UNIVERSITY OF DELHI

SHAHEED BHAGAT SINGH COLLEGE
UNIVERSITY OF DELHI

Tender No.	**SBSC/273**
Project Name	**Construction of New Rooms (Three story & Renovation Work of Staff Room (Room No.-B-6) & Toilets) at Shaheed Bhagat Singh College, Sheikh Sarai, New Delhi- 110017**

SD/-

UNIVERSITY OF DELHI

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if you have any query or concern please contact College at sbscprincipal@gmail.com

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UNIVERSITY OF DELHI

TENDER FORWARDING LETTER INCLUDING INSTRUCTIONS TO TENDERERS.

TENDER NOTICE

Tenders are invited in two bid system from reputed contractors AS PER ELIGIBILITY CRITERIA listed below for carrying out **: Construction of New Rooms (Three story & Renovation Work of Staff Room (Room No.-B-6) & Toilets) at Shaheed Bhagat Singh College, Sheikh Sarai, New Delhi- 110017.**

1	**NIT No.**	**:**	**SBSC/273**
2	**Name of Work & Sub Head**	**:**	**Construction of New Rooms (Three story and Renovation Work of Staff Room (Room No.-B-6) and Toilets) at Shaheed Bhagat Singh College, Sheikh Sarai, New Delhi- 110017**
3	**Estimated Cost put to bid**	**:**	**Rs. 59,42,015.00**
4	**Earnest Money**	**:**	**Rs. 90,000.00**
5	**Tender Fee**	**:**	**Rs. 1,000.00**
6	**Period of Completion of work**	**:**	**180 days**
7	**Publish Date (uploading)**	**:**	**20.05.2023**
8	**Document Download / sale start date**	**:**	**NA**
9	**Document Download / sale end date**	**:**	**NA**
10	**Date and time of Pre –Bid (if applicable)**	**:**	**26.05.2023 at 11:30 AM (In the Committee Room, Shaheed Bhagat Singh College)**
11	**Bid submission start date & time, scanning & uploading UTR of RTGS / NEFT against EMD, proof of payment for processing fee & other documents.**	**:**	**20.05.2023 at 2:00 PM**
12	**Bid submission end date & time, scanning & uploading UTR of RTGS / NEFT against EMD, proof of payment for processing fee & other documents.**	**:**	**10.06.2023 at 5:00 PM**
13	**Bid Opening date & time**	**:**	**12.06.2023 at 2:30 PM**
14	**Eligibility Criteria**	**:**	**Refer Eligibility Criteria under Technical bid**
	Existing Conditions of Site	**:**	**To be examined by the Contractor**

Online Tenders are invited in two bid system from reputed contractors AS PER ELIGIBILITY CRITERIA listed below for carrying out **: Construction of New Rooms (Three story & Renovation Work of Staff Room (Room No.-B-6) & Toilets) at Shaheed Bhagat Singh College, Sheikh Sarai, New Delhi- 110017**

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1. As per the specifications given in the tender.

2. The followings are the eligibility criteria for the contractors to participate in the tender bid:

   a) **Average annual financial turnover during the last three Years ending 31st March, 2023 should be at least Rs 70 Lakhs.** The contractor/ firm should also have earned net profit for the last 3 years.

   b) The bidder/agency/firm should have experience of having successfully completed similar works of value as indicated below during the last 5 years ending 31.03.2023 in multistoried modern building (office /residential) having minimum G+2 floor in Govt. / autonomous / PSU / Delhi University and other similar government institutions.

Details of Work	Value of Work
Three similar completed works costing not less than the amount equal to 40% Estimated cost OR	Rs. 23.77 Lakhs
Two similar completed works costing not less than the amount equal to 50% Estimated cost OR	Rs. 29.71 Lakhs
One similar completed works costing not less than the amount equal to 80% Estimated cost	Rs. 47.54 Lakhs

   c) The contractor should have a Registered Office/Branch in Delhi/NCR at least for the last 3 years.

3. **Important Note:**

   a) The bidder shall attach authenticated documentary proof in support of financial turnover Certificates/annual audited reports of last 3 years certified by Chartered Accountant/Statutory Auditors.

   b) Similar work means carrying out and successful completion of Renovation and interior work of building having minimum G+2 floor in Govt. / autonomous / PSU / Delhi University and other similar government institutions.

   c) The bidder should attach work order copies/PO Copies/Completion Certificate/Performance Certificate from the employer clearly Indicating the nature, magnitude, date of starting and date of completion of work, indicating whether the works are completed within the stipulated time in respect of qualifying works.

   d) The bidder should provide proper documentary proof supporting their claim in respect of all the above criteria.

4. The entire tendering process is online through CPPP (Central Public Procurement Portal) and all the technical and financial bids have to be submitted **online only** through **http://eprocuregov.in** and no tender in physical form would be accepted. The Notice inviting tender can also be downloaded from college website www.sbsc.in. The tender fee of **Rs 1000/- (Rs. One Thousand only) which is non-refundable should be submitted in physical form by way of DD / Pay order (PO) drawn in favour of Principal Shaheed Bhagat Singh College**, payable at New Delhi accompanying the tender documents at the time of submission of the tender documents failing which their tender bid would be summarily rejected. **Physical Purchase of tender is not permitted**.

5. The tender documents should accompany an **Earnest Money Deposit (EMD)** of **Rs. 90,000/- (Rs Ninety Thousand Only)** by way of **DD / Pay order (PO) drawn on drawn in favour of Principal Shaheed Bhagat Singh College**, payable at New Delhi. The EMD shall not bear any **interest. Tender documents not accompanied by such EMD would be summarily rejected.**

SD/-

Time is the essence of contract. The work should be completed in **180 days including monsoon period** from the date of issue of LOI/work order.

6. The documents required to qualify the Technical Bid is to be submitted online duly filled in and signed on all the pages and stamped by the bidder accompanied by details of the Company Profile, audited balance sheet for last 3 years along with other relevant documents in pdf form. Only tender fee and EMD drafts are to be submitted in physical form at the Principal's office of before the closing date and time of tender.

7. The documentary proof in respect of Income tax returns, PAN No., GST registration no., proof of **Work Experience** of similar works during the last 5 years should also be submitted online in pdf form.

8. The Price bid of the Bidder who (fulfill) the eligibility criteria and qualifies in the Technical bid in all respects only will be opened.

9. The College reserves the right to accept any Tender or accept Tenders in part or to reject any or all Tenders without assigning any reasons thereof and will not be liable to Offer any explanation whatsoever.

10. The EMD of the successful bidder would be retained with **Shaheed Bhagat Singh College**, while the EMDs of the unsuccessful bidders would be returned after the placing of work order with the successful bidder.

11. In case if the Bidder after being declared successful L-1 bidder withdraws from the bid or fails to execute the work within the prescribed time his EMD would be forfeited.

12. The bidder must carefully read and examine the whole tender document visit the site at his own expenses, study the technical specifications etc before Submitting the tender.

13. No consideration shall be given to a tender received after the expiry of time as stipulated above and no extension of time will normally be allowed for submission of the tender.

14. The Notice inviting tenders, the conditions of tender and duly completed form of tender, Specifications etc will inter alia form part of the contract agreement to be executed by the Successful bidder with the College.

15. **Pre-bid Meeting**: For any clarification on the Bidding Document quarries may be sent on E-mail or may be submitted to The Principal Office Shaheed Bhagat Singh College At Sheikh Sarai Phase II, New Delhi on or before 26/05/2023 at 11:30 A.M.

16. Conditional bids would be summarily rejected.

17. Only one bid would be considered from one firm.

18. **Execution of Contract Agreement**: Bidder is required to execute contract agreement for the said work as per the prescribed proforma on a non-judicial stamp paper of Rs.100/- within 15 days from the issue of LOI/Award Letter. The bidder shall pay for all stamps duty and legal charges, incidental expenses, if any

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MEMORANDUM

Name of work	:	**Construction of New Rooms (Three story & Renovation Work of Staff Room (Room No.-B-6) & Toilets) at Shaheed Bhagat Singh College, Sheikh Sarai, New Delhi-110017**
Earnest Money Deposit	:	**Rs. 90,000/- (Rs Ninety Thousand Only)**
Date of Commencement of work	:	From the date of issue of LOI/ Work order
Period of Completion of commencement	:	**180 days including monsoon period** from the date of issues of LOI/work order
Payment Terms	:	a) **90%** payment of total value of work can be claimed through running bill as per progress of work i) Minimum amount of value of work to be taken for issue of Interim Certificate for payment: Rs.**10, 00,000/-** . b) **10%** to be released after successful completion of work and handing over to the satisfaction and certification of the consultant/Architect **Shaheed Bhagat Singh College**.
Retention percentage to be deducted From RA Bills as Security Deposit (SD)	:	**03%** of the gross value of the bill
Defects Liability period (DLP)	:	1 year from the date of completion
Refund of Security Deposit (SD)	:	Security Deposit shall be refunded after expiry of Defects Liability Period (DLP)
Liquidated Damages (LD)	:	0.5% of the Contract value per week or part thereof delay subject to a maximum of 10% of the contract value.
Time within which the payment is to be made	:	**15** days

THE CONDITIONS OF TENDER

1. **Online Tender**:

   The bidders have to participate in e-tendering only and no bid in physical form whatsoever would be accepted. Only tender fee and EMD demand draft would be accepted in physical form.

2. **Amendment to Bid documents:**
   At any time prior to the deadline for submission of Bids, **Shaheed Bhagat Singh College** may, for any reason, whether at its own initiative or in response to a clarification sought by any prospective bidder, modify the bidding documents by amendment / addendum/corrigendum.

   i) The amendment will be issued on the CPPP only (i.e. http://eprocure.gov.in). Those bidders shall be solely responsible to check the web site for the amendment issued in shape of Corrigendum and/or Addendum up to last date of submission of bid.

3. **Clarification on Bids:**
   i) To assist in the examination, evaluation and comparison of the technical bids, **Shaheed Bhagat Singh College** may, at its discretion, ask the Bidder for a clarification on its Bid. No

SD/-

change in price of the Bid shall be sought, offered or permitted. If required, the **Shaheed Bhagat Singh College** reserves the right to ask the bidders to submit supplementary documents to support the documents already submitted by the bidder.

ii) **Shaheed Bhagat Singh College** reserves the right to conduct joint post bid discussion after opening the technical bids, for clarification on technical bid and may amend the technical bid requirements so as to bring all the bidders on to a common platform.

4. Abnormal Rates:

The bidder is expected to quote rate for each subsection after careful analysis of cost involved for the performance of the completed sub-section considering all specifications and conditions of contract. In case it is noticed that the rates quoted by the bidder for any items are unusually high or unusually low, it will be sufficient case for the rejection of the tender unless the reasonableness of the rates is convincing. For scrutiny, the analysis for such rates is to be furnished by the bidder on demand.

5. Change Orders:

At any time during the execution of the contract, changes may be made in the specifications, scope of contract by given a written notice to the contractor by **Shaheed Bhagat Singh College** may make any changes in the quality and/or quantity of the work or any part thereof that may, in its opinion, be necessary and for that purpose the **Shaheed Bhagat Singh College** shall have the power to order the Contractor to do and the Contractor shall do any of the following:-

i) Increase or decrease or split the quantity of work include in the contract,
ii) Omit any such work,
iii) Change the character, quality or kind of any such work,
iv) Change the dimensions of any such work,
v) Execute additional work of any kind necessary for completion of the work under the contract, and no such change shall in any way vitiate or invalidate the contract but the cost, if any, arising out of all such changes shall be taken into account in ascertaining the total amount of the contract price. Where the rate is available in the contract and the same is applicable to the additional work, in the opinion of the **Shaheed Bhagat Singh Singh College**, the cost of the additional work shall be determined as per this available rate. But, if the rate for additional work is not available in the contract, the same shall be determined by the **Shaheed Bhagat Singh College** taking into account the market rate and labour cost at the site for similar works and shall be final.

6. Acceptance / Rejection of Bid:

i) **Shaheed Bhagat Singh College** does not bind itself to accept the lowest tender.
ii) **Shaheed Bhagat Singh College** also reserves the right to accept or reject any tender in part or full without assigning any reason whatsoever.
iii) **Shaheed Bhagat Singh College** also reserves the absolute right to reject any or all the Bids at any time solely based on the past unsatisfactory performance by the bidder(s). The opinion/decision of **Shaheed Bhagat Singh College** regarding the same shall be final and conclusive.

7. Each and every page of the tender document must be signed by an authorized person.

8. The tenders must be submitted in the prescribed format only.

9. The Bidder must include these charges in the rates quoted, if applicable. No separate claim on this

SD/-

account will be entertained under any circumstances whatsoever. The bidder shall quote his rates inclusive of cost of materials, corresponding wastages, labour, GST, and any other taxes and duties, octroi, and cost of transportation of materials to work site etc.

10. Errors in the schedule of quantities, rates and amount shall be dealt with in the following manner:

a. In the event of a discrepancy between the rates quoted in words and the rates in figures, lowest rate will be taken into consideration.

b. In the event of an error occurring in the amount column as a result of wrong calculation the unit rate shall be regarded as firm and the amount shall be amended accordingly based on the quantity given.

c. All errors in totaling in the amount column and in carrying forward, the totals shall be corrected.

11. The quantities indicated in the schedule of quantities are only probable quantities and are liable to alteration by omission, reduction or addition. Payment shall be made on the basis of actual quantities of work done at the accepted rates.

12. No alterations which are made by the bidder in the specifications or in probable quantities accompanying the tender will be recognized and if any such alterations are made the tender is likely to be rejected and invalidated.

13. The bidder must have site visit his own expenses for gathering all the information related to work **The site can be inspected on any working day** from 10:00 a.m. to 3:00 p.m

14. The bidder shall also bear all expenses in connection with the preparation and submission of this tender.

15. **EARNEST MONEY DEPOSIT (E.M.D) :**

The bidder shall also deposit an amount of **Rs. 90,000/- (Rs Ninety Thousand Only** in the form of a Demand Draft/pay order drawn on any Nationalized/scheduled Bank in **favour of The "Shaheed Bhagat Singh College",** Payable at **New Delhi** at the time of submission of the tender as Earnest Money. **Shaheed Bhagat Singh College** is not liable to pay any interest on Earnest Money.
The EMD of unsuccessful bidder shall be refunded to them without any interest after the decision to award the work is taken. The EMD of the successful bidder shall be retained as part of security deposit and for the due fulfillment of the contract.

The Earnest Money Deposit submitted by the bidder will be forfeited if,

a) If successful bidder fails to execute an Agreement within specified time as per intimation/request of the **Shaheed Bhagat Singh College**,
b) He withdraws his tender or backs out after acceptance,
c) He withdraws his tender before the expiry of validity period stipulated in the bidding document,
d) He violates any of the terms and conditions of the tender,
e) He revises any of the items quoted during the validity period,
f) Evidences are found to be fraudulent/non-genuine.

16. **SECURITY DEPOSIT (S.D) :**

Security Deposit shall be deducted from running/progressive bill/s of the contractor @3.00% of the gross value of the each bill. Security Deposit shall be refunded after expiry of Defects Liability Period (DLP).

SD/-

17. <u>COMPLETION PERIOD :</u>

The time is the essence of contract. The entire work shall be completed by the contractor within **180 DAYS including monsoon period from** the date of issue of the work order. The work shall be commenced immediately after the issue of LOI. The work is of urgent nature and the completion time schedule should be strictly adhered to by the contractor.

18. The tenders submitted shall remain valid for acceptance for a period of **9 0 days** from the date of their opening. Should any bidder after being declared as successful bidder withdraws his tender or makes any modifications to his tender, the tender shall be treated as having been rejected or abandoned and his EMD will be forfeited.

19. It is not binding on **Shaheed Bhagat Singh College** to accept the lowest tender and reserves the rights to reject any or all the tenders received without assigning any reasons thereof. Further **Shaheed Bhagat Singh College** reserves the right to award any portion of the work or portions of the work to different bidders or to award the entire work to one bidder.

20. The bidder whose tender is accepted is bound to execute a formal agreement with **Shaheed Bhagat Singh College** in accordance with the draft agreement which will include the notice inviting tender, tender conditions, other papers herein, special conditions and specifications etc. Irrespective of whether a formal agreement is drawn or not the contractor on being awarded the contract is liable based on acceptance of his tender. The contractor shall bear all expenses in connection with the execution of the said agreement including fees for stamps and registration of documents as required.

21. The work shall be carried out under the directions and supervision of and subject to the approval in all respects by the Architect /authorized person /**Principal of Shaheed Bhagat Singh College.**

22. On acceptance of the tender the contractor shall in writing inform **Shaheed Bhagat Singh College and t**he Consultants the names of his accredited representatives who will be responsible to take instructions from the Architect /authorized person /**Principal of Shaheed Bhagat Singh College.**

23. The work or any part of it shall not be transferred assigned or subject without the consent of the **Shaheed Bhagat Singh College**.

24. The contractor shall be required to co-operate and work in accordance with and afford reasonable facilities for such other agencies/specialists as may be employed by **Shaheed Bhagat Singh College** on other works / sub works in connection with the work.

25. The contractor will be required to insure the work and keep it insured until one month after the date of taking over the works by **Shaheed Bhagat Singh College** or otherwise as per the terms of the contract, against loss or damage by fire and other usual risks other than the risks accepted in the terms of the contract with an approved in **Shaheed Bhagat Singh College**.

26. The contractor is required to comply with all relevant Acts of Govt. relating to labour rules and regulations made thereunder from time to time submit at the proper times all particulars and statements required to be furnished to the labour authorities.

27. For all the items of work executed by him, the contractor will be required to supply, at his own expenses, to the Consultants, copies of post card size photographs in triplicate for each of the works, taken from two approved portions of each item of work at intervals of not more than two weeks during the progress of the work and also at every important stages of the work or as directed by the Architect /authorized person /**Principal of Shaheed Bhagat Singh College**.

