to desired levels and allowed to harden enough to offer a rigid cushion to0 tiles and enable the mason to put wooden planks across and squat on it. Before laying the tiles grey cement slurry of honey like consistency at 3.3Kg./ square metre shall be applied over the bedding. At a time area to accommodate about 20 tiles shall be applied with cement slurry Tiles Shalala then be washed cleaned and fixed in the grout one after other, each tile being gently tapped in its position till it is properly bedded and in level. The surface of bedding shall be checked with straight edge about 2m long so as to obtain a true face with required slope. Where full size tiles can not be used, these titles be art(sawn) to the required size and other edges rubbed smooth to ensure straight and true joints.

The fixed in floor near the wall shall enter plaster, skirting or dado to a minimum depth of 10mm. After laying excess cement grout is cleaned.

6.4.2.4 Jointing and finishing: The joints shall be cleaned with wire brushes or trowel to a depth of 5mm and all dust and loose mortars removed. While cement shall then be used for flush pointing the joints. The floors shall be cured for seven days. Surface should not sound hollow when tapped.

6.4.2.5 Measurement: white glazed tiles shall be measured in square metre correct to two places of decimal.

6.4.2.6 Rate: Should include cost of all materials and labour involved in all above operation.

## 7. GENERAL TECHNICAL SPECIFICATIONS FOR PAINTS.

Paint:

### 1.1 Primer Paint:

The primer required for priming coat shall be zinc chromate and primer of approved quality. The primer shall be of superior quality and as per I.S. specification and it should be of standard company available in market.

Primer shall be factory prepared ready made mixed in single pack and shall be approved by Engineer-in-charge. It shall be at brushing consistency and suitable for application after thinning with relevant thinner.

Primer shall consist of zinc, chromate, red oxides of iron, suitable varnish radium oil of turpentine & liquid drier. All the composition contents shall be mixed ;in proportion by mass as specified in I.S. code.

Primer required for primer coat shall be obtained directly from manufacturer of authorized dealers and brought to the side in packed drum with seal.

The primer not in use shall be kept properly protected. Lids of containers shall be kept closed and surface of paint in open or partially open containers shall be covered with a thin layers of turpentine to prevent formation of skin. The primer shall be stirred thoroughly in its container before pressing in the small container. While applying also, the primer shall be continuously stirred in small container. No left over primer shall be put back in to stock tins. When not in use, the container shall be kept properly closed. Due to any reason, thinning is found necessary the brand of thinner recommended by manufacturer primer paint shall be applied at coverage rate of 7 to 9 sq.mt. per liter.

### 1.2 Aluminum Paint:

Aluminum paint shall conform to I.S. 2339-1963. The aluminum paint shall be purchased directly from manufacturer or authorized dealer in pack tins and shall be got approved by Engineer-incharge. This paint shall be applied over primer at coverage rate of 8 to 10 sq.mt. per liter. The paint shall brush easily, shall have good leveling

properties and show no running or sagging tendencies. The paint shall be applied by brushing or by spraying to prepare good smooth surface. The paint shall dry to smooth uniform finish, free from roughness, unevenness and other imperfections. If due to any reason thinning is necessary the brand of thinner recommended by the manufacturer shall only be used. This paint shall be applied to downstream face of gate, horizontal girder with bracing, arms, trunion hub, trunion bracket etc. in two coats over one coat of primer.

## 1.2 Enamel Paint:

Synthetic Enamel Paint of (I.S. - 692) smoke grey shade to be procured shall be of approved quality and as per I.S. it shall be of standard company available in market. The same shall be factory prepared, ready mixed in single pack and shall be approved by Engineer-in-charge.

The paint procured shall brush easily, shall have good leveling properties and show running or sagging tendencies. The paint shall not skin within 48 hours in a three quarters filled closed containers. The paint when dry shall form a good uniform surface. The paint shall be applied to cover 8 to 10 sq.mt. average per liter. If due to any reason thinning is necessary, the brand of thinner recommended by the manufacturer shall only be used.

## 2.0 PREPARATION OF SURFACE FOR PAINTING:

The surface of all the parts shall be cleaned by way of sand blasting (I.S. 1477-P-1-1971) by setting the clear sand with high pressure with use of air compressor. The accessories for sand blasting like clean sand, sand container, air compressor shall be of good condition. The primer coat shall be applied only after cleaning the surface of steel part by sand blasting and after prior approval of cleaned surface by the Engineer-in-charge.

All the oil, grease and dirt shall be removed from the surface by using white gasoline where necessary. Sand blasting machine should be kept on site up till the completion of the work.

## 3.0 PRECAUTION:

At the time of application of primer coat of aluminum paint, the air temperature must not be below 10° C and relative humidity must not be above 90 %. The surface should be free of moisture at the time of application.

As these exist the installation of electrification for lighting, all safety precautions shall be taken by contractor for safety of labours working at site of work. Department will not be responsible for any case of accident during the work.

## 4.0 APPLICATION PROCEDURE:

### 4.1 Primer Coat:

After preparation of surface one coat of primer as specified in Para 1.1 above shall be applied to all the steel component of gates like skin plate, trunion girder, wall plate, anchor girder, down stream face of gate, horizontal girder, bracings, arms, trunion hub,

trunion bracket, hoist platform, hoist mechanism and all other parts of gate and hoisting mechanism and platform. The primer shall be applied at average rate of 7 to 9 sq.mt. per litter.

#### 4.2 Coating of surface:

After drying the primer coat the surface shall be got checked by the Engineer-in-charge before start of application of painting coat.

4.2.1' After approval of Engineer-in-charge for drying and smoothen of priming coat first coat of high build epoxy paint shall be applied to upstream face of gate, wall plate, anchor girder.

4.2.2 Similarly after drying primer coat first coat of aluminum paint shall be applied to downstream face of gate, horizontal girder, bracings, arms, trunion hub, trunion brackets etc.

4.2.3 After drying the primer coat the first coat of enamel paint shall be applied to hoist platform with railing, hoist mechanism and bridge with railing.

4.3 After application of first coat of above paints surface shall be allowed to dry enough. After drying the surface the same shall be got approved by the Engineer-in-charge. Only after prior approval of the Engineer-in-charge second coat of painting shall be applied to relevant parts with relevant paints as indicated above.

4.4 All the paints as stated in Para 4.1, 4.2.1, 4.2.2, 4.2.3 and 4.3 shall be applied evenly and smoothly by means of crossing and laying off. The crossing and laying off consists of covering the area over with paint, brushing the surface hard for the first time over and then brushing alternatively in opposite directions two or three times and then finally brushing lightly in direction at right angle to the same. In this process no. laying marks shall be left after the laying off is completed. The final process of crossing and laying off will consist in one coat. Similarly this operation shall be carried out can use the spray method of painting where mix of colours permits the same.

#### 5.0 GENERAL INSPECTION BEFORE AND DURING PAINTING:

It should be ensured:

- (1) that painting follows immediately after pre-cleaning of pre treatment; that any contamination which may occur in the interim period is removed, that special precautions are taken when painting after galvanizing"
- (2) that no painting is carried out when there is damages of dew.
- (3) that tools used are clean and not excessively worn.
- (4) that paint in the drum is thoroughly mixed prior to application, that drum are inspected to make sure that no sediments is left in them.
- (5) that if paint has thickened because of long storage or because of the evaporation of the solvents, its viscosity is adjusted as recommended by the paint manufacturer.
- (6) that each coat is allowed to dry sufficiently but not excessively before applying

the following coat, that manufacturer's instructions for drying time are adhered to properly and;

- (7) that every individual coat is properly applied, reasonably level and smooth, and free from runs and "holiday" (minute uncovered areas).

## 8. GENERAL SPECIFICATION FOR WOOD

### 8.1 Working

All woodwork shall be neatly and truly finished to the exact dimensions required, wood work which will be exposed to view when the work is complete, shall be accurately planed to the required dimensions. A tolerance of (1.6mm) shall be allowed for nominal dimensions of structural timber. Where dimensions are specifically mentioned as net dimensions, no such tolerance shall be permissible.