SD/-

28. In carrying out the work, the contractor shall comply with the provisions of the safety code, annexed to these papers.

29. The bidder shall furnish an undertaking duly attested by notary in a non-judicial stamp paper of value Rs.100/- (Rupees Hundred Only) regarding their non-blacklisting/Left any work abandoned in any of the government department and public sector undertaking/enterprise in India and central vigilance commission during the last five financial years as per Annexure-X.

SD/-

UNIVERSITY OF DELHI

FORM OF TENDER FOR WORKS

To,
The Principal
Shaheed Bhagat Singh College,
Sheikh Sarai Phase II,
New Delhi,
Delhi-110017.

Dear Sir,

1. Having duly examined the tender documents including the specifications, designs, schedule of quantities relating to the works specified in the underwritten memorandum and having visited the site of the said work and having acquired all the requisite information relating thereto as affecting this tender. I/We hereby offer to execute the works specified in the underwritten memorandum within the time specified there in at the rates specified in the schedule of quantities and in accordance, in all respects with the specifications, designs, and instructions in writing referred to in the conditions of the tender, the articles of agreement, special conditions, the schedule of quantities, and conditions of the contract and with such conditions of the contract and with such materials as are specified, by and in all other respects in accordance with such conditions in the schedule of quantities and conditions of contract so far as applicable.

2. Should this tender be accepted, in whole or in part, I/We hereby agree (I) to abide by and fulfill all the terms and provisions of the said conditions of the contract annexed hereto and the conditions of tender so far as applicable or in default thereof to forfeit and pay to **Shaheed Bhagat Singh College, Sheikh Sarai Phase II, New Delhi-110017,** the sums of money mentioned in the said conditions.
   a. A sum of **Rs. 90,000/- (Rs Ninety Thousand Only** is here by forwarded as Earnest Money Deposit in form of Demand Draft /pay order drawn on any Nationalized /schedule bank in favor of **"Shaheed Bhagat Singh College" ,** payable at New Delhi.
   b. I/We agree (i) that should I/We fail to commence the work specified in the above mentioned memorandum **Shaheed Bhagat Singh College** shall without prejudice to any other right or remedy be the liberty to forfeit the Earnest Money, otherwise shall be retained by **Shaheed Bhagat Singh College** towards security deposit mentioned in the above memorandum. (ii) to execute all the works referred to in the tender document upon the terms and conditions contained or referred to therein and to carry out authorized variations as directed by the Architect /authorized person /**Principal of Shaheed Bhagat Singh College** and as per said conditions of the contract.

The name of the Proprietor /Partners/Directors
of our firm are:

Signature of bidder with seal

Dated the ……day of ……2023

SD/-

UNIVERSITY OF DELHI

PERFORMA -I

BIDDER TECHNICAL DETAILS

S. No.	Particulars/Details	
1.	Name of the Bidders/ Firm	
2.	Year of establishment	
3.	Communication Address	
4.	Telephone No. Office	
	Mobile	
	Fax	
	E-Mail	
	Website	
5.	Authorised Person - Name	
	Designation	
	Mobile	
	E-Mail ID	
6.	Alternate Authorised Person - Name	
	Designation	
	Mobile	
	E-Mail ID	
7.	PAN No.	
8.	GST. Registration	
9.	Beneficiary Bank Details	
	Bank Account No	
	IFSC/NEFT Code	
	Name of Bank	
	Address of Branch	

SD/-

10.	Beneficiary Bank Details	
	Bank Account No	
	……../NEFT Code	
	Name of the Bank	
	Address of Bank	
11.	Particular of Earnest Money Deposit (EMD)	
	Amount	Rs.
	(DD/PO) No.	
	Date	
	Name of the Bank	
	Address of Bank	
12.	Name of Directors / Partners/ proprietor(s) (Please enclose relevant document/deed)	
13	Status of the firm (Company / Firm/ Proprietary)	
14	Whether registered with the registrar of companies / registrar of firms. If so, mention number and, date.	
15	Whether the bidder is income tax assesse, If so, please mention permanent account number. Furnish copies of income tax returns for three years duly certified	
16.	Furnish the names with address & telephone nos. of three responsible persons who will be in a position to certify about the services/quality as well as the past performance of your organization.	
17.	Whether you accept all the terms and conditions of the tender; Yes/No	

SD/-

UNIVERSITY OF DELHI

DETAIL OF EXPERIENCE – PROFORMA-II

1. Details of Similar Experience: Details of Similar works executed during the last 5 years

Sl. No.	Name & Address of the client, Concerned Person and contact/ Mobile No	Location of work	Value of Work (In lakh)	Stipulated Time of Completion	Actual time completion with date of start & completion	Completion/ Performance Certificate enclosed 'Yes' or 'No'	Any other information you would like to give

(Fill up the above table & Enclose legible copies of the supporting documents)

2. Financial Capability: Average Annual Turn Over of the bidder in the last 3 years

SL. No.	**Financial Year**	**Turnover (Rs. in lakh)**
1.	2020-21	
2.	2021-22	
3.	2022-23	
	Average	

(Fill up the above table and Enclose copy of Turn over certificates, profit/loss statement certified by any Chartered Accountant.)

SD/-

UNIVERSITY OF DELHI

Proforma -III

NON DISCLOSURE UNDERTAKING (INTEGRITY PACT)

(To be typed and submitted in the Letter Head of the Company/Firm of Bidder)

NON DISCLOSURE UNDERTAKING (INTEGRITY PACT)

I/We understand that **Shaheed Bhagat Singh College** ____ is committed to Information Security Management System as per their Information Security Policy.

Hence, I/We M/s_____

who are submitting offer for providing services to **Shaheed Bhagat Singh College** ___ against Tender Specification No. _____ hereby undertake to comply with the following in line with Information Security Policy of **Shaheed Bhagat Singh College** _____, _____

- To maintain confidentiality of documents & information which shall be used during the execution of the Contract.
- The documents & information shall not be revealed to or shared with third party which shall not be in the business interest of **Shaheed Bhagat Singh College**

(Signature, date & seal of Authorized
Signatory of the bidder)

Date:

SD/-

UNIVERSITY OF DELHI

DECLARATION

(TO BE TYPED ON A LETTER HEAD OF THE COMPANY/ FIRM)

Dated: ____ , 2023.

To,
The Principal
Shaheed Bhagat Singh College,
Sheikh Sarai Phase II,
New Delhi,
Delhi-110017.

Dear Sir,

1. We have carefully read and understood all the terms and conditions of the tender and hereby convey our acceptance to the same.
2. The information / documents furnished along with the above offer are true and authentic to the best of my knowledge and belief. We are well aware of the fact that furnishing of any false information / fabricated document would lead to rejection of our tender at any stage besides liabilities towards prosecution under appropriate law.
3. We have apprised our self fully about the job to be done during the currency of the period of agreement and also acknowledge to bear consequences to of nonperformance or deficiencies in the services on our part.
4. We have no objection, if enquiries are made about the work listed by us.
5. We have not been blacklisted by **Shaheed Bhagat Singh College** or any other organization where we have worked. Further, if any of the partners/directors of the organization /firm is blacklisted or having any criminal case against them, our bid shall not be considered. At any later point of time, if this information is found to be false, **Shaheed Bhagat Singh College** may terminate the assigned contract immediately.
6. We have not been found guilty by a court of law in India for fraud, dishonesty or moral turpitude.
7. We agree that the decision of **Shaheed Bhagat Singh College** in selection of Bidders will be final and binding to us.

Date: Signature of authorized person

Place: Full Name & Designation:

Company's Seal:

SD/-

UNIVERSITY OF DELHI

TENDER FORM

To,
The Principal
Shaheed Bhagat Singh College,
Sheikh Sarai Phase II,
New Delhi,
Delhi-110017.

Dear Sir,

I/We, the undersigned having carefully gone through and clearly understood the Specifications, with conditions of contract for the above mentioned work, do hereby tender to execute and complete the whole of the works strictly in accordance with the said specifications, etc. at the rates set out in the priced bill of quantities.

I/We am/are sending you herewith an amount of **Rs. 90,000/- (Rs Ninety Thousand Only)** as Earnest Money by Demand Draft / Pay Order which amount is not to bear any interest and I/We do hereby agree that the same may be forfeited by you in the event of your accepting my/our tender and I/We fail to execute the contract when called upon to do so.

It is understood that the lowest or any tender will not necessarily be accepted and **Shaheed Bhagat Singh College** reserves the right to accept or reject any or all the tenders and that **Shaheed Bhagat Singh College** is not bound to assign any reason for the same.

I/We agree to keep our offer open for a period of 90 days from the date of opening of tenders.

Thanking you,

Yours faithfully

Dated

Place

(Contractor's signature with seal)

SD/-

UNIVERSITY OF DELHI

SPECIMEN COPY

Not to be filled. To be executed at the time of award of contract

ARTICLES OF AGREEMENT

Stamped Paper of Appropriate Value

This Agreement entered into on this the _____day of _____ Two Thousand and (____/___/) at_____ Between SHAHEED BHAGAT SINGH COLLEGE., a constituent college of University of Delhi, at **Sheikh Sarai Phase II, New Delhi, Delhi-110017.**
, represented herein by its……(hereafter referred to as "THE COLLEGE" which expression shall mean and include, wherever the context so requires or admits, its assigns, nominees, successors-in-interest and administrators)

and

……, a contractor having office at …….. (Address) (hereafter referred to as "the Contractor" which expression shall mean and include, wherever the context so requires or admits, its successors-in-interest, administrators and executors).

WITNESSES AS FOLLOWS:

I. WHEREAS the College is a constituent College of university of Delhi

II. WHEREAS the College is desirous of engaging the services of …… (name of contractor) in respect of …… (name of work) for consideration to be mutually agreed upon by the parties. Whereas the College desirous of appointing …… (name of contractor) as its Contractor to carry out works specified in the Tender documents and the Contractor is desirous of being appointed thus

NOW THIS AGREEMENT WITNESSES THAT in consideration of the above and of the covenants of the parties contained herein, The College hereby engages …….. (name of contractor) as its Contractor for performing work, the scope of which is specified in tender documents, which appointment is hereby accepted by the Contractor, on the mutual terms and conditions contained below:

1. **ENGAGEMENT**

The College hereby engage the Contractor above named for performing the works specified in the tender documents and employing labour to perform the said works in respect of …….. (name of work).

2. DURATION/TENURE OF CONTRACT AGREEMENT

The engagement of the Contractor by the college under this Agreement shall be for a period of ……. months, certain, commencing from …….. This Agreement shall automatically stand terminated upon expiry thereof unless extended by mutual agreement.

3. FUNCTIONS, DUTIES AND RESPONSIBILITIES OF THE CONTRACTOR

3.1 The contractor shall perform all the works specified in Conditions of contract to this agreement and may engage contract labour for the said purpose, the minimum number to be specified by the College.

3.2 The contractor shall and hereby agrees and confirms to comply with all the provisions of Labour laws and industrial laws in respect of the labour employed thereof.

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3.3 The Contractor shall apply for and obtain license as provided for under Section 12 of the Contract Labour (Regulation and Abolition) Act, 1970 whenever it employs 20 or more workmen on any day in a year and also obtain renewal from time to time.

3.4 The contractor shall apply for and obtain license as provided under section 12 of contract Labour (Regulation and Abolition) Act, 1970 for each branch or office as a separate unit.

3.5 The Contractor shall strictly comply with all the terms and conditions that the licensing authority may impose at the time of grant of license and the College shall not be responsible for the same.

3.6 The Contractor shall be solely responsible for the payment of wages, including overtime wages to the workmen and ensure its timely payment thereof.

3.7 The Contractor shall duly maintain a register giving particulars of the contract labour employed, nature of work, rate of wages, etc.

3.8 The Contractor shall also ensure the compliance of the following labour legislations:

(i) Minimum Wages Act, 1984;
(ii) Employees Provident Fund;
(iii) Employees State Insurance Act, 1948
(iv) Workmen's compensation Act, if the ESI Act does not apply.

3.9 The contractor shall obtain an independent code number under the Employees State Insurance Act, 1948 and the Employees Provident Fund.

3.10 The Contractor shall ensure that the compliance with the provisions of the Contract Labour (Regulation and Abolition) Act 1970 and other labour legislations is current and up to date at all times during the performance of the works specified in the tender document.

3.11 The Contractor shall be solely responsible to adhere to all the rules and regulations relating to labour practices and service conditions of its workmen and at no time it shall be the responsibility of the College.

3.12 The Contractor or its workmen shall not at any point of time have any claim whatsoever against the College.

3.13 The Contractor shall indemnify the College in so far as liability incurred by the College on account of any default by the contractor.

3.14 Neither the Contractor nor his workmen can be treated as employees of the College for any purposes. They are not entitled for any claim, right, preference etc over any job/regular employment of the College.

3.15 If the contractor fails to discharge his duties or neglects to perform the work agreed to be done under the agreement, the College is entitled to terminate this agreement as per Clause 6 and get the work done by/through others and claim reimbursement of actual expenses incurred and also damages for the loss incurred on account of failure on the part of the contractor to discharge the duties or to perform the work under the agreement.

4. REMUNERATION

4.1 The College shall pay the Contractor, remuneration for services rendered under the provisions of this Agreement. Provided however, that such remuneration shall be payable only if the Contractor has duly performed all its obligations and covenants under this Agreement and has discharged all its functions and responsibilities to the satisfaction of the College.

4.2 The rate of remuneration payable by the College shall be mutually agreed between the College and the Contractor from time to time, in writing, which shall be read as part and parcel of this Agreement;

4.3 The remuneration payable shall be subject to deduction of tax at source.

1. MISCELLANEOUS

5.1 The College shall not assign, delegate, transfer etc., any of their right/s and/or obligation/s under this Agreement to any third person/s, concern/s, firm/s, company/ies or entity/ies;

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5.2 The Contractor shall at all times during this Agreement and thereafter, indemnify and keep indemnified the College, its officers, employees and representatives, from all or any claims, losses, demands, damages, etc, which the College, its officers, employees and representatives may or are likely to suffer by reason of acts, defaults, deeds, things, omissions and commissions committed by the Contractor, while performing the conditions of this Agreement;

5.3 Any amendment and/or modifications to this Agreement shall be valid and binding on either party, only if such amendment/modification is mutually agreed to in writing and executed by both parties;

5.4 If any provision contained herein should be held unlawful, becomes incapable of performance by either Party, is rendered void or unenforceable for any reason, that provision shall be severed from this Agreement and the other provisions shall continue to be valid and performed, as if the severed provision was never a part of this Agreement.

6. TERMINATION

If the Contractor, in the opinion of the College, fails or neglects to fulfill any or all terms and conditions of the Agreement, the College shall be entitled to terminate this Agreement, without assigning any reason, by a written notice of thirty (30) days to the Contractor and the Contractor shall not have any right to claim any damage/compensation from the College for the same.

7. NOTICES

All notices required to be given under this Agreement shall be deemed to be sufficiently given if they are forwarded by registered post A.D./hand delivery with acknowledgement to:

The College at:

To,
The Principal
Shaheed Bhagat Singh College,
Sheikh Sarai Phase II,
New Delhi,
Delhi-110017.
.

The contractor at: ……..

8. **GOVERNING LAW AND JURISDICTION**

This Agreement shall be construed and interpreted in accordance with the laws of India. The Courts in New Delhi City alone, to the exclusion of all other courts elsewhere in India, shall have jurisdiction to try any dispute arising out of this Agreement.

9. **DISPUTE RESOLUTION**

In case any dispute/s or difference/s arises between the Parties in connection with any matter relating to this Agreement including termination thereof then at the option of the College, the same shall be referred to Arbitration by a sole Arbitrator appointed by the College. The decision of the sole arbitrator shall be final and binding on the Parties. The provisions of the Arbitration and Conciliation Act, 1996 and amendments, if any, thereto shall be applicable to such arbitration. The place of Arbitration shall be New Delhi and the language of arbitration shall be in English.

10. The original of this agreement shall be with the College and the signed duplicate or Photocopy of the agreement shall be handed over to the Contractor.

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UNIVERSITY OF DELHI

(Signature of the Authorized Representative of Shaheed Bhagat Singh College with Seal) **(Signature of the Contractor with seal)**

IN WITNESS WHEREOF THE PARTIES ABOVE NAMED HAVE EXECUTED THESE PRESENTS ON THE DAY, DATE, MONTH AND YEAR WRITTEN HEREINABOVE IN THE PRESENCE OF THE WITNESSES ATTESTING HEREUNDER:

WITNESSES: 1.	For Shaheed Bhagat Singh College
2.	For Contractors

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UNIVERSITY OF DELHI

CONDITIONS OF CONTRACT

1. **Interpretation Clauses:**

   a. In constructing these conditions, the specifications, schedule of quantities and contract agreement, the following words shall have the meanings here in assigned to them except where the subject or context other requires.

   b. Headings and marginal notes to the conditions of contract shall not be deemed to form part thereof or be taken in to consideration in the interpretation or construction there of or of the contract.

   c. Where the context so requires (i) words importing persons include firms and corporations and (ii) words importing the singular only also include the plural and vice versa.

   d. Employer shall mean **Shaheed Bhagat Singh College,** having its Office **for Shaheed Bhagat Singh College at Sheikh Sarai Phase II, New Delhi.**

   e. Consultant**:** Shall mean **architects** and engineers, Project Management or in the event of their ceasing to a. be Consultant for the purposes of this contract such other person or persons as shall be nominated for that purpose by the Employer subject to such qualifying provisions as may be agreed upon.

   f. **Contractor** shall mean the execution agency/firm/Company and include his/their legal representatives, permitted assigns, or successors.

   g**. Site:** The site shall mean the site where the works are to be executed (**Shaheed Bhagat Singh College**, **at Sheikh Sarai, New Delhi**) including any building and erections there on allotted by the Employer for the Contractor's use.

   h. **The Contract:** Shall mean the tender documents comprising the notice inviting tender, form of tender conditions, the drawings and priced bill of quantities with their preamble, the acceptance thereof, and the articles of agreement, together with the conditions of contract with its appendix and special conditions, if any, the specifications referred to in the conditions, designs, drawings and instructions issued from time to time by the **Consultants/ Shaheed Bhagat Singh College** and all these documents taken together are deemed to form one contract and shall be complementary to one another.

   i. **Bills of Quantities:** Variously also termed priced bill of quantities, schedule of rates, shall means the schedule of quantities originally furnished with the notice inviting tender, duly priced in by the bidder and accepted by the Employer for

      a. Inclusion as a part of the contract for determining the consideration payable to the contractor for executing the work and as part of the contract agreement it is also referred to as the contract scheduled.