### 8.2 Joints

Unless otherwise specified, all joints shall be simple tenon and mortise joints with the end of the tenon exposed to view. All mortise and tenon or scarfs shall fit truly and fully, without filling. Where specified in the case of special high class joinery, the end of tenon shall not show. The contractor shall observe the following principles informing joints:-

- (i) to cut the joints and arrange the fastenings, so as to the pieces of timber they connect, as little as possible weaks.
- (ii) to place each abutting surface in a joint as nearly as possible, perpendicular to the pressure, which it has to transmit; and
- (iii) to form and fit accurately every pair of surfaces that come in contact.

The joints shall be painted with white or red lead before the frames are put together.

### 8.3 Screws and nails

Holes of correct sizes shall be drilled before inserting screw driving in or strating in screws with a hammer is prohibited. All screws shall be dipped in oil before being inserted in the wood. When owing to the nailing arrangement or to the timber used, splitting may occur, the nails shall be driven into pre-bored holes with diameter not greater than 4/5 of the nail. The head of nails or screws shall be sunk and putied or dealt with as the Engineer-in- Charge may direct. The guage and length of nails and screws use shall be subject to the approval of the Assistant Engineer –in- Charge.

### 8.4 Inspection before fixing

All woodwork shall be passed and initialized by the Assistant Engineer before being treated or finally fixed in position. Rejected timber shall at-once be removed from the work by the contractor.

## 8.5 Fixing

All woodwork shall be fixed in accordance with the drawings or the instructions of the Executive Engineer.

## 8.6 Preservatives

All portions of timber, built into or against or close to masonry or concrete, and all junctions of rafters beams and wall plates shall be given two coats of hot creosote or other wood preservative approved by the Executive Engineer

## 8.7 Bearing

All beams and girders shall be bedded on wall plates with not less than 22.5cm bearing. All joints shall bear not less than 12cm on wall plates, and every purlin or batten supported on a wall, will have a bearing in the direction of its length equal to its own depth, subject to a minimum of 10 cms.

### 8.8 Posts fixing in exposed position

Wood posts, in exposed position, must rest on a raised stone or cement concrete base, and be fixed by a holding down bolt. Tenons Projecting into the stone or concrete base are prohibited. The holding down bolt shall be at least 16mm in diameter and fixed to a washer embedded in the plinth at least 30cms below the stone base. The bolt must pass through the base and project 25 cms through the bottom of the post, being secured to it by a nut let in through a side cavity, which must be subsequently plugged.

### 8.9.1 Trusses

In construction of roof trusses, a full-size truss shall first be lined on a level platform. From this full size diagram, templates of tenons, mortise and scarf sect., shall be made for use in the manufacture of trusses. Camber shall be provided, where required, in accordance with the specified details.

### 8.10 Scaffolding

The contractor shall provide all labour, scaffolding, ladders and tackle necessary for hoisting and fackle necessary for hoisting and fixing woodwork in position, and foe its inspection during construction . He is also responsible that that the taqckle and staging are of the requisite strength and the work

### 8.11 Scaffolding

The contractor shall provide all labour, scaffolding. ladders and tackle necessary for hoisting and fixing woodwork in position, and for its inspection during construction. He is also responsible that that the tackle and staging are of the requisite strength and the work is secured in a proper manner during construction.

## 8.12.0 WOOD WORK (Individual items)

Specifications given for individual items are in addition to the general specifications described above.

### 8.12.1 Frames and Trusses.

#### 8.12.2 Door, windows and other frames

##### 8.12.2.0 General

8.12.2.1 The work shall be carried out as per detailed drawings and /or as directed by the Engineer-in-Charge. The wooden members of the frame shall be planed smooth and accurate to the full dimensions. Rebates, rounding, moldings etc., as shown in the drawing shall be done before the members are jointed into frames. Where wood work is not exposed to view as in the case of frames for false ceiling however, no planing is required to be done unless specified expressly as wrought timber work.

NOTE:- The wrought shall mean 'planed'.

##### 8.12.2.2 Jointing

Jointing in timber frames must be made carefully and accurately. They shall be strong, neat and shall fit without wedging or filling. The joints shall be pinned with hard wood or bamboo pins of 10 to 15mm dia after the members of the frame are pressed together in a suitable vice-mechanism.

The joints shall be pinned with hard wood or bamboo pins of 10 to 15mm dia after the members of the frame are pressed together in a suitable vice-mechanism. The door and window frame shall have rebate to house the shutters, and the depth of such rebate shall be 1.25cm.

##### 8.12.2.3 Surface treatment:-

Wood work shall be painted, oiled, polished or other-wise treated as specified, All portions of timber against masonry or concrete portion of building shall be coated with boiling coal tar or other type of approved wood preservative or primer, before placing them in final position. Before any surface treatment is applied the wood work shall be got approved by the Engineer-in- Charge.

8.12.2.4 The frames shall be fixed only after acceptance by the Engineer-in-Charge. The method of fixing as indicated in the drawing or as shown in Fig. No.12/1 or otherwise directed by the Engineer-in- Charge shall be buried in floor for the full thickness of the floor, Where doors are not provided with sills, the door frame shall be temporarily braced at the sill level so to prevent warping or distortion of frame during construction. Frames shall also be suitably protected from damage during construction.

##### 8.12.2.5

Chowkhats shall have a rebate cut to receive the leaves, the rebate to be 1.25mm deep and of width equal to the thickness of the leaf. The other side shall be rounded off if wire gauze is to be fitted. Where the plaster butts against the Chowkhat, a 1.25 mm deep rebate with a slight cut back shall be given to serve as a key to the plaster.

To be ready before starting superstructure :-

No Chowkhat shall be painted or fixed before the Assistant Engineer has inspected and initialled it in token of his acceptance. All Chowkhats shall be ready before the work reaches sill level, so that they can be built in as the brick work or masonry proceeds. Where specially ordered Chowkhats may be fixed lately the completion of brick work and roofing but before plastering. In that eventuality, the brick work of portion where holdfasts have to be embedded shall be done in mud or laid dry. No extra payment is due when chowkats are fixed this manner.

#### 8.12.2.6

When sill level is reached and damp proof course laid Chowkats Shall be erected, being placed truly level and plum. They shall be securely strutted or lashed in position till built in .

#### 8.12.2.7

Chowkats shall be secured to the brick work or masonry by hold-fasts which shall be build into the wall with 1:4 cement sand mortar. Each hold fast shall be fixed to the chowkats with three 5cms iron screws Where the chowkat is fixed at the extreme edges of the jambs, the holdfasts shall be forked or bent as directed by the Engineer-in-Charge. The number of hold-fasts to each chowkat shall be indicated in the figure.

#### 8.12.2.8.

Unless otherwise specified, door and windows opening to another room, or to a corridor, or verandah, shall have the chowkats so fixed be kept flush with the wall. The plaster will stop against the chowkat which will have the rebate mentioned in 12.4.1.1.5 as a key for the plaster. Other doors and windows will be set back from the face of the wall to the extent specified in the drawings. If this set-back is not specified, it shall be 6 cms. In the case of doors and windows in dhajji walls, the depth of the chowkat shall be equal to the thickness of the wall and the faces kept flush with the plaster. Where architraves have been provided chowkats shall be fixed as shown in the drawings giving the detail of the architrave.

#### 8. 12.2.9

To protect against water and mortar splashing wood strips shall be lightly nailed on the arrises of the chowkat temporarily till painting

#### 8.12.2.10

All door and window leaves shall be cut out and framed together, as Soon as possible after the commencement of the work and stacked closely. They shall be glued just prior to being hung. Before final gluing up, all portions in which defects appear shall be replaced.

#### 8.12.2.11

All styles and rails shall be properly and accurately through mortised and tenoned, no filling



#### 8.12.2.12

All tenons at the final assemble of the door shall be glued and immediately after gluing , the frames shall be tightly clamped and so left till the glue has set.

#### 8.12.2.13.

All fittings are subject to the approval of the Executive Engineer and where so directed by the him, the contractor must depodit in his office one sample of each fitting to be used in the work. Brass and other special fitting shall ordinarily be arranged departmentally and issued to the contractor for fixing. The fitting to be used in the work . Brass and other special fittings shall ordinarily be arranged departmentally and issued to the contractor for fixing. The fittings shall be provided as per Schedule given in Appendix.12.I.