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j. **Notice in writing** or written notice shall mean a notice in written, typed or printed characters sent (Unless delivered personally or otherwise proved to have been received) by registered post to the last known private or business address or to the registered office of the addressee and shall be deemed to have been received when in the ordinary course of post it would have been delivered.

k. Act **of Insolvency:** Shall mean any act of Insolvency as defined by the presidency towns Insolvency Act. Or the provincial Insolvency Act or any is amending such original.

l. **Net Prices:** If in arriving at the contract amount the contractor shall have added to or deducted from the total of the items in the tender any sum, either as a percentage or otherwise, then the net price of any item in the tender shall be the sum arrived at by adding to or deducting from the actual figure appearing in a tender as the price of that item a similar percentage or proportion of the sum so added or deducted by the contractor, the total amount of any price cost items and provisional sums of money shall be deducted from the total amount or the tender. The expression "net prices" when used with reference to the contract or accounts shall be held to mean rates or prices so arrived at.

m. **The works** (or the work) shall unless there by something either in the subject or context repugnant to such construction, be considered and taken to mean the works by or by virtue of the contract contracted to be executed whether temporary or permanent, and whether original, altered, substituted or addition. Wherever the word "works" is used it shall cover "installation" also under the same definition.

n. **Executed Risks** are risks due to riots (otherwise than among contractors Employees) and civil commotion (in so far as both these are uninsurable war (whether declared or not) invasion, act of foreign enemies, civil war, rebellion, revolution, insurrection, military or usurped power, any acts of Government, damage from air craft, acts of God such as earthquake, lighting and unprecedented floods and other causes over which the contractor has no control and accepted as such by the Employer or causes solely due to use of occupation in manner for which the woks/installations in respect of which a certificate of completion has been issued or a cause solely due to faulty design of works.

o. Provisional **Items** shall mean items for which only very approximate quantities have been included in the tender documents.

p. **Virtual Completion** of works / installations shall mean the substantial Completion of the works / installations in accordance with the contract enabling the employer to take over the same.

2. **Consultant/ Shaheed Bhagat Singh College Instructions :** The contractor shall execute the whole and every part of the work in the most substantial and workmanship like manner and both as regards materials and otherwise in every respect in strict accordance with the specifications, conforming exactly, fully and faithfully, to the designs, and instructions in respect of the work given by the **Consultants/ Shaheed Bhagat Singh College** and under the directions of and under the supervision of and subject to the approved in all respects by the Consultant/ **Shaheed Bhagat Singh College** who may in their

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discretion and from time to time issue further , and/or written instructions, directions and/or written instructions, details and explanations which are hereafter collectively referred to as Consultant/ **Shaheed Bhagat Singh College** in regard to:

a. Variation or modification of the design quality or quantity of works of the addition or omission or substitution of any work.

b. Any discrepancy in the schedule of quantities and/ and/or specifications.

c. The removal from the site of any materials brought thereon by the contractor and the substitution of any other materials therefor.

d. The dismissal from the works of any persons employed there upon.

e. The opening up for inspection of any work covered up.

f. The amending and making good of any defects under clause 19.

g. The removal and/or re-execution of any works executed by the contractors, on account of defects under clause 18.

The contractor shall forthwith comply with and duly execute any work comprised in such **Consultants/ Shaheed Bhagat Singh College** instructions provided always that verbal instructions, directions and explanations given to the contractor or his representative upon the works by the Consultant/ **Shaheed Bhagat Singh College** shall if involving a variation, be confirmed in writing by the contractor within seven days by and if not dissented from writing with in a further seven days by the Consultants/ **Shaheed Bhagat Singh College**, such shall be deemed to the Consultant/ **Shaheed Bhagat Singh College** instructions within the scope of the contract.

Manner of Execution of work: The **Consultant/ Shaheed Bhagat Singh College** shall be entitled to, direct at what point or points and in what manner the works are to be commenced, and from time carried on.

Variation to be approved by Employer : Not withstanding anything herein contained, the **Consultant/ Shaheed Bhagat Singh College** or his representative shall not, without prior concurrence in writing which will result in the Employer having to pay the contractor any additional sum greater than Rs. 2500/- and all such instructions issued to the employer. The contractor shall submit through the **Consultant/ Shaheed Bhagat Singh College** a statement of analysis of rates, vouchers, etc. The rates on scrutiny and final acceptance of the Employer under the terms and clauses 16 hereof shall form a supplementary schedule of quantities.

3. **Agreement copies to be supplied:** The contract Document shall remain in the custody of the Consultant/ **Shaheed Bhagat Singh College** (Employer) and shall be produced by him at his office as and when required by the **Employer/Consultant/ Shaheed Bhagat Singh College** or the contractor. The contractor on the signing hereof shall be furnished by the **Consultant/ Shaheed Bhagat Singh College (Employer**) free of cost with a certified copy of the

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agreement and one copy each of all the works and the **Consultants/ Shaheed Bhagat Singh College** or his representatives shall at all reasonable times have access to the same. Before the issue of the final certificate to the contractor he shall, if so required, forth with return to the Consultant/ **Shaheed Bhagat Singh College** all specifications.

4. **The contractor to provide everything necessary:** The contractor shall be deemed to have satisfied himself before tendering as to the correctness and sufficiency of his tender for the works and of the rates and amounts shall except as otherwise provided cover all his obligations under the contract, and all matters and things necessary for the proper completion of the works.
   The contractor shall provide at his own cost all materials (except such, materials if any, as may in accordance with the contract be supplied by the Employer) machinery, plant, tools, appliances, implements, ladders cordage, tackle, scaffolding, in fact everyt hing necessary or proper for the proper execution of the work, whether original, altered or substituted according to the true intent and meaning of the or substituted taken together whether the same may or may not be reasonably inferred there from, and if the contractor finds any discrepancy in the schedule of quantities and specifications, or between the schedule of quantities and specifications, he shall immediately and in writing refer to the Consultant/ **Shaheed Bhagat Singh College** who shall decide which is to be followed, subject to:

   i. Anything shown or contained in any one or other of (a) the drawings. (b) Specifications and (c) the contract schedule and not shown in the others shall be equally binding as if it were contained in each of them.

   ii. Figured dimensions are to be followed in preference to the scale, and large scale details in preference to small scale drawings.

   iii. The following orders of preference shall apply:
   (a) The drawings, (b) specifications, covered by bill of quantities, (c) Technical specifications.

5. **Contractor to confirm to legal regulations :** The contractor shall confirm to the provisions any Act of the Legislature relating to the works and to the regulations and Bye - laws of any authority and if any water, lighting and other companies and/or authorities with whose system the structure is proposed to be constructed, and shall , before making any variations from the specifications that may be necessitated by so conforming give to the **Consultant/ Shaheed Bhagat Singh College** written notice, specifying the variation proposed to be made and the reason for it, and apply for instructions thereon. In case the contractor shall not within ten days receive such instructions he shall proceed with the work, confirming to the provisions, Regulations or bye-laws in question and any variations so necessitated shall be dealt with under clause 12 & 16.

   The contractor shall bring to the attention of **the Consultant/ Shaheed Bhagat Singh College** all notices required by the said Acts, regulations or bye-laws to be given to any authority and pay to such authority , or to any public office all fees that may be properly chargeable in respect of the works and lodge the receipts with the **Consultant/ Shaheed Bhagat Singh College.**

   The contractor shall indemnify the Employer against all claims in respect of patent rights and shall define all actions arising from such claims to and himself pay all royalties, license fee, damage, cost and charges of all and every sort that may

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legitimately be incurred in respect thereof.

The Employer is entitled to deduct all taxes and rates as per existing laws and rules, from any money due or that may become due to the contractor.

The contractor shall indemnify the Employer from and against all claims, demands, proceedings damages, or to which it may put by reason not confirming to or complying with any of the provisions or requirements of any act or sanction, central or state, rules, regulations, Bye-laws of local authorities, panchayats, collector or any other companies relating to or in water, light or other amenities at the site.

6. **Contractor Responsible for setting out work :** The contractor shall on the basis of dimensioned information necessary for the purpose furnished by the Consultants/ **Shaheed Bhagat Singh College** set out the works on site at his own expense and responsible for the correctness of the positions, levels, dimension and setting out by the representative of the consultant or of the Employer shall not in any way he shall amend at his own cost and to the satisfaction of the **Consultant/ Shaheed Bhagat Singh College,** any error in the setting out or consequential to wrong setting out, found at any stage during the progress of the work or during the defects liability period after completion of the work.

7. The contractor shall maintain at the site comprehensive registers, posted up-to-date, showing the nature of the materials/articles/goods their identification marks, dates and the results of the tests, etc. such registers shall be got countersigned by the representatives of the Consultant/Employer at site and extracts from the Consultant and the Employer. The form of the registers shall be mutually set.

   The costs of the sets and of the materials and labour and equipment if any, involved in the testing operations shall be borne by the Contractor in all cases except as otherwise provided for in the contract.

8. **Supervision by Contractor:** The contractor shall give all necessary personal superintendence during the execution of works, and thereafter as long as the **Consultants / Shaheed Bhagat Singh College** may consider necessary until the expiration of the "Defects Liability Period" satisfied in clause 19 herein. The contractor shall also during the whole time the works are in progress, employ a competent and qualified representative whose name shall be approved by the Consultant/ **Shaheed Bhagat Singh College** and who shall be Consultancy in attendance at the works while the men are at work. Any directions, explanations, instructions, or notices given by the Consultant/Employer to such representative shall be held to have been given to the contractor. If the contractor fails to appoint and keep on the works a competent and qualified representative as aforesaid the **Consultant/ Shaheed Bhagat Singh College** shall have powers to suspend the works till such time a competent qualified representative as aforesaid is posted and the contractor shall not be entitled to claim extension of time on the plea of such suspension of the works.

9. **Dismissal of workman:** The contractor shall on the request of the Consultant/Employer immediately dismiss from the works any person employed thereon by him who may, in the opinion of the person shall not be again employed on the works without the permission of Consultant/Employer.

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10. **Access to works: The** Employer, the consultant and his respective representatives shall at all reasonable times have free access to the works and /or to the workshops, factories or other places where materials are laying or from which they are being obtained and his respective representative, all reasonable facilities necessary for inspection and examination and tests of the materials and workmanship. No person unauthorized by the Employer or the consultant except the representatives of public Authorities shall be allowed on the works at any time.

11. **Work not to be sublet:** The whole of the works included in the contract shall be executed by the Contractor who shall not directly or indirectly transfer, assign or sublet the contract or any part share thereof or interest therein without the written consent of the Employer, and no undertaking shall relieve the contractor from active superintendence of the works during their progress.

12. **Variation not to vitiate the contract:** No alteration, omission or variation shall vitiate this contract but incase if the **Consultant/ Shaheed Bhagat Singh College** thinks proper at any time during the progress of the works to make any alterations in or additions to or omission from or substitutions for the original specifications, designs and instructions or any alterations in the kind or quality of the materials to be used in the work and shall give notice thereof to the contractor, in writing the contractor shall alter, add to or omit from or substitute for as the case may require, in accordance with such notice and carry out the amended work on the same conditions in all respects on which he agreed to do the main work, but the contractor shall not do any work extra to or make any alterations or additions to or omissions from or substitutions in the works or any deviation from any of the provisions of the contract stipulations, specifications or contract drawings without the previous consent in writing of the **Consultant/ Shaheed Bhagat Singh College** and the value of such extra, alteration, additions or omissions or substitutions shall in all cases be determined by the Consultant/ **Shaheed Bhagat Singh College** with the prior approval in writing of the Employer in accordance with the provisions of Clause 16 hereof, and shall be added to or deducted from the contract amount accordingly.

    12.1 The supply and execution of any part of the carrying out of any works incidental to the execution of any item or class of work shown in the schedule of quantities shall not constitute a variation entitling the contractor to extra paying providing that the said item or class of work cannot be executed satisfactorily according to the true intent and meaning of the specifications without the said part thereof or the said work incidental thereto whether the same may or may not be particularly shown or described in the specifications and schedule of quantities and provided the same may be reasonably inferred thereof.

    12..2 In the event of extra item/excess quantity including authorized variations result in an addition to the contract sum in excess of 10% be extended on payment by the contractor as follows:

    i) In the proportion which the total executed contract value including authorized variations bears to the original contract value, the certificate of the **consultant/ Shaheed Bhagat Singh College** being conclusive as to such proportion:

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ii) 10% of the additional value calculated way of i) above or such further value as may be considered to be reasonable by the consultant/ **Shaheed Bhagat Singh College**.

12.3 Similarly, the changing the position of the work from one to another or to a more difficult position than shown in the drawings or described in the specifications or the contract schedule, or the carrying out of work under circumstances not contemplated in the specification or the contractor to extra payment.

13. **a) No compensation for alteration in or restriction of work :** If at any time after the commencement of the work the Employer for any reason whatsoever does not require the whole or part or parts thereof as specified in the tender to be carried out, the **Consultant / Shaheed Bhagat Singh College** shall give notice in writing of the fact to the contractor who shall not claim for any compensation whatsoever on account of any profit which he might have derived from the execution of the work in full, but which he did not derive in consequence of the full amount of the work not having been carried out. Nor shall have any claim for compensation by reason of any alterations having been made in the original specifications, drawings, designs and instructions which shall involve curtailment of the work originally contemplated.

b) Schedule of quantities on standard of measurement: The schedule of quantities unless otherwise stated shall be deemed to have been prepared in accordance with the Indian Standard Method of Measurement.

14. **Errors in Bill of Quantities:** No error in description or in quantity or by way of omission of items from the schedule of quantities shall vitiate this contract but shall be rectified and the value thereof as ascertained under clause 16 herein shall be added to or deducted (as the case may be) from the contract amount provided that there shall be no rectification of errors in the contractor's schedule of rates.

15. **Measurement of works:** The **Consultant/ Shaheed Bhagat Singh College** may from time to time intimate to the contractor and the Employer that he required the works to be measured, the contractor shall fore with attend or send a qualified agent to assist the Consultant/ **Shaheed Bhagat Singh College** or the **Consultant/ Shaheed Bhagat Singh College** representative in taking such measurements and calculations and to furnish all particulars or to give all assistance required either of them.

Provided that the contractor shall give notice of not less than ten clear days to the Consultant/ **Shaheed Bhagat Singh College** or his representative in charge of the work before covering up or placing beyond the reach of measurement any work in order that the same may be measured and correct dimensions thereof be taken before the same is covered or placed beyond reach of measurement any work without the consent of the **Consultant/ Shaheed Bhagat Singh College** and his representative in ten days inspect the work and cause the measurements to be made if any work be so covered up without the consent of the **Consultant/ Shaheed Bhagat Singh College** or his representative-in- charge of the work, the same shall be uncovered at the contractor expense, or in default thereof no payment or allowance shall made for such work or materials with which the same was executed.

Should the contractor not attend or neglect or omit to send such agent then the

measurements taken by the **Consultant/ Shaheed Bhagat Singh College** or person approved by him shall be taken to be correct measurement of the works. Such measurements shall be taken in accordance with the Indian Standard Method of Measurement, unless otherwise provided for elsewhere in this contract.
The contractor or his agent may at the time of measurement taken such notes and details as he may require.

All authorized extra works, omission and all variations made without **Consultant/ Shaheed Bhagat Singh College** knowledge, if subsequently sanctioned by him in writing (with the prior approval in writing of the Employer) shall be included in such measurement.

16. **Price of variation:** The rates for additional, altered, substituted work shall be arrived at in accordance with the following rules:

i. The net rates or prices in the contract schedule shall determine the valuation of (the rates for) the extra work (items) where such extra work is of similar character and is executed under similar conditions as the work priced therein. The extra work shall not exceed 10% of the total contract value.

ii. If the rates for the extra, altered or substituted (deviated) work are not provided for (available) in the contract schedule, they shall to the extent possible be derived out of the rates given in that schedule for similar items. For the purpose of such derivation, where necessary and when so directed, the contractor shall furnish detailed analysis for the said similar or near similar items in the contract schedule. For such portions of the analysis for the extra altered or substituted (deviated) work for which prices cannot be abstracted from the corresponding analysis of rates for the said similar or near substantiated by purpose bills/vouchers shall be adopted. Using factors and constants for quantum's of material labor, T & P and sundries from NBO/CPWD, standard PWD data/analysis in the order. When called upon to do so the contractor shall submit the required purchase bills/vouchers.

iii. In respect of a contract which incorporates more than one schedule the rate applicable in case (i) above if not provided for in the schedule pertaining to the work in which the addition, alteration or substitution(deviation) occurs, shall be taken as the lowest applicable rate in the other schedule similarly, in case (ii) above, if similar or near similar items cannot be found in the schedule pertaining to the work which the addition, alteration or substitution(deviation) occurs, similar or near similar items from the other schedules shall be adopted.

iv. In the case of additional, altered or submitted (deviate) work for which rates cannot reasonably be derived as at (ii) and (iii) above, the rates shall be worked out adopting market prices substantiated by purchase bills/vouchers, using factors and constants for quantum's of material, labour, T&P and sundries from NBO/CPWD/Standard materials, labour, T&P and sundries from NBO/CPWD/Standard PWD/data analysis in the order thus written, adding 15% towards profits and overheads. When called upon to do so the contractor shall submit his purchase bills/vouchers, to the **Consultant/ Shaheed Bhagat Singh College**.

v. The question as to what particular items, being similar or near similar

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to the additional, altered or substituted (deviated) work in the contract schedule are to be adopted for deviation of rates for the additions, altered or substituted (deviated) work and whether the said rates cannot be derived from similar or near to similar items in the contract schedule will be decided by the Consultant/ **Shaheed Bhagat Singh College**.

vi. In case (ii) to (iv) the contractor is required to submit his analysis of rates adopting the principals enunciated and the Consultant/ **Shaheed Bhagat Singh College** after scrutinizing the analysis and other paper furnished, will allow such rates as he considers reasonable.

vii. Where extra work is of such a nature that it cannot be properly measured or valued the contractor shall be allowed day work prices at the net rates stated in the tender or the period schedule of quantities or , if not stated, then in accordance with the minimum local day work rates and wages for the district, notified by the concerned authority, provided that in either case if required by the **Consultant/ Shaheed Bhagat Singh College** vouchers, muster rolls and other documents required for proper verification of the labour employed and the materials developed on the said work and the costs thereof be delivered to the **Consultant/ Shaheed Bhagat Singh College** or his representatives at or before the end of the week following that in which the work has been executed.