#### Screws

8.12.2.14 Screws shall be used of such diameter as to fill completely the holes and cups in the fitting which they secure, and are to be oiled before being inserted. Unless the head can be counter-sunk flush with the fitting , round-headed screws shall be used. Brass fitting shall be secured with brass screws.

#### Chocks and stops

8. 12.2.15 These shall be provided as shown in the drawings or as directed by Engineer-in-Chief

#### 8.12.3.0 False ceiling partition frames etc.

The work shall be done as specified in 12.4.1.1 except that the scantling need not be planed unless otherwise specified.

#### 8.12.4 Trusses

The work shall be carried out as per detailed drawings and as directed drawings and as directed by the Engineer-in-.Charge. Specified timber shall be used. Sawing shall be truly straight and spuace , and in the direction of the grains. The scantlings shall be accurately planed smooth to the full dimensions and rebates, roundings and mouldings shown in the drawings, before the same are framed. Patching or plugging or any kind shall not be permitted. A tolerance of = 2mm shall be allowed in the finished cross sectional dimensions.

#### Joints

8.12.4.1 Joints shall be simple , neat and strong. All mortice and tenon joints, mitred joints, scarfs etc. Shall it in fully accurately without wedging or fillings. The joints shall be as per detailed drawings. Holes of correct sizes shall be drilled before inserting screws/bolts. Driving in screws with hammer is prohibited. Holes for bolts shall be of uniform diameter. The screws bolts and nails shall be dipped in oil before using. The heads of nails and screws shall be sunk and puttied or dealt with as instructed by Engineer-in- Charge. The gauge and length of nails, screws and bolts shall be approved by the Engineer- in- Charge. The gauge and length of nails, screws and bolts shall be approved by the Engineer-in-Charge before using on work.

#### 8.12.4.2 Shaping form and cutting

The wood sections as specified or required shall be straightened cut square and to correct lengths and measured with a steel tape. A great accuracy shall be taken in the fabrication of various members so that these can be assembled without being under packed, strained or forced into position and when built up ,shall be true to shape and free from twist, kinks, buckles or open joints.

#### 8.12.4.3 Fabrication

As per drawing, a full size truss diagram shall first be drawn on a levelled platform. From this full size diagram templates of all joints as for tenons mortices, searves ect. Shall be made for use in the fabrication. The template shall be made to correspond to each member and plate holes for screws and bolts shall be marked accurately on them and drilled. The templates shall be laid on wooden members, and the holes for screwing and bolting marked on them, The ends of the wooden members, and the holes for screwing and bolting marked on them , The ends of the wooden members shall also be marked for cutting. The base R.C.C. columns and the position of anchor bolts shall be carefully set out. Before fabrication of the truss, individual members shall be assembled together to ensure close abutting or lapping of the surfaces of the different members and fitted close together as per drawing.

#### 8.12.4.4 Hoisting and placing in

The trusses shall be hoisted and placed in position carefully, without any damage to itself and other

#### 8.12.4.4 Position

building work and injury to workmen. The trusses shall be screwed to walls by means of holding down

bolts or as directed by the Engineer-in Charge. The necessary mechanical appliances such as lifting tackal , winch etc. for hoisting the truss shall be used. The plant shall not be supplied by the department unless otherwise specified in the contract. The trusses shall be stayed temporarily till they are permanently secured in position and connected with each other by means of purlins. Holding down bolts, cleats used for purlins and bottom plates used for tie and rafter member shall be paid separately.

#### Surface treatment

8.12.4.6 Wood work shall not be painted, oiled or otherwise treated before it has been approved by the Engineer-in-Charge. All portions of timber built in to or against or close to masonry of concrete or buried in ground shall be given two coats of boiling coal tar. All junctions of rafters, purlins beams and wall plates shall be painted with approved wood primer.

#### Circular work

8.12.5. Classification of circular work shall be decided by Engineer-in-Charge.

#### 8.12.6 Panelled & glazed shutters.

Panelled glazed or panelled and glazed shutters for doors windows etc. The specifications for frames of doors, windows, ventilators and clerestory windows are described here. The frames shall be wrought, framed and fixed in position as per detailed drawing and as directed by the Engineer-in-Charge. Specified timber shall be used, and it shall be sawn in the direction of the grains. Sawing shall be truly straight and square. The timber shall be planed smooth and accurate to the full dimensions rebates, roundings and mouldings, as shown in the drawings made, before assembly. Patching or plugging of any kind shall not be permitted except as provided.

#### WATER SUPPLY & SANITARY INSTALLATION A GENERAL SPECIFICATION

The Agency/ supplier shall be responsible for the installation, testing the commissioning of all the items and materials supplied by him against the specifications. All the items required to make the installation complete, shall constitute the part of major items specified in the specifications/ drawings and as specified in bill of quantities and tenderer should quote for complete item, taking into consideration the minor related items required if any for finished item of work.

Position of valves, porcelain, installation, S.C.I pipes, G.I. pipes etc. inside toilets, ducts and position of external services etc, shown in the drawings are only indicative. The actual position services of these shall be decided at site by the engineer-in-Charge.

The contractor is not at liberty to charge any extra cost for the related item on account of this. All the materials supplied by the contractor according to the contract conditions will be subject to inspection and approval by the engineer or his representative from time to time in order to certify them that they are upto required standards. The contractor will provide all facilities of such inspections free of cost. At the time of inspection, the Engineer(owner) or his representative will have a full liberty to reject any such materials which does not confirm to the specifications/ requirement. No claim for any rejected materials will be entertained by the owner. The contractor will remove all the rejected materials from site at his own cost & risk. No surplus material procured by the contractor will be acceptable by the contractor.

The material having No. I.S specification, shall be of available best make & quality and the same make is to be approved by the engineer-In-Charge of the work before putting in use by the contractor.

All the materials shall be supported with manufacturer's test certificate.

In case of any dispute or variation in any opinion, the decision of Engineer-in-Charge or his representative is final.

During testing if any component. items/any materials found to be defective, the same have to be replaced/rectified by the contractor at his own cost & risk.

During execution & till handover of works to the Department, the contractor will be custodian of the materials, and all items of works and any theft, loss, damage in this regard shall be accounted at the risk & cost of the contractor.

The measurements of any item of work shall have to be agreed both by Department & agency.

During payment of any item, some percentage of rate at the item (depending upon gravity of the item) have to be made withheld by the engineer-in-charge of the work towards testing which in turn depends upon the quality. The same will be released only after successful testing.

All the items will be executed as per latest relevant Indian standards if found more, other than the list of I.S. attached & that is the detailed specification.

During execution the drawings attached herewith will also be followed in addition to Indian Standards and detailed specifications.

The lines either G.I/H.C.I. which have to be laid inside roof slab, below floors etc, the same have to be done well ahead before execution of related items at the cost & responsibility of the contractor.

All the items of work includes cost, conveyance, taxes of all materials, specials, jointing materials, labour T&P including cost of all other related components that required for finished item of work including testing & commissioning.

The contractor will be responsible for successful commissioning & testing of complete system of external and internal water supply & sanitary system, fire fighting water supply system. The contractor is top hand over the work to the Department only after successful testing and running of complete system.

## 10. ELECTRICAL WORKS INTERNAL ELECTRIC WORKS

The details of internal wiring, the position of fittings, fans, switches and plug sockets etc. are indicated in the layout drawings. The position of light fittings, fans, switch boards etc. indicated in these drawings are only for the guidance of the supplier and the actual positions of these shall be mutually decided between the supplier and the purchaser for his supplier shall submit to the purchaser for his consideration and approval all runs of wiring and the exact position of the point and the switch boxes firm marked on the point of the buildings.

All internal wiring shall be done in conformity to the latest Indian Standard specification/ Rules, code of practice adopted by PWD and other standards practices prevalent in that part of the country. For the purpose of the specification, the terminology, used shall be as defined in IS: 732 and IS: 1356 for the definition of points wiring. The installation shall be carried out in conformity to all requirement of IE ACT 1910 and IE Rules 1956.