The question as to whether extra work is of such nature that it cannot be properly measured or valued will be decided by the **Consultant/ Shaheed Bhagat Singh College**. The margin to be allowed on actual costs to the contractor towards profits and overheads shall be 10%.

Viii **Deviation Limit :** It is the value of which the total executed contract value including authorized variation in excess of the original contract value, expressed as a percentage and shall be adjusted on the sum total of all additions, omissions, reductions, alterations or substitutions (deviations) covered by authorized variations under clause 2 and 13 of the conditions of contract. The values of prime cost sums shall not be included in calculating the above percentage.

ix There shall be no escalation in the price once the price is fixed and agreed by Shaheed Bhagat Singh College with the contractor, but the contractor should agree to pass on to Shaheed Bhagat Singh College any benefit arising out of any subsequent reduction in the price due to reduction in duties and levies so after the prices are fixed, but before delivery of the goods.

17. **Unfixed Materials:** Wherein any certificate (of which the contractor has received payment) the **Consultant/ Shaheed Bhagat Singh College** has included the value of any unfixed materials intended for and/or placed on or adjacent to the works such materials shall become the property of the Employer and they shall not be removed except for use upon the works, without the written authority of the Consultant/ **Shaheed Bhagat Singh College** . The contractor shall be liable for any loss or damage to such materials.

18. **Removal of Improper work, material, etc., :** The **Consultant/ Shaheed Bhagat Singh College** shall, during the progress of the work, have full powers to order in writing from time to time, removal from the works within such reasonable in the opinion specified in the order, of any materials which in the opinion

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specified in the order, of any materials which in the opinion of the **Consultant/ Shaheed Bhagat Singh College** are not in accordance with the specifications or the instructions of the Consultant/ **Shaheed Bhagat Singh College** or do not confirm to approved samples, the substitution of the rejected materials by proper other materials, and the removal and proper re-execution of any work executed with unsound, imperfect or skilled workmanship or with materials not in accordance with the contract, not withstanding that the same may have been passed or certified or, and paid for and the contractor shall fore with carry out such order at his own cost.

In case of default on the part of the contractor to carry out such order, the Employer shall have the power to being answerable or accountable for any loss or damage that may happen or arise to such materials removed and all expenses consequent on or incidental thereto as certified by the **Consultant/ Shaheed Bhagat Singh College** shall be borne by the contractor, or may be deducted by the Employer from money due or that may become due to the contractor.

In lieu of re-execution of any work not in accordance with the contract **Consultant/ Shaheed Bhagat Singh College** may in their option allow it to remain but will allow for such work reduce rates. The decision of Consultant/ **Shaheed Bhagat Singh College** to exercise his option in this regard and the quantum of reduction to be made in the rate for the item in question shall be final and binding on the contractor.

19. **Defects Liability Period:** Any defect, shrinkage, settlement or other faults which may appear within the Defects Liability Period stated in the appendix hereto or if none so stated, within 12 months after the completion of the works arising in the option of the Consultant/ **Shaheed Bhagat Singh College** from materials or workmanship not in accordance with the contract, shall on demand which shall be made within the defects liability period, in writing by the Consultant/ **Shaheed Bhagat Singh College** and within such reasonable time as shall be stated therein specifying the work, materials or articles complied of notwithstanding that the same may have been passed or/and certified, paid for, be amended and made good by the contractor, at his own proper charges and cost and incase of default. The Employer may employ and pay other person or persons to amend and make good such defects, shrinkage, settlements or other faults and all damages, loss and expenses consequent thereon or incidental thereto shall be made good and borne by the contractor and such damages loss and expenses shall upon the Consultant/ **Shaheed Bhagat Singh College** certificate in writing be recoverable from the contractor by the Employer or may be deducted by the Employer from any money due or that may become due to the contractor or the Employer may in lieu of such amending and making and by the contractor deduct from any money due to or that may become due to the contractor a sum to be determined by the Consultant/ **Shaheed Bhagat Singh College** equivalent to the cost of the amending and making good such work and in the event of the amount retained under clause 27 being insufficient, recover the balance from the contractor, together with any expenses the Employer may have incurred in connection therewith, should any defective work have been done or material supplied by any sub-contractor employed on the works who has been nominated or approved by the Consultant/ **Shaheed Bhagat Singh College** /Employer as provided in clause 11 the contractor shall be liable to make good in the same manner as if such work or material had been done or supplied by the contractor himself and been subject to the provisions of clause 2 thereof. The contractor shall remain liable under the provisions of this clause not withstanding the signing by the Consultant/ **Shaheed Bhagat Singh College** of any certificate including the

final certificate, or the passing of any accounts.

20. Completion certificate: The works shall not be considered as completed until the Consultant/ **Shaheed Bhagat Singh College** has certified in writing that they have been virtually completed and the defects liability period shall commence from such certified date of virtual completion of work Within ten days of the completion of work, the contractor shall give notice of such completion to the Consultant/ **Shaheed Bhagat Singh College** shall inspect the work and if there is no defect in the work shall furnish the contractor with certificate of completion otherwise a provisional certificate of completion indicating defects (a) to be rectified by the contractor and / or (b) for which payment will be made at reduced rates, shall be issued but no certificate of shall the work considered to be complete until the work as executed, all scaffolding, surplus materials, rubbish and cleaned off the dirt from all woodwork, doors, windows, walls, floors or other parts of any building, in upon or about which the work was executed, or of which he may have had possession for the purpose of execution thereof, and not until the work shall have been measured by the Consultant**/ Shaheed Bhagat Singh College** . If the contractor fail to comply with the requirements of this clause as to removal of scaffolding, surplus materials and rubbish as aforesaid and cleaning off dirt on or before the date fixed for the completion of the work, original or extended in terms of clause 24 herein, the employer after issuing due to notice, may at the expense of the contractor remove such scaffolding, surplus materials and rubbish, etc., and dispose of the same as he thinks fit and clean off such dirt as aforesaid, and the contractor shall have no claim in respect of any such scaffolding or surplus materials as aforesaid except for any sum actually realized by the sale thereof. And the expense, if any, so incurred may be recovered from any money due or that may become due to the contractor by the Employer.

21. **Contractor Liable for Damage done:**

21.1. The contractor shall be responsible for all injury to persons, animals or things, and for all structural and decorative damage to the property which may arise from the operation or neglect of himself or if any nominated sub-contractor's employee whether such injury of damage arise from careless, accident or any other cause whatever in anyway connected with the carrying out of the contract. This clause shall be held to include, inter- alia, any damage to building, whether immediately adjacent or otherwise, and any damage to roads, streets, foot-paths, bridges or ways as all damage caused to the buildings and works forming the subject of this contractor by frost or other inclemency of weather. The contractor shall indemnify the employer and hold him harmless in respect of all and any acts of Government or otherwise and also in respect of any awards of compensation or damages consequent upon such claims.

21.2. The contractor shall reinstate all damages of every sort mentioned in this clause, so as to deliver up the whole of the contract works complete and perfect in every respect and so as to make good or otherwise satisfy all claims for damage to the property of third party.

21.3 The contractor shall indemnify the employer against all claims which may be made against the employer by any member of the public or other third

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party in respect of anything which may arise in respect of the works or in consequence thereof and shall at his own expense arrange to effect and maintain, until the virtual completion of the contract, with an approved insurer a policy of insurance in the joint names of the employer and contractor against such a risks and deposits such policy or policies with the employer from time to time during the currency of this contract. The contractor shall also similarly indemnify the employer against all claims which may be made upon the employer whether under the workmen's compensation act or any other statue in force during the currency of this contract or at common law in respect of any employee of the contractor or sub-contractor and shall at his own expenses effect and maintain, until the virtual completion of the contract, with an approved insurer a policy of insurance in the joint names of the employer and the contractor against such risks and deposit such policy or policies with the employer from time to time during the currency of the contract.

The contractor shall be responsible for anything which may be excluded from the insurance policies above referred to and also for all other damages to any property arising out of and incidental to the negligent or defective carrying out of this contract. He shall also indemnify the employer in respect of any costs, charges or expenses arising out of claim or proceeding and also in respect of award of compensation for damage arising there form.

The Employer with the concurrence of the consultant/ **Shaheed Bhagat Singh College** shall be at liberty and is hereby empowered to deduct the amount of any damage, compensation, costs, charges and expenses arising or occurring from or in respect of any such claims or damage from any or all sums due or to become due to the contractor.

22. **Responsibility for safety of building:** The contractor shall be responsible for the safety of the works (including the materials, temporary buildings and plant) until they are taken over by the employer and they shall stand at there risk, and be in the sole charge of the contractor, who shall be responsible for and must with all possible speed make good all damage from whatever cause.

22. a) **Insurance of the works:** The contractor shall within 7 days from the date of commencement of the work insure the works at his cost and keep them insured until one month after the works are taken over by the Employer or three months after the date of completion whichever is earlier against laws or damage by fire and unusual risks other than fire against which insures generally provide cover in a **CONTRACTORS ALL RISK POLICY**, with names of the employer and contractor(the name of former being placed first in the policy), for the full amount of the contract. Such policy shall cover the property of amount of the employer only and Consultant and surveyor's fees for assessing the claim and in connection with his services generally in re-instatement sub-contractor or employee.

The contractor shall deposit the policy and receipts for the premium paid with the consultant within a week of the date of commencement of the work unless otherwise instructed by the consultant/ **Shaheed Bhagat Singh College.** In default of the consultant/ **Shaheed Bhagat Singh College** on his behalf may be due or that may become due to the contractor. The contractor shall as soon as claim under the policy is settled, or the work reinstated by the insurers should they elect to do so, proceed with all due diligence with the completions of the works in the

same manner as though the fine or other such risk had not occurred and in all respects under the same conditions of contract. The contractor in case of rebuilding or reinstatement after fire or other such usual risk shall be entitled to such extension of time for completion as the consultant/ **Shaheed Bhagat Singh College** deciders.

23. **Liquidated damages:** If the contractor fails to complete the works by the date stated in the Memorandum or within any extended time under clause 24 herein below the contractor shall pay or allow the employer the sum named in the appendix as "Liquidated damages" for period during completion of the work as defined in the contract, and the employer may deduct such damages from any money due or that become due to the contractor.

24. **Extension of time:** If the contractor shall desire of time for completion of the work on the grounds of his having been unavoidably hindered by such causes as (a) force majeure or (b) any an act of God or (c) proceedings taken or threatened by or dispute with adjoining or neighboring owners or public owners or public authorities arising otherwise than though the contractors or (d) the work or delays of other contractors or the consultant/ **Shaheed Bhagat Singh College** and not referred to in the schedule of quantities and or specifications or (e) strike or lockout affecting any of the building trades or directly the work or (f) delays in the supply of materials stipulated to be supplied by the employer or any other valid ground, he shall apply in writing to the consultant/ **Shaheed Bhagat Singh College** within 15 days of the date of such hindrance an account of which he desires such extension as aforesaid and the consultant/ **Shaheed Bhagat Singh College**, if in his opinion reasonable grounds have been shown thereof, may with the previous approval in writing of the employer make a fair and reasonable extension of time for completion of contract works, but the contractor shall nevertheless the constantly use his Endeavour's to prevent delay and shall do all that may reasonable be required of him to proceed with the work expeditiously provided.

    a. That the contractor shall have no claim other than extension of time for the delay in completion of the work due to such hindrance and

    b. That the contractor shall suspend the works whenever called upon to do so in writing by the **consultant/ Shaheed Bhagat Singh College** and shall be allowed reasonable extension of time for completion of work due to such suspension of work and nothing else.

25. **Failure of contractor to comply with consultant/ Shaheed Bhagat Singh College Instruction:** If the contractor, after receipt of written notice from the consultant/ **Shaheed Bhagat Singh College** requiring compliance within a week fails to comply with such further drawings/and/or consultant/ **Shaheed Bhagat Singh College** instructions, the employer may employ and pay other persons to execute any such work whatsoever that may employ and pay other persons to execute any such work whatsoever that may necessary to give effect thereto, and all costs incurred in connection there with shall be recoverable from the contractor by the employer on the certificate of **the consultant/ Shaheed Bhagat Singh College** as a debt or may be deducted by him from any money due or to become due to the contractor.

26. **Termination of contract by Employer**: If the contractor being an individual or a firm commits any "Act of Insolvency", or college shall have an

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order for compulsory/voluntarily or be subject to the supervision of the court and of official assignee or the liquidator in such acts of insolvency or winding up, as the case may be and shall be unable within 7 days after notice to him requiring him to do so, to show to the reasonable satisfaction of the consultant/ **Shaheed Bhagat Singh College** that he is able to carry out and fulfill the contract and to give security therefore, if so required by the **consultant/ Shaheed Bhagat Singh College** OR if the contractor (whether an individual, firm of incorporated company) shall suffer execution to be issued. OR shall suffer any payment under this contract to be attached by or on behalf of any of the creditors of the contractor. OR shall assign or subject this contract without the consent in writing of the employer first obtained. OR shall charge or encumber this contract or any payments due or which may become due to the contractors there under; OR if the **consultant/ Shaheed Bhagat Singh College** shall certify in writing to the employer that the contractor.

i) Has abandoned the contract, or

ii) Has failed to proceed with the works with such due diligence and failed to make such due progress as would enable the works to be completed within the time agreed upon or

iii) Has failed to commence the works, or has without any lawful excuse under these conditions suspended the progress of the works for 14 days after receiving the consultant/ **Shaheed Bhagat Singh College notice** to proceed.

iv) Has failed to remove the materials from the site or to pull down and replace work for seven days after receiving from the consultant/ **Shaheed Bhagat Singh College** written notice that the said materials or work were condemned and rejected by the consultant/ **Shaheed Bhagat Singh College** under these conditions, or

v) Has neglected or failed persistently to observe and perform all or any of the acts, matters or things by this contract to be observed and performed by the contractor for seven days after written notice shall have been given to the contractor requiring the contractor to observe or perform the same, or

vi) Has to determine of good workmanship or without the consent if writing of the employer sublet any part of the contract.

Then and in any of the said causes the employer may not withstanding any previous waiver, after giving seven day's notice in writing to the contractor, determine the contract, but without thereby affecting the powers of the **Consultant/ Shaheed Bhagat Singh College** or the obligations and liabilities of the contractor the whole of which shall continue in force as fully as if the contract had not been so determined and as if the works subsequently executed had been executed by or behalf of the contractor. And further the employer by his agents or servants may enter upon and take possessions of the works and all plant, tools, scaffolding, sheds, machinery, steam or other power utensils and materials laying upon the premises or the adjoining lands or roads, and use the same as his own property or may deploy the same by means of his own servants and workmen in carrying on and completing the works or by employing other contractor or persons to complete the work and the contractor shall not in any way interrupt do not act, matter,

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or thing to prevent or hinder such other contractor/s or other person or persons employed for completing and finishing or using the materials as soon thereafter as convenient the Consultant/ **Shaheed Bhagat Singh College** shall give notice in writing to the contractor to remove his surplus materials and plant, and should be contractor fail to do so within a period of 14 days after receipt thereof by him the employer shall be entitled to sell the same by public auction and give credit to the contractor for the amount realized.

The contractor's account shall also be credited with the amount that would have been payable to him, for uncompleted work (completed by the Employer through other contractor/s or person as aforesaid) in terms of his agreement as if the contractor had not been determined and he (the contractor) had continued to execute the work to it completion. The actual gross expense to the employer including incidental charges in completing the uncompleted work through other contractor/s or person or persons shall be debited to the contractor's accountant if it be not less than the credit for the uncompleted work as above referred if however, the said debit to be made less than the said credit then the amount to be debited shall be less than the said credit, then the amount to be debited shall be equal to the value of the credit given as above referred.

The consultant/ **Shaheed Bhagat Singh College** shall thereafter as certain and certify in writing what (if anything) in the final accounting is due to payable to the contractor for the sale of the surplus materials and plant and loss the employer shall have been put any owing, to the contractor and vice versa, and the certificate of the Consultant/ **Shaheed Bhagat Singh College** in this regard shall be final and conclusive between the parties.

27. **Certificate and payment:** All bills in triplicate shall be submitted by the contractor along with detailed measurements of the work completed at site provided. The consultant shall check/take the measurements or cause the measurements to be checked/taken for the purpose of having some to be verified and to the extend work has been executed in accordance with the contract, issue interim certificate and the employer shall make payment to the contractor (as per payment terms mentioned in Memorandum) on the basis of such certificates within the period specified for honoring interim certificates) subject to retention of SD at the percentage mentioned in the said Memorandum till the whole SD is collected.