The following shall be deemed to be included in the point wiring:

- i.** Switch and ceiling rose as required in case of ceiling and exhaust fan.
- ii.** In the case of wall brackets, bulk head fittings, cables as required up to the lamp holders.
- iii.** Bushed conduct for porcelain tubing where cables pass through walls.
- iv.** All wood or metal blocks, boards and boxes, R. J. Boxes sunk or surface type including those required for an regulator but excluding those under the distribution boards and main control switch.
- v.** Earth wire from 3 pin socket point to common, earth including connection to the earth drolley.
- vi.** Earth wire of 16 SWG/14 SWG-G-1. wire for loop earthing of the fixture.
- vii.** All fixing accessories such as clips nails, screw, plug, rawl plug, wooden plug, round blocks etc, as required .
- viii.** Joint for junction boxes and connection the same as required.
- ix.** Connection to ceiling rose or connector socket outlet, lamp holder, switch, fan regulators etc.

The point wiring in case of fan and light points shall mean the distance between the control switch and ceiling rose, connector or back plates, socket outlet or lamp holder depending upon the fitting measured along the run of wiring irrespective of the number wires in run. In the case of socket outlet points, the length shall mean the distance between the socket outlet and the tapping point of live wire on the nearest switch board or junction box, as the case may be.

In the case of exclusive socket outlet circuits wired on `joint Box` system of wiring any junction provided for extending the wiring beyond the point referred to shall not be treated as the nearest tapping point, in case of call bell/ buzzer points the length shall mean the distance between the call bell and the ceiling rose/ socket outlet ball push ( When the ceiling rose / socket outlet is not used).

The connection between call bell and ceiling rose or bell push, if wired by flexible wire shall be paid extra on linear basis.

Main and Sub Distribution Boards:

The position of main boards for lighting and sub-distribution board for different building are approximate and the exact location shall be given to the successful tendered at the time of installation.

Cable Installation Work

Earthings:

Installation, Testing and Commissioning:

Circuit wiring shall include the length for wiring along with 14 WGG.I Wire for loop earthing from the sub distribution board up to the tapping point that is up to the first switch shall be considered as circuit wiring. Such wiring has been classified on the basis of length.

Sub- main wiring shall include the earth wire of adequate size main Distribution Board up to sub-distribution board BDB such wiring has been classified on the basis of length. For the internal lighting either surface conduct wiring system or recessed conduct or batten wiring system shall be provided as specific in the bill of quantities and working drawings.

For recessed conduct wiring system the conduits shall be placed in the ceiling / columns etc. before the casting of the slab or column. The conduit pipes shall be properly positioned and fixed so that it will not be displaced at the time of concreting. The conduit pipes shall be properly positioned and fixed so that its cover will be flushed with the finished surface of the ceiling or column.

For placing the conduits in the walls, chases of ample dimension shall be made neatly to fix the conduit in a desired manner. The conduit pipe shall be fixed by means of staples or saddles not more than 600 mm apart. Fixing of standard bends or elbows shall be avoided and all curves maintained by bending the conduit itself with a long radius will permit easy drawing of the conductors. Suitable inspection boxes shall be provided to permit periodical inspection and removal and replacement of inspection boxes shall be provided to permit periodical inspection and removal and replacement of wires if necessary. These shall be mounted flush with the wall, with holes in the cover of the box.

Conduit pipes shall be joined by means of screwed couplers and screwed accessories only. In long distance straight run of conduits, inspection type couplers at reasonable interval shall be provided or running threads with couplers and jam nuts shall be provided. Out ends of conduit pipes shall have not sharp edge let to avoid damage to the insulation of the conductors while pulling them through the pipes.

The switch or regulator box shall be made of metal on all sides except on the front where bakelite sheet or Perspex cover painted to match the colours of the wall be used in the case of surface wiring system. For recessed wiring system, These boxes shall be made flush with the conduit after installation shall be tested for mechanical strength and electrical continuity throughout. The earthing for the entire installation shall be carried out in accordance with T.E. Rules and Standards.

The number of wires drawn in the conduits shall not exceed the numbers those specified in Indian standards specification No. 732.

The scope of this specification includes installation of the panel boards and distribution boards and making necessary connections. The installation of the boards shall be done strictly in accordance with the instructions supplied by the switchgear manufacturer, Indian standard specifications and I.E. Rules. The supplier shall submit the details of installation to the purchase for his consideration and approval, prior installation.

Then the switch boards are wall/ column mounted type, they shall be mounted on a suitable angle iron frame work. All the metal supports etc., shall be protected against

corrosion. The mounting tight for such switch boards shall be such that it can be conveniently operated.

The cables are to be taken out from the cable end boxes provided on the lighting distribution board located in the sub-station to the concerned switch-gear distribution boards for lighting located

In the different Building or from the nearest Pole mounted fuse distribution box to the main incoming switch of the buildings. The scope of work under this specification shall include providing connection at both ends and laying of the cable in ground.

The method of directly burying the cables in trenches is generally indicated in the drawings. The cable shall be run in the cable trench at a depth of 600 mm below the finished ground level and shall be duly partitioned by bricks and protected on top by concrete slab all along the run or with top bricks concerns. The cables shall be laid within a reasonably thick bed of sand. The back filling of the earth shall be done in successive layers with watering and ramming and crest about 100 mm of earth shall be done in successive layers with watering and ramming and crest about 100 mm of earth shall be made on the trench.

Then directly buried cables cross the roads pipe lines, power and telecommunication cables, it shall be protected against technical damage. All necessary protection must be given to the cables as may be required for a particular installation condition irrespective of whether it has been specifically shown in the drawing or not, to the entire satisfaction of the purchaser.

Then the cables directly buried come out of the ground or enter the buildings, it shall be laid in protective pipe properly clamped and sealed.

Bending of G.I. pipes where required shall be done so as not to damage or deform the wall of the pipe.

The installation of cables shall generally be carried out in accordance with Indian Standard Specification 1255.

Earthing shall generally be carried out in accordance with the requirement of Indian Electricity Rules and the relevant rules and regulations of electrical supply authorities. The complete earthing work for the installation covered by this specifications shall also be provided taking into account Indian Standard Specification No.IS:732 And IS:3043. The earthing system adopted shall also have adequate mechanical strength.

The work shall include earthing of non-current carrying metallic parts of all the equipment, light fittings conduit pipes, cable and cable supports and earth strips (the design to be approved by the purchaser) and all the inter connection between the earthing system to a value mutually agreed upon between the purchaser and the supplier.

#### Installation, testing & commissioning:

The supplier shall be responsible for the installation testing the commissioning of all the equipment and materials supplied by him against this specification. This shall also include the provision of miscellaneous wiring and supports and earthing in compliance with Indian Electricity Rules and to the full satisfaction of the Government Electrical Inspector.

All small items such as clamps, bolts, nuts, racks, supports, miscellaneous wiring etc. required to make the installation complete have not been specified separately. All the items required to make the installation complete, shall constitute the part of major items specified in the bill of quantities and the tenderer should quote for each item taking these into consideration.

The responsibility of the supplier shall include receiving all the equipment and material at site storage for the required period, handling the same at the site of erection, final erection, revision of equipment, if any testing and commissioning and handling over the installation complete in all aspect to the entire satisfaction of the purchaser's authorized representative. The supplier shall make of all the damaged equipment and materials during this period at his own expense.

The supplier shall submit samples of each and every equipment and every equipment and materials for the final approval of the purchasers representative immediately after the acceptance of offer. All the equipment and materials shall be supplied exactly as per to the approved samples. If at any stage the purchaser brings to the notice of the supplier any discrepancy or defect the supplier shall replace the same at his own expense.

The supplier shall render all reasonable assistance to the purchaser in getting the installation approved by the Government Electrical Inspector prior to tenderization and supply necessary drawings, test certificates and both for tests which the inspector may demand. In case any addition or alternations are required to be made in this installation or in the equipment as per the directive of supplier, at his own expense,

The position of light fittings, main boards, switches, sockets the routes of pipes and cables shown in the drawings are only indicative. The actual position of these shall be decided at site at the time of execution jointly by the supplier and the authorized representative of the purchaser. The positions of light fittings, pipes and boards if required, to be changed shifted due to change in the building design etc. by the purchaser's authorized representative, the same shall be carried out at no extra cost.

Standard:

Unless otherwise specified, all switchgears equipment and materials covered under this specification shall be designed, manufactured tested and installed in conformity with the latest Indian standard specification or B.S. Specifications, Indian specification are not published for such items. All equipment shall conform to the latest Indian Electricity



Rules, P.W.D. and Local/State Laws/Bye laws as regards safety, earthing and other essential provisions specified therein.

All The equipment and materials selected shall also be supplied and installed taking into consideration the Factories Act. Fire Regulations and local laws /bye law. All lightening fittings and equipment selected shall be of well tried out design. All the materials used in the assembly of fittings and their accessories shall be of high quality and manufactured in accordance with the best modern practice.

All the materials supplied by the contractor according to the contract conditions will be subject to inspection and approval by the Engineer his representative from time to time. The contractor will provide all facilities of such inspections free of cost. At the time of inspection the owner or his representative will have a full liberty to reject any such materials which does not confirm to the specifications or requirement. No. claim for any rejected material will be entertained by the owner. The contractor will remove all rejected materials from site at this own cost.

No. surplus material procured by the contractor will be accepted by the owner.

The contractor will be responsible to get the Electric Installation cleared by the electrical Inspector of HIMACHAL PRADESH Government.

The arrangement of work boards shall be such that the operating handle of the top mounted switches are within the convenient reach of operators (about 1.2m .from the finished floor level ) and proper space shall be provided for the termination of the cable in the switches provided below the bus bars.

Two bolted type earthing terminals shall be provided on the switch boards. All individual, switches shall be connected with suitable size earth wire to the main earthing terminals of the switch board.

Danger Boards and shock treatment! charts shall be supplied where ever required  
Installation and Maintenance Tools:

The supplier along with the tender shall furnish a complete list of tools, appliances and accessories required for the installation of switchgears, light fittings, pipes, cables and wires.

### DRAWINGS

All drawings, test certificate instruction manuals etc. shall be in English Languages and all dimensions and weights shall be in metric units.

The tenderer shall submit with the tender general arrangement drawings for the installation works, typical methods of cabling and cable supports pipe work and pipe supports, typical methods of earthing and fixing of light fittings, earthing etc. as offered by him in the tender.

The contractor shall submit for the purchasers approval all layout and general arrangement drawings as well as the typical details of all types of installation work in three sets before commencing the manufacture and the site installation work well in advance so that the site work shall not suffer.

After obtaining approval of the above drawings the contractor shall supply three sets of the following drawings.

- (a) The arrangement and support of conduit pipe.
- (b) The position of light fittings, switches! plug socket and switch boards.
- (c) Earthing installment.
- (d) Layout plan showing the entire cable network.

On completion of work the successful tenderer shall supply one set of tracing in transparent linen and five sets of prints of all the drawings incorporating all the changes/modifications effected during the execution of the contract. All wiring diagram shall indicate clearly, the switchboard, the of main and sub main wiring and the position of all the points with their controls. All the circuits shall be clearly indicated and numbered in accordance with IS: 375.

The technical literatures and operating instructions and the maintenance manuals shall also be supplied in triplicate to the purchaser after the completion of the instillation work.

#### TESTS:

Manufacturers standard tests in accordance with Indian standard and other standards adopted shall be carried out on all equipment and accessories covered by this specification so as to ensure efficient and satisfactory performance of all the components and also the equipment as a whole uneerr working condition at site. The tenderers shall submit a complete list of all such tests. If the purchaser so desired for special tests, to be carried out Under certain conditions the same shallble made by the successful tenderer at his Own expenses.

All equipment shall be tested at site before the commissioning in accordance with the ad opted standard and Indian Electricity Rules. Voltage tests shall be carried out on each circuit on completion of wiring and cabling.

The bus bars within the bus-bar chamber shall be liberally spaced for taking the riser connections. The bus-bars with aluminum conductors shall be provided and PVC sleeves of different colour shall be mounted on them for easy identification. Bolted type joints fore taking the riser connections, instead of clamped type shall be preferred.

#### TECHNICAL DATA:

The tenderers shall submit with their tender all such technical data which are required for complete evaluation of the equipment offered. The suppliers shall give complete technical information of the equipment as detailed in Annexure and relevant Indian standards. The tenderer should supply such details of all equipment and materials offered specially with regard to the following:

- (a) Fuse switch boards and distribution boards.
- (b) Light fittings
- (c) Conduits and the accessories for them

- (d) Switches/plug sockets.
- (e) Cables and wires.

The tenderer shall also give along with his tender the following details.

- (a) Complete details of earthing electrodes, earthing station and earthing conductors.
- (b) Details of conduit supports.
- (c) Details of all the equipment and accessories to be supplied.

**Switches and Plug - Sockets**

Switches provided for control of light points shall confirm to IS: 1087 and shall be rated for 5A,250 V. or 15A, 250, as required. The plug-sockets provided in all the places shall be three pin type. The box sockets shall be flush mounted type.

**Ceiling Fans and Exhaust Fans**

Ceiling fan shall conform to Indian Standard specifications IS: 374-1960, The fans shall be supplied with all standard accessories like regulator and capacitors etc.

The performance rating of the propeller fans shall in accordance with stipulations of IS: 2312.

All the fans shall be robust in design and construction and shall be supplied complete with wall bracket clamps etc.

**Fluorescent Fittings**

All fluorescent fittings supplied shall conform in general to IS: 1913 and shall be complete with all standard accessories like choke, starter and capacitors etc. The type of enclosure provided for the fittings shall or that specified in the bill of quantities and the working drawings. The materials of construction for fittings use for outdoor installations and for use in the work anods shall be such that they shall withstand the atmospheric condition in that area.

Lamp holders used shall be fully shock proof, spring-loaded rotary type to ensure positive lamp locking. It should also be not possible to touch live parts of the lamp-holder both after the lamp has been taken out and during the insertion or removal of the lamp.

**MAKES**

**Switches & Plug Sockets:**

Switches provided for control of light, fan plug points shall 2.1 confirm to IS 1087 & shall be rated for 5A mps 250V. or 15A. 250V as required.

The plug sockets provided in all the places shall be three pin type. The sockets shall be flush mounted type.

- 2.1 5A. FT switch socket & plug Ball push. Anchor/Cona/CPL having 1S1 mark
- 2.2 15 Amps switch socket & plug ball push -do-
- 2.3 b. k. angle holder -do-
- 2.4 Superior type Bulk head with preventative glass steel guard water &t dust proof including holder (Porcelain) *Bajajl* G.E.C  
*I* Crompton

- |             |   |  |
|-------------|---|--|
| <b>2.5</b>  | I.C, B/D.B. made of 16 C.C sheet painted with Red Oxide paint in 2 coats and one coat of grey paint with 15 Amps. 240V. cut out & neutral base having hinged type arrangement with brass screen | Anchor/G.E.CI<br><i>Crompton</i><br>Havelal C & S. |
| <b>2.6</b>  | 16 Amps. 32A. ICDP main switch  | B.P.C I Crompton<br><i>I.J.IHavelal C&amp;S</i>    |
| <b>2.7</b>  | 1.5 mm <sup>2</sup> 2.5mm <sup>2</sup> 4 mm <sup>2</sup> P.V.C  | Having 1.S.1. Mark                                 |
| <b>2.8.</b> | M.S. Board of IG G M.S. sheet duly painted. with red oxide paint in coats & one coat of Grey paint with 3 mm thick white bakelite cover.  |  |
- 3** .Polythene pipe superior quality with an uniform thickness of 3 mm confirming to relevant *I:S :6946/1973* (Non metallic flexible conduits for electrical wiring.)
- 4.** M. S. Conduit pipes of 16 SWG confirming to *IS:1653/72* with amendments up to date.