    And when the works have been virtually completed and the **Consultant/ Shaheed Bhagat Singh College** shall have certified in writing that they have been so completed, the contractor shall submit the final bill in respect of the contract work within one month thereafter and in accordance with the certificate to be issued by the **Consultant/ Shaheed Bhagat Singh College** payment shall be made by the employer with in the time named in the Memorandum as "Installment after virtual completion". And the contractor shall be entitled to the payment of the final balance in accordance with the final certificate to be issued in writing by the **Consultant/ Shaheed Bhagat Singh College** after the expiration of the period to as "the defects liability period" in the appendix hereto from the date of virtual completion or as soon after the expiry of such period as the works shall have been finally completed and all made good according to the true intent and meaning thereof whichever shall last happen. Provided always that the issue by the **consultant/ Shaheed Bhagat Singh College** of any certificate

during the progress relive the contractor from his liability in case of fraud, dishonesty, or fraudulent concealment relating to the works or material or to any matter dealt with in the certificate and in case of all defects and insufficiencies in the work or materials which is reasonable examination would not have disclosed. No certificate of the **consultant/ Shaheed Bhagat Singh College** shall itself be conclusive evidence that any work or materials to which it relates are in accordance with the contract neither will be contractors have a claim for any amounts which the consultant/ **Shaheed Bhagat Singh College** might subsequently be discovered as not payable and in this respect the employer's decision shall be final and binding.

The **Consultant/ Shaheed Bhagat Singh College** shall have power to withhold any certificate if the works or any parts thereof are not being carried out to his satisfaction. The **Consultant/ Shaheed Bhagat Singh College**, may, in any certificate make any correction in any previous certificate which shall have been issued by him. No certificate of payment will be issued by **the Consultant/ Shaheed Bhagat Singh College** if the contractor fails to insure the works and keep them insured till the issue of the virtual completion certificate of payment may be refused if the contractor fails to execute the formal agreement within two weeks of his being called upon to do so.

28. **Security Deposit / Retention moneys bear no interest:**
Return money/security deposit, or the balance of it available with the employer, shall be refunded to the contractor in the manner specified in the Appendix to the conditions of contract and shall bear no interest whatsoever until the date of its return, not withstanding any provision to the contrary elsewhere in this contract.

29. **Matters accepted from Arbitration:** The decision, opinion, direction certificates (except for payment) with respect to all or any of the matters under clauses 2,4,7,9,12,16,18,19,24,26 hereof (which matters are herein referred to as the excepted matters) shall be final and conclusive and binding on the parties hereto and shall be without appeal. Any other decision, opinion, direction, certificate or valuation of the **Consultant/ Shaheed Bhagat Singh College** or any refusal of the **Consultant/ Shaheed Bhagat Singh College** to give any of the same shall be subject to the right of Arbitration and review in the same way in all respect (including the provisions as to opening the reference) as if it were a decision of the Consultant/ **Shaheed Bhagat Singh College** under the following clause.

30. **Arbitration Clause:**
    i. All disputes or differences of any kind whatsoever which shall at any time arise between the parties hereto touching or concerning the works or the execution or maintenance thereof on this contract or the rights touching or concerning the works or the execution or maintenance operation or effect thereof or to the rights or liabilities of the parties or arising out of or in relation thereto whether during (other than those in respect of which the decision of any person is by the contract expressed to be final and binding) shall after written notice by either party to the contract or after determination, for closure or breach of the contract to the contract either of them and to the appointing authority who shall be appointed for this purpose by the employer (NIC) be referred for adjudication to a sole arbitrator to be appointed as herein after provided.

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ii. For the purpose of appointing the sole arbitrator referred to above, the appointment authority will send within thirty days of receipt by him of the written notice aforesaid to the contractor a panel of three names of persons who shall be presently unconnected with the organization for which the work is executed.

iii. The contractor shall on receipt by him of the names as aforesaid, select any one of the persons named to be appointed as a sole arbitrator and communicate his name to the appointing authority within thirty days of receipt of him of the names. The appointing authority shall there upon without any delay appoint the said person and the sole arbitrator. If the Contractor fails to communicate such selection as provided above within the period specified, the appointing authority shall make the selection and appoint the selected person as the sole arbitrator.

iv. If the appointing authority fails to send to the contractor the panel of three names as aforesaid within the period specified, the contractor shall send to the appointing authority a panel of three names of persons who shall be unconnected with either party. The appointing authority shall on receipt by him of the names as aforesaid select any one of the persons named and appoint him as the sole person and appoint him as the sole arbitrator within 30 days of receipt by him of the panel and inform the contractor accordingly, the contractor shall be entitled to appoint one of the persons from the panel as the sole arbitrator and communicate his name to the appointing authority.

v. If the Arbitrator so appointed is unable or unwilling to act or resigns his appointment or vacates his office due to any reason whatsoever another sole arbitrator shall be appointed as aforesaid.

vi. The work under the contract shall however, continue during the arbitration proceedings and no payment due or payable to the contractor shall be withheld on account of such proceeding.

vii. The Arbitrator shall be deemed to have entered on the reference on the date he issues notice to both the parties fixing the date of the first hearing.

Viii. The Arbitrator shall give a separate award in respect of each dispute or difference referred to him. The arbitrator shall decide each dispute in accordance with the terms of the contract and give a reasoned award. The venue of arbitration shall be such place as may be fixed by the arbitrator in his sole discretion.

ix. The arbitrator may from time to time, with the consent of the parties, enlarge the time for making and publishing the award.

x. The fees, if any of the arbitrators shall, if required to be paid before the award is made and published, be paid half by each of the parties. The costs of the reference and of the award including the fees, If any of the arbitrator who may direct to and by whom and in what manner, such costs or any part there of shall be paid and may fix or settle the amount of costs to be paid.

xi. The award of the arbitrator shall be final and binding on both the parties.

xii. Subject to aforesaid the provisions of the arbitration and Conciliation Act, 1996 or any statutory modifications or re-enactment thereof and

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the rules made there under, and for the time being in force, shall apply to the arbitration proceedings under this clause.

31. **Right of technical scrutiny of final bill:** The employer shall have a right to cause a technical examination of the works and the final bill of the contractor including all supporting vouchers, abstract etc., to be made at the time of payment of the final bill. If as a result of this examination or otherwise any sum is found to have been over paid or over certified it shall be lawful for the employer to recover the sum.

32. **Employer entitled to recover compensation paid to workmen:** If, for any reason the employer is obliged, by virtue of the provisions of sub- section (1) of section 12 of the Work men Compensation Act 1923, to pay compensation to a work men employed by the contractor, in the execution of the works the employer will recover from the contractor the amount of compensation so paid, and without prejudice, to the right of the employer under sub-section (2) of section 12 of the said Act, the employer will be at liberty to recover such amount or any part thereof by deducting it from the security deposit or from any sum due by the employer shall not be bound to contest any claim made against him under sub-section (1) of section 12, of the said act, except on the written request of the contractor and upon his giving to the employer full security for all cost for which the employer might become liable in consequence of contesting such claim.

33. **Labor laws/Regulations:** The contractor shall employ labor in sufficient numbers directly through sub-contractors to maintain throughout the period of the contract the rate of progress required according to approved program of work and of quality to ensure proper workmanship in accordance with the specifications and drawings and the Consultant/ **Shaheed Bhagat Singh College** instructions.

    The contractor will comply with the provisions of all Acts of Government relating to labor and the rules and regulations made there under from time to time. He shall also submit at the proper time all particulars statements required to be furnished to the labor authorities on being directed to do so by the Consultant/ **Shaheed Bhagat Singh College**.

    The contractor shall register and obtain necessary licenses, maintain all registers, records, notices and documents and submit returns as prescribed by various enactments required under various statutes including the contract labour (Regulation and abolition) Act, 1970 and rules made there of all the statutory regulations that are in time in all matters concerning this contract. The contractor will also comply with all the rules and regulations stated in the minimum wages Act 1948 and the subsequent amendments. The contractor shall indemnify the employer against any liability that may arise due to the noncompliance of any provisions under minimum wages act 1948 or any enactment affecting the work contemplated under this contract.

34. **Apprentice Act:** The contractor shall comply with the provisions of the Apprentice Act 1961 and the Rules and Orders issued there under form time to time. Failure to do so will amount to a breach of contract and the employer may in his discretion terminate the contract. The contractor shall also be liable for any or other liabilities arising on account of any violation by him of the provisions of the Act.

35. When Contractor Dies: Without prejudice to any or remedies under this contract, if the contractor dies, the employer shall have the option of terminating the contract and the contractor would be compensated to the extent of work done and duly certified by the **consultant/Architect. & Employer**

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36. **General Indemnity :**The contractor shall indemnify the employer from and against all claims, demands, proceedings, damages, costs and expenses which may be brought or made against employer or to which it may be put by reason of the contractor not conforming to or complying with any of the provisions or requirements of any Act or Status, Central or State, Rules, Regulations, Bye laws of Local Authorities, Panchayat, Collector or any companies relating to or in connection with the works or to labour or for supply of water, light or other amenities at the site.

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UNIVERSITY OF DELHI

TECHNICAL SPECIFICATIONS & SPECIAL CONDITIONS IN RELATION TO EXTERIOR CIVIL WORKS & INTERIOR FURNISHING WORKS.

SAFETY CODE

1. The contractor shall maintain in a readily accessible place " **FIRST AID APPLIANCES"** Including adequate sterilized dressings and cotton wool.

2. The injured person shall be taken to public Hospital without loss of time, in case where the injury necessitates hospitalization.

3. Suitable and strong and scaffolds should be provided for workmen for all works that cannot safety be done from ground.

4. No portable single, ladder shall be over 9 meters in length. The width between the side rails shall not be less than 30cm (clear) and the distance between two adjacent rungs not more than 30 cm. When a ladder is used an extra helper shall be engaged for holding the ladder.

5. Every opening in the floor of a building or in a working platform shall be provided with suitable means to prevent the fall of persons or materials by providing suitable fencing or railing, the minimum height of which shall be one meter.

6. No floor, roof or any other part of the structure shall be so loaded with materials as to render it unsafe.

7. Workers shall be provided with protective glasses, footwear, headwear and rubber hand gloves wherever required.

8. Those engaged in welding works shall be provided with welder's protective eye and gloves.

9. I) No paint containing lead or lead products shall be used except in the form of paste or readymade paint.

   II) Suitable facemasks should be supplied for use by the workers when the paint is applied in the form of spray or surface having lead paint if dry rubbed and scraped.

10. Overalls shall be supplied by the contractor to the painter and adequate facilities shall be provided to enable the working painters to wash themselves during the period of cessation of work.

11. Hoisting machines and tackle used in the works including their attachments anchorage and supports shall be maintained in perfect conditions.

12. Ropes used in hoisting or lowering materials or as a means suspension Shall be of durable quality and of adequate strength and free from defects.

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SPECIAL CONDITIONS

1. These specifications are for the work to be done. Items to be supplied and materials to be used in the works as shown and defined on the drawings and described herein all under the supervision and to the satisfaction of the Consultant/ **Shaheed Bhagat Singh College**.

2. The workmanship is to the best available and of a high standard, use must be made of Specialist tradesman in all aspects of the work and allowance must be made in the rates for doing so.

3. The materials and items to be provided by the contractor shall be the best of their respective kinds and as approved by the Consultants/ **Shaheed Bhagat Singh College** in accordance with the samples which may be submitted for approval and generally in accordance with the specifications.

4. Samples of all materials including those specified by name of the manufacturer or the brands, trades name or by the reference to catalogue Nos. are to be submitted to the either orders delivers in the bulk to site. Samples together with their packing are to be provided by the contractor free of any charge and should any materials are rejected, the same will be removed from the site at the expanse of the contractor.

5. The contractor is also required to submit specimen finishes of all colours, fabrics, polish shades etc, for approval of the Consultant/ **Shaheed Bhagat Singh College** before proceeding with such works.

6. Should it be necessary to prepare shop drawings, the contractor at his own expense prepare and submit at least four sets of such drawings to Consultant/ **Shaheed Bhagat Singh College** for approval.

7. The contractor shall produce all invoices, vouchers or receipts account of all purchases done by him for materials if called upon to do so either by consultants or the **Shaheed Bhagat Singh College.**

8. The contractor should verify all measurements given in the drawings at the site before commencing the work. Any difference should be clarified with the Consultant before commencing the work.

9. Partition line out shall be done at the site before starting the work and got approved from the Consultants.

10. The contractor shall submit Bar chart (CPM method) for the complete work within one week of letter of acceptance of tender and get the same approved from Consultant/ **Shaheed Bhagat Singh College** in advance to co-ordinate the work with other agencies.

11. The contractor shall make necessary security arrangements at the site for the safety of his tools, materials and equipment etc, his own cost.

12. GST will be paid separately. All other taxes will be inclusive and the bidder should quote accordingly.

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13. The rates are firm and no escalation on any account shall be allowed on accepted rates.

14. During working at site, some restrictions may be imposed by **Shaheed Bhagat Singh College** /Security staff of **Shaheed Bhagat Singh College** or Local Authorities regarding safety and security etc., the bidder shall be bound to follow all such restrictions/instruction & nothing extra shall be payable on this account.

15. No compensation shall be payable to the bidder for any damage caused by rains, lightening, wind, storm, floods Tornado, earth quakes or other natural calamities during the execution of work. He shall make good all such damages at his own cost; and no claim on this account will be entertained.

16. If the bidder fails to proceed with the work within the stipulated time as specified from the date of issue of letter of intent/ Award Letter to proceed with the work, **Shaheed Bhagat Singh College** shall forfeit the earnest money deposited by him along with the tender.

17. All the works to be carried out in accordance with latest CPWD/ IS Specifications and as per the directions of **Shaheed Bhagat Singh College .**

18. The work has to be carried out in neat and tidy manner to the satisfaction of the **Shaheed Bhagat Singh College** and all care has to be taken to ensure that no part of the building gets damaged during execution of works. Materials used for carrying out the work shall be of standard quality as per technical specifications. Work has to be completed in all respect within **180 days including monsoon period** from the date of issue of LOI/Award Letter to the contractor.

19. If the bidder fails to undertake the job satisfactorily or violates the terms conditions or not attending the work effectively, **Shaheed Bhagat Singh College** has every right to cancel the contract and forfeit the EMD/security deposit without assigning any reason whatsoever.

20. The contractor has to comply with all the norms of municipal and other authorities as per regulations. Clearance from all local authorities for carry out the work shall be scope of bidder without any extra cost.

21. The bidder shall have to remove all 'malba/debris' if any from the site on same day at his own cost and cleaning of the site has to be done on daily basis. No assistance for cleaning work shall be provided by **Shaheed Bhagat Singh College** .

22. COST OF TESTS

The bidder is bound to carry out the tests, if any, as per the CPWD guidelines for ascertaining the quality of the works executed/ materials used as and when directed by the **Shaheed Bhagat Singh College /Consultants**. The cost of preparing samples and carrying out tests for quality of material or workmanship will be borne by the bidder except for such exclusions as are specifically mentioned in the specifications laid down in the contract. The cost of all test carried out in Laboratories as directed by the **Shaheed Bhagat Singh College** will be borne by the contractor.

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23. DRAWING AND SPECIFICATIONS

A copy of tender documents and all relevant drawings and specifications shall be available at site for reference. All as built drawings both soft and hard copy has to be submitted by the contractor along with final bill.

24. SHOP DRAWINGS

The Contractor will submit Shop Drawings of Lift to the Consultant and after its approval only the purchase order for supply and installation of the same shall be given.

25. APPROVAL OF MATERIALS

Sample of all the materials shall be submitted and get it approved before giving the Purchase Order.

26. SUBSTITUTION

If the approved is not available in the market, the contractor shall take prior approval from Consultant for Substitute Brand.

SD/-

Annexure – X

UNDERTAKING

This is to confirm that we M/s _____ (give full address) have not been blacklisted/left any work abandoned in any of the government department and public sector undertaking / enterprise in India and central Vigilance commission, in last five year before release of advertisement. If the above information found false at any stage after the placement of Purchase/work Order, **Shaheed Bhagat Singh College, at Sheikh Sarai Phase II, New Delhi.** Rein after called Procurement Consultant) will have full right to cancel the Purchase/work Order and forfeit the Performance Guarantee. All the direct and indirect cost related to the cancellation of the order will be borne by us besides any legal action by, which may be deemed, fit at that point of time.

Authorized Signatory

SD/-

TECHNICAL SPECIFICATIONS

1. SCOPE OF WORK

The scope of work under this contract includes for the full, final and entire completion of the items of works described in Schedule of Quantities and all as specified in these Technical Specifications and all as shown in drawings including notes thereon.

2. EXCAVATION AND EARTHWORK

2.1 Preparatory work, surface excavation: Before setting out the building and commencing the construction, the contractor shall carry out the preparatory work such as removal of grass, vegetation etc. and shall also carry out surface excavation not exceeding 30 cm deep and averaging 15 cm deep over the entire area covered by the respective items of Schedule of Quantities and dispose off the spoil to a distance exceeding 50 metre and spread and levelled all as directed by the Consultant/ SBSC. The cost of such works shall be deemed to be included in the lump sum quoted by the contractor against respective items of Schedule of Quantites. The ground level shown on drawings shall be considered as the ground level after surface excavation. The area referred to imply the entire area occupied by the building including plinth protection, saucer drain, ramp, platform, steps, shaft and the like.

2.2 In case the existing ground is undulated (i.e. if the average difference in levels at different places exceeds 30 cm) it shall be excavated to a level as directed by the Consultant/ SBSC and relevant items shall be measured and paid under relevant measurable Item of Schedule of Quantities. The ground level thus obtained shall be considered as average GL.