DRAWINGS

ATTACHED

## Annexure I

Description of the Works: **Hydrology Project-II (SH: - C/O 1 No. Sectional Office Building at NALTI in Distt. Hamirpur (HP))**

**BILL OF QUANTITIES**

Sr No	Description of Item	Total Qty.	Rate		Unit	Amount
			In Figure	In Word		
1	2	3	4	5	6	7
	<b>CIVIL WORK:-</b>					
1	Cutting in earth work in all kind of soil and disposal of excavated earth up to all leads & lifts & as per satisfaction of the engineer in charge.	55.20	74.90	(Rs one seventy four & paise ninety)	cum	4134
2	Excavation in foundation trenches etc. in earth work in all kinds of soil such as kankar, moorum, conglomerate and decomposed of loose soil by pick jumper work, blasting in soft or hard rock by chiseling and including removal of black top in all leads and lifts and then stacking the excavated soil not more than 3 metres clear from the edge of the excavation and then returning the stacked soil in 15cm layer when required in to plinth, sides of foundation etc. consolidating each deposited layer by ramming and watering and then disposing of all Surplus excavated earth in all leads & lifts as directed by Engineer-in-Charge.	36.80	128.80	(Rs one hundred twenty eight & paise eighty)	cum	4740
3	Providing & laying cement concrete 1:6:12 (1cement,6 sand,12 graded stone aggregate 40 mm nominal size) and curing complete excluding cost of form work in foundation and plinth including all leads and lifts.	12.99	2675.80	(Rs two thousand six hundred seventy five & paise eighty)	cum	34759

4	Random rubble masonry polygonal rubble masonry (uncoursed/brought to coursed) with hard stone of approved quality in foundation and plinth including leveling up with cement concrete 1:6:12 graded stone aggregate 20mm nominal size) in cement mortar 1:6 (1 cement:6 sand) including all leads and lifts.	39.66	3556.40	(Rs three thousand five hundred fifty six & paise forty)	cum	141047
5	Brick work using common burnt clay building bricks in super-structure above plinth level up to floor to level in cement mortar 1:6 (1 cement:6 sand) First class building bricks in all leads and lifts.	18.43	4255.25	(Rs four thousand two hundred fifty five & paise twenty five)	cum	78424
6	Half bricks masonry using common burnt clay building bricks above plinth up to floor two level in cement mortar 1:4.(1 cement:4 sand).First class building bricks in all leads and lifts.	7.38	435.50	(Rs four hundred thirty five & paise fifty)	sqm	3214
7	Providing form work with steel plates 3.15 mm thick welded with angle iron in frame 30x30x5mm so as to give a fair finish including centering, shuttering , strutting and propping etc. with wooden battens and ballies, height of propping and centering below supporting floor to ceiling not exceeding 4 mtrs. and removal of the same for insitu-reinforcement concrete and plain concrete work in:-					
i)	Flat surfaces such as soffits of suspended floors, roofs, landings and the like.Floor etc. up to 200mm thickness in all leads and lifts..	45.96	267.40	(Rs two hundred sixty seven & paise forty )	sqm	12290
ii)	Beams,cantilever,girders and lintels Sides and Soffits of beam, haunching,cantilever, bressumers and lintels not exceeding 1 meter in depth in all heights from floor.	14.43	233.65	(Rs two hundred thirty three & paise sixty five )	sqm	3372

iii)	Edges of slab and breaks in floors and walls under 20cm wide complete in all respect.	15.54	86.35	(Rs eighty six & paise thirty five )	Rmt	1342
iv)	Sloping of battering surfaces i/c sides plates where inclination to horizontal plane not exceeding.	8.35	196.35	(Rs one hundred ninety six & paise thirty five )	sqm	1640
v)	Vertical surfaces such as Wall (Any thickness but not less than 0.10 meter attached pilasters buttresses plinth and string courses etc. from top of foundation level up to floor two level and the like.	22.77	170.00	(Rs one hundred seventy )	sqm	3871
8	Providing & laying cement concrete having strength of M 20 mixed design aggregate mechanically mixed and vibrated and curing complete excluding cost of form work and reinforcement for reinforced concrete work including carriage of material in all leads and lifts.					
	Suspended floors roof landings and shelves and their supports. Balconies beams girders, bressumers and cantilevers up to floor two level.	16.11	4639.70	(Rs four thousand six hundred thirty nine & paise seventy)	Cum	74746
9	Providing mild steel / Tor steel reinforcement for RCC work including bending binding and placing in position complete up to floor two level. Tor Steel	1372.00	39.00	(Rs thirty nine )	Kg	53508
10	Providing wood work in frames of door and windows clear storey windows and others frames and other wrought frames and fixed in position in 2nd class deodar wood.	0.48	50261.90	(Rs fifty thousand two hundred sixty one & paise ninety)	Cum	24126
11	Providing and fixing Pannelled glazed door panelled and glazed shutters for doors windows and clear storey windows including black enamelled iron butt hinges with necessary screws 40mm thick 2nd1st class deodar wood.	10.75	2202.30	(Rs two thousand two hundred two & paise thirty)	Sqm	23675



12	Providing and fixing wire gauge shutters using MS wire gauge of IS gauge designation 85 G with wire of dia0.56 mm for doors windows clerestorey windows including bright finished black enamelled iron hinges with necessary screws 30 mm thick 2nd class deodar wood.	9.52	1185.20	(Rs one thousand one hundred eighty five & paise twenty)	Sqm	11283
13	15mm thick cement plaster in single coat on fair/ rough sides of brick/stone masonry concrete walls for interior plastering up to floor two level including arises internal rounded angles not exceeding 80mm girth in cm 1:6(1cement:6sand) including all leads and lifts.	201.90	134.45	(Rs one hundred thirty four&paise forty five)	Sqm	27145
14	6 mm cement plaster to ceiling in cement mortar 1:4 (1cement:4sand) with in all leads and lifts.	93.50	60.20	(Rs sixty & paise twenty)	Sqm	5629
15	Pointing on brick work with cement mortar 1:3 (1cement:3 sand).Flush Pointing.	7.78	51.45	(Rs fifty one & paise forty five)	Sqm	400
16	White washing with lime on undecorated wall surfaces(two coats) to give an even shade I/c thoroughly brooming the surface to remove all dust dirt mortar dirt and other foreign matter with in all leads and lifts.	93.50	4.85	(Rs four & paise eighty five)	Sqm	453

17	Distempering (two coats) with oil bound washable distemper of approved brand and manufacture of and of required shade on undecorated wall surface to give an even shade over and including priming coat with Alkali-resistance primer of approved brand and manufacture of after thoroughly brushing the surface free from mortar droppings and other foreign matters including preparing the surface even and sand papered smooth. Priming coat with distemper primer.	201.90	48.25	(Rs forty eight & paise twenty five)	Sqm	9742
18	Stone soling under flooring including all leads and lifts complete in all respect.	5.05	1432.50	(Rs one thousand four hundred thirty two & paise fifty)	Cum	7234
19	Providing and laying (KAJARIA MAKE or equivalent) spartic ceramic tiles 5.5mm thick specified shade and of specified size in flooring treads of steps and landing on a bed of 12mm thick of cement mortar 1:3 (1cement:3sand) finished with flush pointing in white cement.	17.45	1159.05	(Rs one thousand one hundred fifty nine & paise five)	Sqm	20225
20	White glazed tiles 6 mm thick in skirting risers of steps and dado 12 mm thick cement mortar 1:3 (1 cement : 3 sand) and jointed with cement slurry.	10.19	713.60	(Rs seven hundred thirteen & paise sixty)	Sqm	7272
21	Kota stone slab flooring 20mm (average) thick base of cement mortar 1:4 ( 1 cement : 4 sand ) laid over and jointed with Grey cement slurry mixed with pigment to match the shade of the slab including rubbing and polishing complete. 25mm thick in all leads and lifts..	4.34	1150.25	(Rs one thousand one hundred fifty & paise twenty five)	Sqm	4992

22	Applying priming coat over new wood and wood based surfaces after and including preparing the surface by thoroughly cleaning oil grease dirt and other foreign matter sand papering and knotting. Ready mixed paint brushing wood primer pink.	14.70	26.05	(Rs twenty six & paise five )	Sqm	383
23	Painting two coats (excluding priming coat) on new wood and wood based surfaces with enamel paint brushing to give even shade including cleaning all dirt,dust and other foreign matters with white enamel paint.	14.70	40.50	(Rs forty & paise fifty)	Sqm	595
24	Providing and fixing M.S. grills of required pattern in wooden frames of windows etc. with MS flats square or round bars with round headed bolts and nuts or by screws. Plain grill.	182.42	64.40	(Rs sixty four & paise forty)	Kg	11748
25	Applying priming coat over new steel and other metal surfaces after and including preparing the surface by thoroughly cleaning oil grease dirt and other foreign matter and scoured with wire brushes fine steel wool scrapers and sand paper complete with ready mixed priming paint brushing red lead red oxide/Zinc oxide chrome.	4.65	21.50	(Rs twenty one & paise fifty)	Sqm	100
26	Painting two coats(excluding priming coat) on new steel and other metal surfaces with enamel paint brushing to give even shade including cleaning the surface of all dirt,dust and other foreign matters with black enamel paint.	4.65	38.15	(Rs thirty eight & paise fifteen)	Sqm	177
27	Providing plinth protection 50mm thick in cement concrete 1:3:6(1cement:3 sand:6 graded stone aggregate 20mm nominal size)	21.55	162.15	(Rs one hundred sixty two & paise fifteen)	Sqm	3494

28	P/F 40x3 mm flat iron hold fast 40cm long including fixing to frame with 10mm dia metre bolts nuts and wooden plugs and embedding in cement concrete block 30x10x15cm 1:3:6(1cement:3 sand :6 graded stone aggregate 20mm nominal size)	34.00	72.60	(Rs seventy two & paise sixty)	Each	2468
29	Providing and fixing oxidized M.S. sliding door bolts with nuts and screw complete)250mmx16mm.	3.00	90.65	(Rs ninety & paise sixty five)	Each	272
30	Providing and fixing oxidized M.S. handles with the necessary screws etc. complete (1)125mm	20.00	31.10	(Rs thirty one & paise ten)	Each	622
31	Providing and fixing oxidized M.S.tower bolts ( barrel type) with necessary screws etc. complete(1)150mmx10mm	44.00	22.90	(Rs twenty two & paise ninety)	Each	1008
32	Providing and fixing conduit pipe for railing for stair case as per required pattern and to the entire satisfaction of the Engineer-in-	39.90	111.15	(Rs one hundred eleven & paise fifteen)	Rmt	4435
33	Steel work welded in built up sections, trusses and framed work i/c cutting hoisting, fixing in position and applying a priming coat of red lead paint in trusses and trussed purlings in building	193.73	55.00	(Rs fifty five )	Kg	10655
34	P/L Cement Conc. 1:2:4 in foundation For Post	0.61	3826.35	(Rs three thousand eight hundred twenty six & paise thirty five)	cum	2334
35	Supply and Fixing of Galvanized steel Barbed Wire(IS-78-1962)	243.30	43.10	(Rs forty three & paise ten)	Rmt	10486
36	Providing and fixing M.S round and square bar with M.S. flats as required in steel /wooden frame etc.	7.00	64.80	(Rs sixty four & paise eighty)	kg	454
	<b>SANITORY FITTINGS</b>					

37	Providing and fixing to wall ceiling and floor galvanized mild steel tube, tube fittings and chamber making the good wall ceiling and floor. Jindal make c-class					
	a) 20mm nominal	50.00	170.00	(Rs one hundred seventy )	mtr	8500
38	Providing and fixing G.I. Unions SPW make					
	a) 20mm nominal	3.00	48.30	(Rs forty eight & paise thirty)	Each	145
39	Providing PVC water storage tank of approved quality including fitting complete in all respect. 1000 litres in all leads and lifts. Sintex. make.	1.00	6037.50	(Rs six thousand thirty seven & fifty)	Each	6038
40	Construction of 300x300x500mm in size for stop cock with G.I. surface box 100x100x5mm (in side) with hinges cover fixed in cement concrete slab 1:2:4 (1 cement:2 sand:4 graded stone aggregate 20mm nominal size) 75mm thick foundation concrete 1:5:10 (1 cement:5 sand:10 graded stone aggregate 40 mm nominal size) and in side plastering with cement mortar in 1:3 (1 cement:3 sand) finished with a floating coat of neat cement with 100mm thick wall of stone masonry in c.m. 1:5 (1 cement:5 sand) in all leads and lifts .	2.00	1627.30	(Rs one thousand six hundred twenty seven & paise thirty)	Each	3255
41	Providing and fixing sand cast/cast iron spun spigot and socked soil waste and ventilating pipe (lead caulked) joint to be measured and paid for separately)					
	a) 50mm dia.	5.00	311.75	(Rs three hundred eleven & paise seventy five)	Rmt	1559
	b) 100mm dia	25.00	478.30	(Rs four hundred	Rmt	11958

				seventy eight & paise thirty)		
42	Providing and fixing M.S hooks and clamps. 50mm nominal size.	3.00	35.20	(Rs thirty five& paise twenty)	Each	106
43	Providing and fixing sand cast iron/cast iron fittings and accessories Plain bend 100mm nominal size.	4.00	356.50	(Rs three hundred fifty six & paise fifty)	Each	1426
44	Providing and fixing collar 100mm nominal size.	5.00	122.90	(Rs one hundred twenty two & paise ninety)	Each	615
45	Providing and fixing cast iron cowl 100mmdia	1.00	128.80	(Rs one hundred twenty eight& paise eighty)	Each	129
46	Providing lead caulked joint to sand cast iron pipe and fittings i/c testing of the joint in all leads and lifts a)50mm dia.	4.00	49.30	(Rs forty nine& paise thirty)	Each	197
	b) 100mm dia	12.00	104.80	(Rs one hundred four& paise eighty)	Each	1258
47	Providing and fixing cast iron floor trap of silt cleaning designed with sand cast iron screws down or hinges grating with cast vent iron including cost of cutting and making good the same. 75 mm No.minal size.	1.00	496.10	(Rs four hundred ninety six & paise ten)	Each	496
48	Providing and fixing viterious china water closet squleatting pan (Indian type) W.C. pan size 580mm(Earth work, bed concrete, footrest and trap to be measure and paid for separately) CERA Make White.	1.00	1721.70	(Rs one thousand seven hundred twenty one & paise seventy)	Each	1722
49	Providing & fixing 100 mm size Por S trap for water closed squatting pan including jointing the trap with the pan and soil pipe cement mortar 1:1 ( 1 cement : 1 sand). CERA Make	1.00	662.40	(Rs six hundred sixty two & paise forty)	Each	662

50	Providing & fixing in cement mortar 1:3 (1 cement:3 sand) a pair of vitreous china 250mmx130mmx50mm foot rest for long pattern squatting pan and water closet.	1.00	196.60	(Rs one hundred ninety six & paise sixty)	Pair	197
51	Providing and fixing 10 litres vitreous china low level flushing cistern with a pair of CI brackets or mild steel brackets complete with fitting such as lead valve less Syphon 15mm nominal size brass ball valve with polythene float, CP. brass handle Unions and coupling for connection with inlet, outlet and over flow pipes 40mmdia C.P. flush bend including cutting holes in wall and making good the same and connecting the flush bend with cistern and closet (overflow ) pipe to be measured and paid separately etc. complete in all respect A) Vitreous china white	1.00	2439.55	(Rs two thousand four hundred thirty nine & paise fifty five)	Each	2440
52	Providing and fixing in position brass mosquito proof coupling for over flow pipe 25mm nominal dia (over flow pipe to be measured and paid for separately)	1.00	36.25	(Rs thirty six & paise twenty five)	Each	36
53	Providing and fixing G.I. inlet connection for flush pipe with W.C. pan.	1.00	97.75	(Rs ninety seven & paise seventy five)	Each	98
54	Providing and fixing vitreous china wash basin with single hole for pillar tap with CI or M.S. bracket painted white including cutting holes and making good the same but excluding fitting. Flat back 550x400mm.	1.00	1369.55	(Rs one thousand three hundred sixty nine & paise fifty five)	Each	1370