2.3 Loose pockets of disintegrated rock/ soil, if encountered, shall be completely removed and backfilled with lean concrete PCC (1:5:10) type E-2 using stone aggregate as per the direction of the Consultant/ SBSC.

2.4 Hard rock met with during excavation shall be taken out and stacked and accounted and credited as described here-in-after. Soft/Disintegrated rock may, however, be used in filling as and when permitted by the PM. The contractor may use the hard rock obtained from excavation in the work for building stone, hard core, soling, WBM if approved by Consultant/ SBSC.

2.5 METHOD OF MEASUREMENTS OF EXCAVATION

Where soft/loose soil, hard/dense soft, soil/disintegrated rock and hard rock are mixed, the measurement for the total quantity shall be made by taking levels of the ground as directed by Consultant/ SBSC and the total quantity of excavation shall be computed from these levels. The soft/disintegrated rock and the hard rock excavated shall then be stacked separately and measured in stacks. The quantity of soft/disintegrated rock and hard rock so measured shall be reduced by 50% to allow for voids. These reduced quantities of soft/disintegrated rock and hard rock shall be admissible for payment under item of excavation of soft/disintegrated rock and hard rock respectively. From the total quantity of the mixture the quantity of soft/disintegrated rock and hard rock excavated thus arrived at shall be deducted to work out the quantity of soil (i.e. soft/loose/hard dense soil) excavated.

Where only soft disintegrated rock and hard rock are mixed, the measurement for the total quantity shall be made by taking levels of the grounds as directed by PM and the total quantity of the excavation shall be computed from these levels. The hard rock excavated shall then be stacked and measured in stacks. The quantity of hard rock so measured shall be reduced by 50% to allow for voids. This reduced quantity of hard rock shall only be admissible for payment under item of excavation of hard rock. From the total quantity of the mixture, the quantity of hard rock excavated thus arrived at, shall be deducted to work out the quantity of soft/disintegrated rock excavated.

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All excavation shall be measured in successive stages of 1.5 metres depth starting from the commencing level. In case of excavation in rocks, if the depth of successive stage slightly exceeds 1.5 metres the levels shall be taken at that stage but excavated rock though obtained from the deeper depth, shall be measured in the previous successive stage only.

2.6 Dewatering /Bailing/pumping out of water, if met with during excavation due to high water table or where required, shall be carried out as described in CPWD Specification.

2.7 LEVELLING OF SITE AROUND BUILDINGS AND FORBUILDING

2.7.1 After construction and before handing over buildings/blocks/structures, the area around the building/block/structure to a width of 3 metre beyond the outer edge of plinth protection, ramps etc. shall be dressed and levelled without any extra cost to the Government Spoil obtained from preparatory works, surface excavation and leveling shall be removed to a distance exceeding 50 metres to a place notified for dumping debris by the local administration as directed by the Consultant/ SBSC.

2.7.2 Plinth level shall be decided/ approved by Consultant/ SBSC.

2.8 EARTH FILLING

2.8.1 Earth obtained from excavation and approved by Consultant/ SBSC shall be used for filling around foundations, under floors and other situations to make up levels and shall be watered and well rammed in layers not exceeding 25 cm thick. Use of vegetable soil/turf/peat in filling is prohibited. The thickness of filling shown on drawings is after consolidation.

2.8.2 Earth obtained from surface excavations / surface dressing shall not be used for filling purpose for works under this Contract and shall be removed from the site for filling in low lying areas or at location directed by Consultant/ SBSC without any extra cost.

2.9 REMOVAL OF SPOIL

The surplus spoil (soil/loose/hard/dense soil, soft/disintegrated rock) obtained from excavation in respect of Schedule of Quantities shall be disposed off to a distance 50 metre all as per direction of the Consultant/ SBSC.

3. ANTI-TERMITE TREATMENT (PRECONSTRUCTION SOIL TREATMENT) TO FOUNDATIONS AND GROUND FLOOR AND EXTERNAL PERIMETER OF BUILDINGS.

3.1 Anti-termite treatment shall be carried out in strict compliance with IS-6313 (Part II) of 2001 for pre-construction treatment using chemical Chloropyriphos or Lindane 20% emulsifiable concentrates (EC) and shall be as per IS 8944. The chemical shall be brought in original sealed container and should be purchased from approved manufacturers. The contractor shall submit test certificates of the chemical from the manufacturers.

3.2 The scope of work pertaining to Anti-termite treatment shall be restricted to the provisions in paras 7.2.1, 7.2.2, 7.3 to 7.7 of IS: 6313 (Part II). The provisions of chemical in other paragraphs of the said IS shall also apply to the extent they are applicable to the items of works, specified in various paras of IS mentioned above. The rate of quantity of chemical required for application at different locations shall be as given in respective paras of IS.

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3.3 A record of quantity of chemicals received in sealed containers shall be maintained in the measurement book duly signed by Consultant/ SBSC and the contractor.

3.4 The work of anti-termite treatment shall be got executed by the contractor through an approved agency (as approved by PM) who is a member of IPCA holding valid license as per clause 12 of Insecticides Act 1968 and persons employed to do the Anti-termite treatment shall be qualified as per rule 1991.

3.5 Preconstruction ant termite chemical treatment, which includes treatment to bottom and sides of foundation trenches / pits, filling in trenches / pits and below floors, junction of walls and floors, external perimeter of buildings and treatment under apron/plinth protection shall be carried out all as specified in CPWD Specification.

4. REINFORCED CEMENT CONCRETE WORKS

LIST OF BUREAU OF INDIAN STANDARDS CODES

Sl. No.	*I.S. No.*	*Subject*
1.	IS 226	Structural Steel
2.	IS 2285	Methods for chemical analysis of steel (Issues in various parts)
3.	IS 432 (Part I)	Specification for mild steel and medium tensile steel bars and hard drawn steel wire for concrete reinforcement part-I mild steel and medium tensile steel bars.
4.	IS 432 (Part II)	Specification for mild steel and medium tensile steel bars and hard drawn steel wire for concrete reinforcement – Part-II hard drawn steel wire.
5.	IS 456	Code of Practices for plain and Reinforced concrete.
6.	IS 516	Method of test for strength of concrete.
7.	IS 716	Specification for pentachlorophenol
8.	IS 1199	Method of sampling and analysis of concrete.
9.	IS 1200 (Part II)	Method of measurement of building and civil engineering work – concrete work
10.	IS 1200 (Part V)	Method of measurement of building and civil engineering work – concrete work (Part 5- Form work)
11.	IS 1566	Specification for hard drawn steel wire fabric for concrete requirement.
12.	IS 1599	Method for bend test
13.	IS 1343	Code of Practice for Prestressed Concrete
14.	IS 1387:1993	General requirements for the supply of metallurgical materials
15.	IS 14687	Guidelines for falsework for concrete structures
16.	IS 1608	Method for tensile testing of steel products

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17.	IS 1786	Specification for high strength deformed steel and wires for concrete reinforcement.
18.	IS 1791	Specification for batch type concrete mixes
19.	IS 2502	Code of practice for bending and fixing of bars for concrete reinforcement.
20.	IS 2751	Recommended practice for welding of mild steel plain and deformed bars for reinforced construction.
21.	IS 4925	Batch plants specification for concrete batching and mixing plant
22.	IS 4926	Ready – Mixed Concrete
23.	IS 5522:2014	Specification for Indian Standard Stainless Steel sheet and strips for utensils
24.	IS 6523	Specification for precast reinforced concrete door, window frames
25.	IS 10262	Recommended guidelines for concrete mix design
26.	IS 13311 (Part I)	Indian standard for non-destructive testing of concrete. Method of test for ultrasonic pulse velocity
27.	IS 13311 (Part II)	Indian standard for non-destructive testing of concrete. Method of testing by rebound hammer.
28.	IS 14276:1995	Indian standard for Cement bonded particle boards
29.	IS 16172:2014	Specification for Reinforcement couplers for mechanical splices of bars in concrete

4.0 GENERAL

Reinforced cement concrete work may be cast-in-situ or Precast as may be directed by Engineer-inCharge according to the nature of work. Reinforced cement concrete work shall comprise of the following which may be paid separately or collectively as per the description of the item of work.

(a) Form work (Centering and Shuttering)
(b) Reinforcement
(c) Concreting: (1– Cast-in-situ), (2 – Precast)

4.1 MATERIALS

4.1.1 Water, cement, fine and coarse aggregate shall be as specified under respective clauses of chapter 03 mortars and chapter 04 concrete work as applicable.

4.1.2 Steel for Reinforcement

4.1.2.1 The steel used for reinforcement shall be any of the following types:
(a) Mild steel and medium tensile bars conforming to IS 432 (Part I)
(b) High strength deformed steel bars conforming to IS 1786
(c) Hard drawn steel wire fabric conforming to IS 1566

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(d) Structural steel conforming to Grade A of IS 2062
(e) Thermo-mechanically treated (TMT) Bars.

4.1.2.2 Elongation percent on guage length is 5.65 A where A is the cross sectional areas of the test piece.

4.1.2.3 Mild steel is not recommended for the use in structures located in earthquake zone subjected to severe damage and for structures subjected to dynamic loading (other than wind loading) such as railway and highway bridges.

4.1.2.4 Welding of reinforcement bars covered in this specification shall be done in accordance with the requirement of IS 2751.

Nominal mass/weight : the tolerance on mass/weight for round and square bars shall be the percentage given in Table 5.1 of the mass/ weight calculated on the basis that the masses of the bar/wire of nominal diameter and of density 7.85 kg/ cm^3 or 0.00785 kg/mm^3 .

TABLE 2.1
Tolerance on Nominal Mass

Nominal size in mm	Tolerance on the Nominal Mass per cent		
	Batch	Individual sample +	Individual sample for coil (x)
(a) Upto and including 10	±7	-8	±8
(b) Over 10, upto and including 16	±5	-6	±6
Over 16	±3	-4	±4

+ for individual sample plus tolerance is not specified
(x) for coil batch tolerance is not applicable
Tolerance shall be determined in accordance with method given in IS 1786.

4.1.2.5 High strength deformed bars & wires shall conform to IS 1786. The physical properties for all sizes of steel bars are mentioned below in Table 2.2.

TABLE 2.2

Sl. No	Property	Fe 415	Fe 415D	Fe 500D	Fe 550 D
(i)	0.2 Per cent Proof stress/ yield stress, Min, N/mm	415.0	415.0	500.0	550.0
(ii)	elongation, per cent, min. on gauge length 5.65 a, where a is the	14.5	18.0	16.0	14.5

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	corss-sectional area of the test piece.				
(iii)	Tensile strength, Min	10 Per cent more than the actual 0.2 per cent proof stress/ yield stress but not less than 485.0 N/mm^2	12 Per cent more than the actual 0.2 percent proof stress/yield stress but not less than 500.0 N/mm^2	10 Per cent more than the actual 0.2 per cent proof stress/ yield stress but not less than 565.0 N/mm^2	8 Per cent more than the actual 0.2 per cent proof stress/yield stress but not less than 600.0 N/mm2
(iv)	Total elongation at maximum force, percent, Min on gauge length 5.65 A, where A is the cross-sectional area of the test piece.	-	5	5	5

Tests: Selection and preparation of Test sample. All the tests pieces shall be selected by the Engineerin-Charge or his authorized representative either-

(a) From cutting of bars

Or

(b) If he so desires, from any bar after it has been cut to the required or specified size and the test piece taken from and any part of it.

In neither case, the test pieces shall be detached from the bar or coil except in the presence of the Engineer-in-Charge or his authorized representative.

The test pieces obtained in accordance with as above shall be full sections of the bars as rolled and subsequently cold worked and shall be subjected to physical tests without any further modifications. No deduction in size by machining or otherwise shall be permissible. No test piece shall be enacted or otherwise subject to heat treatment. Any straightening which a test piece may require shall be done cold.

Tensile Test: 0.2% proof stress and percentage elongation –

This shall be done as per IS 1608, read in conjunction with IS 226.

RE- test: This shall be done as per IS 1786.

Rebend test: This shall be done as per IS 1786.

4.1.2.6 Chemical composition of reinforcement bars shall be as per Table 2.3 as follows:-

TABLE 2.3

Constituent	Maximum Per cent			
	Fe 415	Fe 415D	Fe 500D	Fe 550 D
Carbon	0.30	0.25	0.25	0.25

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Sulphur	0.060	0.045	0.040	0.040
Phosphorus	0.060	0.045	0.040	0.040
Sulphur and Phosphorus	0.110	0.085	0.075	0.075

4.1.2.7 Thermo Mechanically treated reinforcement bars:

(a) There is no BIS code for TMT bars. The available code BIS 1786 pertains to HSD Bars. Therefore there should be no stipulation that TMT bars should conform to relevant BIS code.

(b) The TMT bars are being produced under valid licence from either of the firms namely Tempcore, Thermex Evcon Turbo & Turbo Quench. These firms have acquired patents and are giving licences to various producers to produce TMT Bars.

(c) The TMT bars shall conform to IS 1786 pertaining to Fe 415 D or Fe 500 D or Fe grade of steel as specified.

(d) In design and construction of reinforced concrete building in seismic zone III and above, steel reinforcement of Grade Fe 415 D shall be used. However, high strength deformed steel bars, produced by thermo mechanical treatment process of grade Fe 415, Fe 500 and Fe 550 having elongation more than 14.5. % and conform to other requirements of Fe 415 D, Fe 500 D and Fe 550 D respectively of IS 1786 may also be used for reinforcement. In future, latest provision of IS 456 and IS 13920 or any other relevant code as modified from time to time shall be applicable.

4.1.3 Stacking and Storage Steel for reinforcement shall be stored in such a way as to prevent distorting and corrosion. Care shall be taken to protect the reinforcement from exposure to saline atmosphere during storage, fabrication and use. It may be achieved by treating the surface of reinforcement with cement wash or by suitable methods. Bars of different classifications, sizes and lengths shall be stored separately to facilitate issue in such sizes and lengths to cause minimum wastage in cutting from standard length.

4.1.4 Identification Care shall also be taken to properly identify these bars at site. The staff shall be specially trained for looking for identification marks on these bars given by the manufacturers which are generally given colour code. It will be advisable to see that only one type/grade of bars are brought to site and used in the project after conducting tests for each lot.

4.2 FORM WORK (CENTRING & SHUTTERING)

4.2.1 Form Work Form work shall include all temporary or permanent forms or moulds required for forming the concrete which is cast-in-situ, together with all temporary construction required for their support.

4.2.2 Design & Tolerance in Construction Form work shall be designed and constructed to the shapes, lines and dimensions shown on the drawings with the tolerance given below.

(a)	Deviation from specified dimension of cross section of columns and beams	+10 mm -5 mm

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(b)	Deviation from dimensions of footings	
	(i) Dimension in Plan	(+ 50 mm (-10 mm
	(ii) Eccentricity in plan	0.02 times the width of the footing in the direction of deviation but not more than 50 mm.
	(iii) Thickness	+50mm Or ± 0.05 times the specified thickness Whichever is less

(Note- These tolerance apply to concrete dimensions only, and not to positioning of vertical steel or dowels).

4.2.3 General Requirement

It shall be strong enough to withstand the dead and live loads and forces caused by ramming and vibrations of concrete and other incidental loads, imposed upon it during and after casting of concrete. It shall be made sufficiently rigid by using adequate number of ties and braces, screw jacks or hard board wedges where required shall be provided to make up any settlement in the form work either before or during the placing of concrete. Form shall be so constructed as to be removable in sections in the desired sequence, without damaging the surface of concrete or disturbing other sections, care shall be taken to see that no piece is keyed into the concrete.

4.2.3.1 Material for Form Work (a) Propping and Centering : All propping and centering should be either of steel tubes with extension pieces or built up sections of rolled steel.

4.2.3.2 **(a) Centering/Staging :** Staging should be as designed with required extension pieces as approved by Engineer-in-Charge to ensure proper slopes, as per design for slabs/ beams etc. and as per levels as shown in drawing. All the staging to be either of Tubular steel structure with adequate bracings as approved or made of built up structural sections made form rolled structural steel sections.

(b) In case of structures with two or more floors, the weight of concrete, centering and shuttering of any upper floor being cast shall be suitably supported on one floor below the top most floor already cast.

(c) Form work and concreting of upper floor shall not be done until concrete of lower floor has set at least for 14 days.

4.2.3.3 Shuttering: Shuttering used shall be of sufficient stiffness to avoid excessive deflection and joints shall be tightly butted to avoid leakage of slurry. If required, rubberized lining of material as approved by the Engineer-in-Charge shall be provided in the joints. Steel shuttering used or concreting should be sufficiently stiffened. The steel shuttering should also be properly repaired before use and properly cleaned to avoid stains, honey combing, seepage of slurry through joints etc.

(a) Runner Joists: RSJ, MS Channel or any other suitable section of the required size shall be used as runners.

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(b) Assembly of beam head over props. Beam head is an adopter that fits snugly on the head plates of props to provide wider support under beam bottoms.

(c) Only steel shuttering shall be used, except for unavoidable portions and very small works for which 12 mm thick water proofing ply of approved quality may be used.

4.2.3.4 Form work shall be properly designed for self weight, weight of reinforcement, weight of fresh concrete, and in addition, the various live loads likely to be imposed during the construction process (such as workmen, materials and equipment). In case the height of centering exceeds 3.50 metres, the prop may be provided in multi-stages. A typical detail of multistage shuttering is given in Fig. 5.9.

4.2.3.5 Camber: Suitable camber shall be provided in horizontal members of structure, especially in cantilever spans to counteract the effect of deflection. The form work shall be so assembled as to provide for camber. The camber for beams and slabs shall be 4 mm per metre (1 to 250) or as directed by the Engineer-in- Charge, so as to offset the subsequent deflection, For cantilevers the camber at free end shall be 1/50th of the projected length or as directed by the Engineer-in-Charge.

4.2.3.5.1 Typical arrangement of form work for 'beams, columns and walls' are shown in Figures 5.1 to 5.8 and form secured by wall ties is shown in Fig. 5.3.

4.2.3.6 **Walls :** The form faces have to be kept at fixed distance apart and an arrangement of wall ties with spacer tubes or bolts is considered best. A typical wall form with the components identified is given in Fig. 5.1, 5.2 & 5.3. The two shutters of the wall are to be kept in place by appropriate ties, braces and studs, some of the accessories used for wall form are shown in Fig. 5.3.

4.2.3.7 **Removal of Form work (Stripping Time) :** In normal circumstance and where various types of cements are used, forms, may generally be removed after the expiry of the following periods:

Type of Form work	Minimum period Before Striking Form work for OPC 33 grade	Minimum period Before Striking Form work for OPC 43 grade	Minimum period Before Striking Form work for PPC
(a) Vertical form work to columns, walls, beams	16-24 h	16-24 h	16-24 h
(b) Soffit form work to slabs (Props to be refixed immediately after removal of formwork)	3 days	3 days	4 days
(c) Soffit form work to beams (Props to be refixed immediately after removal of formwork	7 days	7 days	10 days
(d) Props to slabs:	7 days 14 days	7 days 14 days	10 days 20 days

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(1) Spanning upto 4.5m (2) Spanning over 4.5m			
(e) Props to beams and arches: (1) Spanning upto 6m (2) Spanning over 6m	14 days 21 days	14 days 21 days	20 days 30 days

Note 1: For other types of cement, the stripping time recommended for ordinary Portland cement may be suitably modified. Generally If Portland Pozzolana or low heat cement or OPC with direct addition of fly ash has been used for concrete, the stripping time will be 10/7 of the period stated for OPC with 43 grade cement above.

Note 2: The number of props left under, their sizes and disposition shall be such as to be able to safely carry the full dead load of the slabs, beam or arch as the case may be together with any live load likely to occur during curing or further construction.

Note 3: For rapid hardening cement, 3/7 of above periods for OPC 33 grade will be sufficient in all cases except for vertical side of slabs, beams and columns which should be retained for at least 24 hours.

Note 4: In case of cantilever slabs and beams, the centering shall remain till structures for counter acting or bearing down have been erected and have attained sufficient strength.

Note 5: Proper precautions should be taken to allow for the decrease in the rate of hardening that occurs with all types of cement in cold weather and accordingly stripping time shall be increased.

Note 6: Work damaged through premature or careless removal of forms shall be reconstructed within 24 hrs. 5.2.4 Surface Treatment.

4.2.4.1 **Oiling the Surface :** Shuttering gives much longer service life if the surfaces are coated with suitable mould oil which acts both as a parting agent and also gives surface protections. A typical mould oil is heavy mineral oil or purified cylinder oil containing not less than 5% pentachlorophenol conforming to IS 716 well mixed to a viscosity of 70-80 centipoises. After 3-4 uses and also in cases when shuttering has been stored for a long time, it should be recoated with mould oil before the next use. The second categories of shuttering oils / leavening agents are Polymer based water soluble Compounds. They are available as concentrates and when used diluted with water in the ratio of 1:20 or as permanufacturer specifications. The diluted solution is applied by brush applications on the shuttering both of steel as well as ply wood. The solution is applied after every use.

4.2.4.2 The design of form work shall conform to sound Engineering practices and relevant IS codes.

4.2.5 Inspection of Form Work

The completed form work shall be inspected and approved by the Engineer-in-Charge before the reinforcement bars are placed in position. Proper form work should be adopted for concreting so as to avoid honey combing, blow holes, grout loss, stains or discoloration of concrete etc. Proper and accurate alignment and profile of finished concrete surface will be ensured by proper designing and erection of form work which will be approved by Engineer-in-Charge. Shuttering surface before concreting should be free from any defect/ deposits and full cleaned so as to give perfectly straight smooth concrete surface. Shuttering surface should be therefore checked for any damage to its surface and excessive roughness before use.

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4.2.5.1 Erection of Form Work (Centering and shuttering): Following points shall be borne in mind while checking during erection.

(a) Any member which is to remain in position after the general dismantling is done should be clearly marked.

(b) Material used should be checked to ensure that, wrong items/ rejects are not used.

(c) If there are any excavations nearby which may influence the safety of form works, corrective and strengthening action must be taken.

(d) (i) The bearing soil must be sound and well prepared and the sole plates shall bear well on the ground.
(ii) Sole plates shall be properly seated on their bearing pads or sleepers.
(iii) The bearing plates of steel props shall not be distorted.
(iv) The steel parts on the bearing members shall have adequate bearing areas.

(e) Safety measures to prevent impact of traffic, scour due to water etc. should be taken. Adequate precautionary measures shall be taken to prevent accidental impacts etc.

(f) Bracing, struts and ties shall be installed along with the progress of form work to ensure strength and stability of form work at intermediate stage. Steel sections (especially deep sections) shall be adequately restrained against tilting, overturning and form work should be restrained against horizontal loads. All the securing devices and bracing shall be tightened.

(g) The stacked materials shall be placed as catered for, in the design.

(h) When adjustable steel props are used. They should: 1. be undamaged and not visibly bent. 2. have the steel pins provided by the manufacturers for use. 3. be restrained laterally near each end. 4. have means for centralizing beams placed in the fork heads.

(i) Screw adjustment of adjustable props shall not be over extended.

(j) Double wedges shall be provided for adjustment of the form to the required position wherever any settlement/ elastic shorting of props occurs. Wedges should be used only at the bottom end of single prop. Wedges should not be too steep and one of the pair should be tightened/ clamped down after adjustment to prevent shifting.

(k) No member shall be eccentric upon vertical member.

(l) The number of nuts and bolts shall be adequate.

(m) All provisions of the design and/or drawings shall be complied with.

(n) Cantilever supports shall be adequate.

(o) Props shall be directly under one another in multistage constructions as far as possible.

(p) Guy ropes or stays shall be tensioned properly.

(q) There shall be adequate provision for the movements and operation of vibrators and other construction plant and equipment.

(r) Required camber shall be provided over long spans.

(s) Supports shall be adequate, and in plumb within the specified tolerances.

4.2.5.2 Guidelines for Multistage Certering: The proper handling the situation of multistage centering in buildings or where height of casting of concrete is higher than normal height of 3.5M or where higher loadings are coming during casting of concrete or large span structures and in situations of casting of some special structures like Domes, Vaults etc. In all situations, centering/scaffolding/staging for casting of these structures should be properly designed by a qualified and experienced person/agency having past experience in design of false work (centering) for concrete structures and should be proof checked by similar experienced person/

agency and it should be properly approved and issued to contractor by Engineer-In-Charge. The provisions of clause 7 of IS:14687 may be referred for design of false work (centering). A method statement for erection and dismantling of the centering/scaffolding/staging and process of concreting shall be prepared by contractor and submitted to Engineer-in-Charge for approval and the work shall be commenced only after approval of method statement by Engineer-in-Charge. The provisions of clause 9 of IS:14687 may be referred for erection of false work (centering), safety precautions and other site operations, pertaining to false work (centering). Experienced form watcher shall be engaged during erection, concreting and dismantling for early detection of any movement or instability in the system. The field engineers shall ensure that CPWD specifications and provisions of BIS codes are strictly followed. A detailed programme of field safety inspection of centering /scaffolding/form work of such structures during different stages should be chalked out and strictly followed. Provision of safety net, fall arresting system including other safety gears, for workers, working over these structures shall be made in contract and should be followed strictly.

4.2.6 MEASUREMENTS

4.2.6.1 General : The form work shall include the following:

(a) Splayed edges, notching, allowance for overlaps and passing at angles, sheathing battens, strutting, bolting, nailing, wedging, easing, striking and removal.

(b) All supports, struts, braces, wedges as well as mud sills, piles or other suitable arrangements to support the form work.

(c) Bolts, wire, ties, clamps, spreaders, nails or any other items to hold the sheathing together.

(d) Working scaffolds, ladders, gangways, and similar items.

(e) Filleting to form stop chamfered edges of splayed external angles not exceeding 20 mm wide to beams, columns and the like.

(f) Where required, the temporary openings provided in the forms for pouring concrete, inserting vibrators, and cleaning holes for removing rubbish from the interior of the sheathing before pouring concrete.

(g) Dressing with oil to prevent adhesion and

(h) Raking or circular cutting

4.2.6.2 Classification of Measurements: Where it is stipulated that the form work shall be paid for separately, measurements shall be taken of the area of shuttering in contact with the concrete surface. Dimensions of the form work shall be measured correct to a cm. The measurements shall be taken separately for the following.

(a) Foundations, footings, bases of columns etc. and for mass concrete

(b) Walls (any thickness) including attached pilasters, buttresses, plinth and string courses etc.

(c) Suspended floors, roofs, landings, shelves and their supports and balconies.

(d) Lintels, beams, plinth beams, girders, bressummers and cantilevers.

(e) Columns, pillars, piers, abutments posts and struts.

(f) Stairs (excluding landings) except spiral staircase.

(g) Spiral staircases (including landings).

(h) Arches, Domes, vaults, shells roofs, arch ribs, curvilinear shaped folded plates

(i) Extra for arches, domes, vaults exceeding 6 m span other than curvilinear shaped

(j) Chimneys and shafts

(k) Well staining.

(l) Vertical and horizontal fins individually or forming box, louvers and bands.facias and eaves board

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(m) Waffle or ribbed slabs.

(n) Edges of slabs and breaks in floors and walls (to be measured in running metres where below 200 mm in width or thickness).

(o) Cornices and mouldings.

(p) Small surfaces, such as cantilevers ends, brackets and ends of steps, caps and boxes to pilasters and columns and the like.

(q) Chullah hoods, weather shades, chajjas, corbels etc. including edges and

(r) Elevated water reservoirs.

4.2.6.3 Centering, and shuttering where exceeding 3.5 metre height in one floor shall be measured and paid for separately.

4.2.6.4 Where it is not specifically stated in the description of the item that form work shall be paid for separately, the rate of the RCC item shall be deemed to include the cost of form work.

4.2.6.5 No deductions from the shuttering due to the openings/ obstructions shall be made if the area of each openings/ obstructions does not exceed 0.4 square metre. Nothing extra shall be paid for forming such openings.

4.2.6.6 Form work of elements measured under categories of arches, arch ribs, domes, spiral staircases, well staining, shell roofs, curvilinear folded plates & curvilinear eaves board, circular shafts & chimneys shall not qualify for extra rate for circular work.

4.2.6.7 Extra for circular work shall be admissible for surfaces circular or curvilinear in plan or in elevation beyond the straight edge of supporting beam in respective mode of measurement. However, there may be many different types of such structures. In such cases, extra payment shall be made judiciously after deducting areas where shuttering for circular form work is not involved.

4.2.7 Rate

The rate of the form work includes the cost of labour and materials required for all the operations described above.

4.3 REINFORCEMENTS

4.3.1 General Requirements Steel conforming to para 2.1.3 for reinforcement shall be clear and free from loose mill scales, dust, loose rust, coats of paints, oil or other coating which may destroy or reduce bond. It shall be stored in such a way as to avoid distortion and to prevent deterioration and corrosion. Prior to assembly of reinforcement on no account any oily substance shall be used for removing the rust.

4.3.1.1 Assembly of Reinforcement: Bars shall be bent correctly and accurately to the size and shape as shown in the detailed drawing or as directed by Engineer- in-Charge. Preferably bars of full length shall be used. Necessary cutting and straightening is also included. Overlapping of bars, where necessary shall be done as directed by the Engineer-in-Charge. The overlapping bars shall not touch each other and these shall be kept apart with concrete between them by 25mm or 11 / 4 times the maximum size of the coarse aggregate whichever is greater. But where this is not possible, the overlapping bars shall be bound together at intervals not exceeding twice the dia. of such bars with two strands annealed steel wire of 0.90 mm to 1.6 mm twisted tight. The overlaps/ splices shall be staggered as per directions of the Engineer-in-Charge. But in no case the overlapping shall be provided in more than 50% of cross sectional area at one section. 4.3.1.2 Bonds and Hooks Forming End Anchorages: Reinforcement shall be bent and fixed in

accordance with procedure specified in IS 2502, code of practice of bending and fixing of bars for concrete reinforcement. The details of bends and hooks are shown below for guidance.

(a) U-Type Hook In case of mild steel plain bars standard U type hook shall be provided by bending ends of rod into semicircular hooks having clear diameter equal to four times the diameter of the bar. Note: In case of work in seismic zone, the size of hooks at the end of the rod shall be eight times the diameter of bar or as given in the structural drawings.

(b) Bends Bend forming anchorage to a M.S. plain bar shall be bent with and internal radius equal to two times the diameter of the bar with a minimum length beyond the bend equal to four times the diameter of the bar.

4.3.1.3 **Anchoring Bars in Tension**: Deformed bars may be used without end anchorages provided, development length equipment is satisfied. Hooks should normally be provided for plain bars in tension. Development length of bars will be determined as per IS: 456.

4.3.1.4 **Anchoring Bars in Compression:** The anchorage length of straight bar in compression shall be equal to the 'Development length' of bars in compression as specified in IS: 456. The projected length of hooks, bend and straight lengths beyond bend, if provided for a bar in compression, shall be considered for development length.

4.3.1.5 Binders, stirrups, links etc. : In case of binders, stirrups, links etc. the straight portion beyond the curve at the end shall be not less than eight times the nominal size of bar.

4.3.2 Welding of Bars Wherever facility for electric arc welding or gas pressure welding is available, welding of bars shall be done in lieu of overlap. The location and type of welding shall be got approved by the Engineer-in-Charge.Welding shall be as per IS 2751 and 9417.

4.3.3 Placing in Position

4.3.3.1 Fabricated reinforcement bars shall be placed in position as shown in the drawings or as directed by the Engineer -in -charge. The bars crossing one another shall be tied together at every intersection with two strands of annealed steel wire 0.9 to 1.6 mm thickness twisted tight to make the skeleton of the steel work rigid so that the reinforcement does not get displaced during deposition of concrete. Tack welding in crossing bars shall also be permitted in lieu of binding with steel wire if approved by Engineer-in-Charge.

4.3.3.2 The bars shall be kept in correct position by the following methods:

(a) In case of beam and slab construction pre-cast cover blocks in cement mortar 1:2 (1 cement : 2 coarse sand) about 4x4 cm section and of thickness equal to the specified cover shall be placed between the bars and shuttering, so as to secure and maintain the requisite cover of concrete over reinforcements.

(b) In case of cantilevered and doubly reinforced beams of slabs, the vertical distance between the horizontal bars shall be maintained by introducing chairs, spacers or support bars of steel at 1.0 mere or at shorter spacing to avoid sagging.

(c) In case of columns and walls, the vertical bars shall be kept in position by means of timber templates with slots accurately cut in them: or with clock of cement mortar 1:2 (1 cement: 2 coarse sand) of required size suitable tied to the reinforcement to ensure that they are in correct position during concreting.

(d) In case of other R.C.C. structure such as arches, domes, shells, storage tanks etc. a combination of cover blocks, spacers and templates shall be used as directed by Engineer-in-Charge.

4.3.3.3 Tolerance on Placing of Reinforcement: Unless otherwise specified by the Engineer-inCharge, reinforcement shall be placed within the following tolerances: Tolerance in spacing

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(a) For effective depth, 200 mm or less +10 mm
(b) For effective depth, more than 200 mm + 15 mm

4.3.3.4 Bending at Construction Joints: Where reinforcement bars are bent aside at construction joints and afterwards bent back into their original position care should be taken to ensure that at no time the radius of the bend is less than 4 bar diameters for plain mild steel or 6 bar diameter for deformed bars. Care shall also be taken when bending back bars to ensure that the concrete around the bar is not damaged.

4.3.3.5 Cover : The minimum nominal cover to meet durability requirements shall be as under:-

Exposure	Nominal Concrete cover in mm not less than
Mild	20
Moderate	30
Severe	45
Very severe	50
Extreme	75

Notes :

1. For main reinforcement upto 12 mm diameter bar for mild exposure the nominal cover may be reduced by 5 mm.

2. Unless specified otherwise, actual concrete cover should not deviate from the required nominal cover by + 10 mm.

3. For exposure condition 'severe' and 'very severe' reduction of 5mm may be made, where concrete grade is M35 and above.

4. Nominal cover to meet specified period of fire resistance shall not be less than as given in Table 16A of IS 456.

4.3.4 Measurement

Reinforcement including authorized spacer bars and lappages shall be measured in length of different diametre, as actually (not more than as specified in the drawings.) used in the work nearest to a centimetre and their weight calculated on the basis of standard weight given in Table 2.4 below. In case actual unit weight of the bars is less than standard unit weight, but within variation, in such cases weight of reinforcement shall be calculated on the basis of actual unit weight. Wastage and unauthorized overlaps shall not be paid for. Annealed steel wire required for binding or tack welding shall not be measured, its cost being included in the rate of reinforcement.

Where tack welding is used in lieu of binding, such welds shall not be measured. Chairs separators etc. shall be provided as directed by the Engineer-in-Charge and measured separately and paid for.

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TABLE 2.4

Cross Sections Area and Mass of Steel Bar

Nominal Size mm	Cross sectional Area Sq.mm	Mass per metre Run Kg.
6	28.3	0.222
8	50.3	0.395
10	78.6	0.617
12	113.1	0.888
16	201.2	1.58
20	314.3	2.47
25	491.1	3.85
28	615.8	4.83
32	804.6	6.31
36	1018.3	7.99
40	1257.2	9.86

Note: These are as per clause 6.2 of IS 1786.