55	Providing and fixing viterious china pedestal for wash basin complete recessed at the back for racaaption of pipe and fittings CERA with single hole for pillar tap with CI or M.S. bracket painted white including cutting holes and making good the same but excluding fitting. Flat back	1.00	968.80	(Rs nine hundred sixty eight & paise eighty)	Each	969
56	Providing and fixing C.P. Brass chain 50cm long and rubber plug of following size for pink or wash basin 32mm dia	1.00	115.00	(Rs one hundred fifteen)	Each	115
57	Providing and fixing C.P. Brass waste pipe for wash basin or sink 32mm dia ARK make	1.00	258.75	(Rs two hundred fifty eight & paise seventy five)	Each	259
58	Providing and fixing G.I. Union for wash basin or sink 32mm dia	1.00	109.25	(Rs one hundred nine & paise twenty five)	Each	109
59	Providing and fixing 100mm sand cast/cast iron pipe grating for gully floor or Nahani trap .	2.00	103.50	(Rs one hundred three & paise fifty)	Each	207
60	Providing and fixing 800x450mm leveled edge mirror for superior glass marked on 6mm thick A.C. sheet or plywood sheet and fixed to wooden plug with C.P. Brass screw and washer.	1.00	939.15	(Rs nine hundred thirty nine & paise fifteen)	Each	939
61	Providing & fixing C.P. Brass towel rail complete with C.P. brass brackets fixed to wooden plug with C.P. brass chrome pipe PCASSO-RANGE.	1.00	912.35	(Rs nine hundred twelve & paise thirty five )	Each	912
62	Providing & fixing C.P Brass Soap dish with C.P. Brass bracket fixed to wooden plug with screws chrome plate.	1.00	547.65	(Rs five hundred forty seven & paise sixty five)	Each	548
63	Providing and fixing Brass bib tap with capston head 15mm dia chrome plate ARK-GARNET collection.	3.00	1805.50	(Rs one thousand eight hundred five & paise fifty)	Each	5417



64	Providing & fixing consiled stop cocks 15 mm dia. Chrome plate	2.00	1937.75	(Rs one thousand nine hundred thirty seven & paise seventy five)	Each	3876
65	Providing & fixing PVC connection pipe with brass union 300cm length 15 mm nominal bore.	2.00	97.75	(Rs ninety seven & paise seventy five)	Each	196
66	Providing & fixing Brass full way valve with wheel ZOLOTO MAKE 15mm dia	1.00	425.50	(Rs four hundred twenty five & paise fifty)	Each	426
67	Construction of chamber in size 900x900x600mm deep including C.I. cover with frame light duty / single seal pattern 200mm thick wall of brick masonry in cement mortar 1:5 (1 cement:5 sand)	2.00	6013.30	(Rs six thousand thirteen& paise thirty)	Each	12027
68	Excavation in drain and channel etc.in earth work including dressing of sites leveling of bed and disposing the excavated earth up to all leads and lifts.	11.62	103.05	(Rs one hundred three & paise five)	cum	1197
	<b><u>ELECTRICAL FITTING</u></b>					
69	Wiring for light point/ fan point/ exhaust fan point/ call ball point with 1.5 Sqmm PVC insulated copper conductor cable in surface/ recessed steel conduit as required	12.00	913	(Rs nine hundred thirteen)	Each	10956
70	Wiring for switch main with following sizes of PVC insulated , copper conductor single core cable in surface/ recessed PVC conduit as required.					
	2x1.5sqmm	30.00	162	(Rs one hundred sixty two)	Each	4860
	2x4sqmm	35.00	213	(Rs two hundred thirteen)	Each	7455
	2x6sqmm	3.00	277	(Rs two hundred seventy seven)	Each	831

71	Earthing with G.I. Earth pipe 4.5 metre longx40mm dia including accessories and providing machinery enclosures with copper plate having locking arrangement and watering pipe extra (but without char-coal/coke and salt) complete as required	1.00	8174	(Rs eight thousand one hundred seventy four)	Each	8174
72	Extra for using char-coal/coke and salt for pipe earth electro rod as required.	1.00	904	(Rs nine hundred four)	Each	904
73	Supply and laying of 8 SWG G.I. wire at 0.50 metre below for conductor earth electro rod including soldering extra as required.	20.00	84	(Rs eighty four)	Per meter	1680
74	Providing, installing, testing and commissioning of prewired florescent tube fitting. Complete with ballast, starter and capacitors but excluding tube rod, suitable to operate on 230 Volts, single phase A.C. supply directly on surface with copper wiring as required. F/Tube fixture 1x36 watt.box type cat A	2.00	646	(Rs six hundred forty six)	Each	1292
75	Supplying and fixing metal box of 180mmx100mm x60mm deep (Nominal size) on surface with suitable size phenolic laminated sheet cover in the front including providing and fixing 6 pin 15/16 amps socket out let and 15/16 amps piano type switch, connection, painting etc as required.	3.00	189	(Rs one hundred eighty nine)	Each	567
76	Supply and fixing Tube rod 1x36 watt. of Bajaj make on the existing tube fixture complete in all respect.	2.00	48	(Rs forty eight )	Each	96
77	Supply and fixing 5 amps to 32 amps rating 240 Volts , of L- series , miniature circuit breaker of following pole in the existing MCBDB complete with connection testing and commissioning etc. as required CAT-B.	5.00	153	(Rs one hundred fifty three)	Each	765

78	Supplying and Fixing of following rating, double pole, (Single face and neutral) 240 Volts, RCCB having a sensitivity current up to 300 millian amps in the existing MCBDB. Complete with connection, testing and commissioning etc. as required. 63 amps CAT-A	1.00	2225	(Rs two thousand two hundred twenty five)	Each	2225
79	Supply and fixing of following way, single pole and neutral sheet steel, MCB, distribution board 240 Volts, on surface / recessed Complete with copper bush bar neutral link, earth dinbar, detachable gland plate, interconnection. Including painting, earthling as required 8WAY.	1.00	644	(Rs six hundred forty four)	Each	644
80	Supply and fixing metal box of 180mm x100mm x60mm deep (nominal size) on surface or in recess with suitable size penolic laminated sheet cover in the front including providing and fixing 3 pin 5/6 amps socket outlet and 15/16 amps tumt insulator switch, connections painting as required (for power plug).	2.00	136	(Rs one hundred thirty six)	Each	272
81	Suplying and fixing call bell /bugger and piano type bell push , suitable for D.C/ A.C. single phase, 230 volts, complete as required.	1.00	68	(Rs sixty eight)	Each	68
82	Providing , installing, testing and commissioning of ceiling fan and regulator , including wiring , the down rod of standard length(up to 30Cm) with 1.5 Sqmm PVC insulated , copper conductor, single core cable etc. as required.Ceiling fan 1200mm sweep category-A.	2.00	1548	(Rs one thousand five hundred forty eight)	Each	3096
83	Supplying and fixing baka light butten/angle holder including connection etc. as required.	5.00	32	(Rs thirty two)	Each	160

84	Supplying and fixing of bulk head fitting of all sizes and shapes, containing oneNO thread type CFL Lamp holder (S) complete with all accessories but excluding CFL Lamp i/c making connection, testing etc. as required.	1.00	385	(Rs three hundred eighty five)	Each	385
85	Providing and installation of exhaust fan of following sizes in the existing opening i/c making the hole to suit the size of the above fan making good the damage connections ,testing and commissioning etc. as required. Size 225mm sweep (domestic)	1.00	1043	(Rs one thousand forty three)	Each	1043
					<b>Total :-</b>	<b>723364</b>

**Gross Total Cost : Rs. ....**

We agree to execute the works in accordance with the approved drawings and technical Specifications at ..... percentage above/below the estimated rates, i.e., for a total contract price of Rs. ....(amount in figures ) (Rs. .... amount in words).

**Signature of Contractor**

**Format of certificate**

Certified that the works upto ----- level in respect of construction of ----- at ----- have been executed in accordance with the approved drawing and technical specifications.

Signature  
Name & Designation  
(Official address)

Place :  
Date :

Office seal