4.3.5 Rate

The rate for reinforcement shall include the cost of labour and materials required for all operations described above such as cleaning of reinforcement bars, straightening, cutting, hooking bending, binding, placing in position etc. as required or directed including tack welding on crossing of bars in lieu of binding with wires.

4.3A STEEL FOR REINFORCEMENT READY TO USE "CUT & BEND"

4.3A.1 Cut and bend rebars are customised reinforced steel bars required at construction sites. These shall be made from specialized machinery ensuring exact precision, ready to use pre-cut and pre-bent as per approval drawings. The steel used for reinforcement shall be the following types. (a) Thermo-mechanically treated (TMT) Bars.

4.3A.2 Elongation percent on gauge length is 5.65A, where A is the cross sectional area ofthe test piece. 2.3A.3 Welding of reinforcement bars covered in this specification shall be done in accordance with the requirement of IS 2751. Nominal mass/weight:- The tolerance on mass/weight for round and square bars shall be the percentage given in Table 2.4A of the mass/weight calculated on the basis that the masses of the bar/wire of nominal diameter and of density 7.85 Kg/cm^3 or 0.00785 kg/mm^3.

TABLE 2.4A

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Tolerance on Nominal Mass

Nominal size in mm	Tolerance on the Nominal Mass per cent		
	Batch	Individual sample+	Individual sample for coil (x)
(a) Upto and including 10	+-7	-8	+-8
(b) Over 10, upto and including 16	+-5	-6	+-6
(c) Over 16	+-3	-4	+-4

+ for individual sample plus tolerance is not specified

(x) for coil batch tolerance is not applicable Tolerance shall be determined in accordance with method given in IS 1786.

4.3A.3 High strength deformed bars & wires shall conform to IS 1786. The physical properties for all sizes of steel bars are mentioned below in Table 2.4B

TABLE 2.4B

Sl. No.	Property	Fe 500 D	Fe 550 D
(i)	0.2 Per cent Proof stress/yield stress, Min, N/mm^2	500.0	550.0
(ii)	Elongation per cent, Min. on gauge length 5.65 $\sqrt{A}$, where A is the cross-sectional area of the test piece.	16.0	14.5
(iii)	Tensile strength, Min	10 Per cent more than the actual 0.2 per cent proof stress/yield stress but not less than 565.0 N/mm^2.	8 Per cent more than the actual 0.2 per cent proof stress/yield stress but not less than 600.0 N/mm^2.
(iv)	Total elongation at maximum force, percent, Min on gauge length 5.65 $\sqrt{A}$, where A is the cross-sectional area of the test piece.	5	5

5. BRICK WORK

5.0. TERMINOLOGY

Bond: The arrangement of the bricks in successive courses to tie the brick work together both longitudinally and transversely. The arrangement is usually designed to ensure that no vertical joint of one course is exactly over the one in the next course above or below it, and there is greatest possible amount of lap.

Bed Joint: Horizontal joint in brick work or masonry.

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5.1 The Common Burnt Clay Bricks shall conform to IS:1077 and shall be hand moulded or machine moulded. They shall be free from nodules of free lime, visible cracks, flaws warpage and organic matter, have a frog 100 mm in length 40 mm in width and 10 mm to 20 mm deep on one of its flat sides. Bricks made by extrusion process and brick tiles may not be provided with frogs. Each brick shall be marked (in the frog where provided) with the manufacturer's identification mark or initials.

5.1.1 Dimensions The brick may be modular or non-modular. Sizes for both types of bricks/tiles shall be as per Table 6.1. While use of modular bricks/tiles is recommended, non-modular (FPS) bricks/tiles can also be used where so specified. Non-modular bricks/tiles of sizes other than the sizes mentioned in Table 5.1 may also be used where specified.

TABLE 5.1

Type of Bricks/ Tiles	Nominal Size mm	Actual Size mm
Modular Bricks	200 × 100 × 100 mm	190 × 90 × 90 mm
Modular tile bricks	200 × 100 × 40 mm	190 × 90 × 40 mm
Non-modular tile bricks	229 × 114 × 44 mm	225 × 111 × 44 mm
Non-modular bricks	229 × 114 × 70 mm	225 × 111 × 70 mm

5.1.2 Classification

Bricks/Brick tiles shall be classified on the basis of their minimum compressive strength as given below :

TABLE 5.2

Class Designation	Average compressive strength			
	Not less than		Less than	
	N/mm2	(kgf/cm2)	N/mm2	(kgf/cm2)
12.5 (125)	12.5	125	15.0	150
10 (100)	10.0	100	12.5	125
7.5 (75)	7.5	75	10.0	100
5 (50)	5.0	50	7.5	75
3.5 (35)	3.5	35	5.0	50

The bricks shall have smooth rectangular faces with sharp corner and shall be uniform in colour and emit clear ringing sound when struck.

5.1.3 Sampling and Tests
Samples of bricks shall be subjected to the following tests :

(a) Dimensional tolerance.
(b) Water absorption.
(c) Efflorescence.
(d) Compressive strength.

5.1.3.1 **Sampling:** For carrying out compressive strength, water absorption, efflorescence and dimensional tests, the samples of bricks shall be taken at random according to the size of lot as given in Table 5.3 below. The sample thus taken shall be stored in a dry place until tests are made. For the purpose of sampling, the following definition shall apply.

(a) **Lot:** A collection of bricks of same class and size, manufactured under relatively similar conditions of production. For the purpose of sampling a lot shall contain a maximum, of 50,000 bricks. In case a consignment has bricks more than 50,000 of the same classification and size and manufactured under relatively similar conditions of production, it shall be divided into lots of 50,000 bricks or part thereof.

(b) **Sample:** A collection of bricks selected for inspection and/or testing from a lot to reach the decision regarding the acceptance or rejection of the lot.

(c) **Defective:** A brick failing to meet one or more of the specified requirements.

5.1.3.2 The samples shall be taken as below:

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(i) **Sampling from a Stack:** When it is necessary to take a sample from a stack, the stack shall be divided into a number of real or imaginary sections and the required number of bricks drawn from each section. For this purpose bricks in the upper layers of the stack shall be removed to enable units to be sampled from places within the stack.

Note: For other methods of sampling i.e. sampling in motion and sampling from lorries or trucks, IS :5454 may be referred.

Scale of sampling and criteria for conformity for visual and dimensional characteristics:—

Visual characteristics: The bricks shall be selected and inspected for ascertaining their conformity to the requirements of the relevant specification. The number of bricks to be selected from a lot shall depend on the size of lot and shall be in accordance of Col. 1 and 2 of Table 5.3 for visual characteristics in all cases and dimensional characteristics if specified for individual bricks.

(ii) **Visual Characteristics:** All the bricks selected above in accordance with Col. 1 and 2 of Table6.3 shall be examined for visual characteristics. If the number of defective bricks found in the sample is less than or equal to the corresponding number as specified in Col. 3 of Table 6.3 the lot shall be considered as satisfying the requirements of visual characteristics, otherwise the lot shall be deemed as not having met the visual requirements.

(iii) **Dimensional Characteristics:** The number of bricks to be selected for inspecting the dimensions and tolerance shall be in accordance with Col. 1 and 4 of Table 6.3. These bricks will be divided into groups of 20 bricks at random and each of the group of 20 bricks thus formed will be tested for all the dimensions and tolerances. A lot shall be considered having found meeting the requirements of dimensions and tolerance if none of the groups of bricks inspected fails to meet the specified requirements.

TABLE 5.3

Scale of Sampling and Permissible Number of Defectives for Visual and Dimensional Characteristics

No. of bricks in the lot	**For characteristics specified for individual bricks**		**For dimensional characteristics for group of 20 bricks**
	No. of bricks to be selected	**Permissible no. of defective in the sample**	**No. of bricks to be selected**
(1)	(2)	(3)	(4)
2001—10000	20	1	40
10001—35000	32	2	60
35001—50000	50	3	80

(iv) **Scale of Sampling and Criteria for Physical Characteristics:** The lot which has been found satisfactory in respect of visual and dimensional requirements shall be next tested for physical characteristics like compressive strength, water absorption, efflorescence as specified in relevant material specification. The bricks for this purpose shall be taken at random from those already selected above. The number of bricks to be selected for each of these characteristics shall be in accordance with relevant columns of Table 5.4.

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TABLE 5.4

Scale of Sampling for Physical Characteristics

Lot size	Sample size for compressive strength, water absorption and efflorescence	Permissible No. of defectives for efflorescence	Warpage Sample Size	Permissible No of defects
(1)	(2)	(3)	(4)	(5)
2001—10000	5	0	10	0
10001—35000	10	0	20	1
35001—50000	15	1	30	2

Note: In case the lot contains 2000 or less bricks, the sampling shall be as per decision of Engineer-in-Charge.

(v) A lot shall be considered having satisfied the requirements of physical characteristics if the condition stipulated here in are all satisfied.

(a) From the test results for compressive strength, the average shall be calculated and shall satisfy the requirements specified in relevant material specification. Note: In case any of the test results for compressive strength exceeds the upper limit for the class of bricks, the same shall be limited to the upper limit of the class for the purpose of averaging.

(b) Wherever specified in the material specification, the compressive strength of any individual bricks tested in the sample shall not fall below the minimum average compressive strength specified for the corresponding class of brick by more than 20 per cent.

(c) From the test results for water absorption, the average for the bricks in the sample shall be calculated and shall satisfy the relevant requirements specification in material specification.

(d) The number of bricks failing to satisfy the requirements of the efflorescence specified in the relevant specification should not be more than the permissible no. of defectives given in Col. 3 of Table 5.4.

5.1.3.3 Dimensional Tolerances: The dimensions of, modular bricks when tested as described aboveas per procedure described in Appendix A of Chapter 6 shall be within the following limits per 20 bricks or locally available size as approved by Engineer-in-charge.

(a) For modular size

Length 7320 to 3880 mm (3800 ± 80 mm)

Width 1760 to 1840 mm (1800 ± 40 mm)

Height 1760 to 1840 mm (1800 ± 40 mm) for 90 mm high bricks

760 to 840 mm (800 ± 40 mm) for 40 mm high bricks

(b) For non modular bricks

Length 4520 to 4680 mm (4600 ± 80 mm)

Width 2240 to 2160 mm (2200 ± 40 cm)

Height 1440 to 1360 mm (1400 ± 40 mm) for 70 mm high bricks

640 to 560 mm (600 ± 40 mm) for 30 mm high bricks

Brick Tiles

760 to 840 mm (800 ± 40 mm) for 40 mm high brick tiles

In case of non-modular bricks, % age tolerance will be ± 2% for group of 20 numbers of class 10 bricks, and ± 4% for other class of bricks.

5.1.3.4 **Compressive Strength:** The bricks, when tested in accordance with the procedure laid down in Appendix B of Chapter 6 shall have a minimum average compressive strength for various classes

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as given in Table 5.2. The compressive strength of any individual brick tested shall not fall below the min. average compressive strength specified for the corresponding class of brick by more than 20%. In case compressive strength of any individual brick tested exceeds the upper limit specified in Table 5.2 for the corresponding class of bricks, the same shall be limited to upper limit of the class as specified in Table 5.2 for the purpose of calculating the average compressive strength.

5.1.3.5 Water Absorption: The average water absorption of bricks when tested in accordance with the procedure laid down in Appendix C of Chapter 6 shall be not more than 20% by weight.

5.1.3.6 Efflorescence: The rating of efflorescence of bricks when tested in accordance with the procedure laid down in Appendix D of Chapter 6 shall be not more than moderate.

5.2. Mortar: The mortar for the brick work shall be as specified, and conform to accepted standards. Lime shall not be used where reinforcement is provided in brick work.

5.3 Soaking of Bricks: Bricks shall be soaked in water before use for a period for the water to just penetrate the whole depth of the bricks. Alternatively bricks may be adequately soaked in stacks by profusely spraying with clean water at regular intervals for a period not less than six hours. The bricks required for masonry work using mud mortar shall not be soaked. When the bricks are soaked they shall be removed from the tank sufficiently early so that at the time of laying they are skin -dry. Such soaked bricks shall be stacked on a clean place where they are not again spoiled by dirt earth etc.

Note I: The period of soaking may be easily found at site by a field test in which the bricks are soaked in water for different periods and then broken to find the extent of water penetration. The least period that corresponds to complete soaking will be the one to be allowed for in construction work.

Note II: If the bricks are soaked for the required time in water that is frequently changed the soluble salt in the bricks will be leached out, and subsequently efflorescence will be reduced.

5.4 Laying

5.4.1 Bricks shall be laid in English Bond unless otherwise specified. For brick work in half brick wall, bricks shall be laid in stretcher bond. Half or cut bricks shall not be used except as closer where necessary to complete the bond. Closers in such cases, shall be cut to the required size and used near the ends of the wall. Header bond shall be used preferably in all courses in curved plan for ensuring better alignment. Note: Header bond shall also be used in foundation footings unless thickness of walls (width of footing) makes the use of headers impracticable. Where thickness of footing is uniform for a number of courses, the top course of footing shall be headers.

5.4.2 All loose materials, dirt and set lumps of mortar which may be lying over the surface on which brick work is to be freshly started, shall be removed with a wire brush and surface wetted. Bricks shall be laid on a full bed of mortar, when laying, each brick shall, be properly bedded and set in position by gently pressing with the handle of a trowel. Its inside face shall be buttered with mortar before the next brick is laid and pressed against it. Joints shall be fully filled and packed with mortar such that no hollow space are left inside the joints.

5.4.3 The walls shall be taken up truly in plumb or true to the required batter where specified. All courses shall be laid truly horizontal and all vertical joints shall be truly vertical. Vertical joints in the alternate course shall come directly one over the other. Quoin, Jambs and other angles shall be pro-perly plumbed as the work proceeds. Care shall be taken to keep the perpends properly aligned within following maximum permissible tolerances:

(a) Deviation from vertical within a storey shall not exceed 6 mm per 3 m height.

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(b) Deviation in verticality in total height of any wall of building more than one storey in height shall not exceed 12.5 mm.
(c) Deviation from position shown on plan of any brick work shall not exceed 12.5 mm.
(d) Relative displacement between load bearing wall in adjacent storeys intended to be vertical alignments shall not exceed 6 mm.
(e) A set of tools comprising of wooden straight edge, masonic spirit levels, square, 1 metre rule line and plumb shall be kept on the site of work for every 3 masons for proper check during the progress of work.

5.4.4 All quoins shall be accurately constructed and the height of brick courses shall be kept uniform. This will be checked using graduated wooden straight edge or storey rod indicating height of each course including thickness of joints. The position of damp proof course, window sills, bottom of lintels, top of the wall etc. along the height of the wall shall be marked on the graduated straight edge or storey rod. Acute and obtuse quoins shall be bonded, where practicable in the same way as square quoins. Obtuse quoins shall be formed with squint showing three quarters brick on one face and quarter brick on the other.

5.4.5 The brick work shall be built in uniform layers. No part of the wall during its construction shall rise more than one metre above the general construction level. Parts of wall left at different levels shall be raked back at an angle of 45 degrees or less with the horizontal. Toothing shall not be permitted as an alternative to raking back. For half brick partition to be keyed into main walls, indents shall be left in the main walls.

5.4.6 All pipe fittings and specials, spouts, hold fasts and other fixtures which are required to be built into the walls shall be embedded, as specified, in their correct position as the work proceeds unless otherwise directed by the Engineer-in-Charge.

5.4.7 Top courses of all plinths, parapets, steps and top of walls below floor and roof slabs shall be laid with brick on edge, unless specified otherwise. Brick on edge laid in the top courses at corner of walls shall be properly radiated and keyed into position to form cut (maru) corners Where bricks cannot be cut to the required shape to form cut (maru) corners, cement concrete 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm nominal size) equal to thickness of course shall be provided in lieu of cut bricks.

5.4.8 Bricks shall be laid with frog (where provided) up. However, when top course is exposed, bricks shall be laid with frog down. For the bricks to be laid with frog down, the frog shall be filled with mortar before placing the brick in position.

5.4.9 In case of walls one brick thick and under, one face shall be kept even and in proper plane, while the other face may be slightly rough. In case of walls more than one brick thick, both the faces shall be kept even and in proper plane.

5.4.10 To facilitate taking service lines later without excessive cutting of completed work, sleeves (to be paid separately) shall be provided, where specified, while raising the brick work. Such sleeves in external walls shall be sloped down outward so as to avoid passage of water inside.

5.4.11 Top of the brickwork in coping and sills in external walls shall be slightly tilted. Where brick coping and sills are projecting beyond the face of the wall, drip course/throating (to be paid separately) shall be provided where indicated.

5.4.12 Care shall be taken during construction that edges of jambs, sills and projections are not damaged in case of rain. New built work shall be covered with gunny bags or tarpoulin so as to prevent the mortar from being washed away. Damage, if any, shall be made good to the satisfaction of the Engineer-in-Charge.

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5.4.13 Vertical reinforcement in the form of bars (MS or high strength deformed bars or thermo-mechanically treated bars as per direction of Engineer-in- Charge)), considered necessary at the corners and junction of walls and jamb opening doors, windows etc. shall be encased with cement mortar not leaner than 1:4 (1 cement : 4 coarse sand), or cement concrete mix as specified. The reinforcement shall be suitably tied, properly embedded in the foundation and at roof level. The dia. of bars shall not be less than 8 mm and concrete grade shall be minimum 1:3:6 (1 cement : 3 coarse sand : 6 graded stone aggregate 20 mm nominal size).

5.4.14 In retaining walls and the like, where water is likely to accumulate, weep holes, 50 to 75 mm square shall be provided at 2 m vertically and horizontally unless otherwise specified. The lowest weep hole shall be at about 30 cm above the ground level. All weep holes shall be surrounded by loose stones and shall have sufficient fall to drain out the water quickly. Note : Work of providing loose stone will be payable extra.

5.4.15 Work of cutting chases, wherever required to be made in the walls for housing G.I. pipe, CI pipe or any other fixtures shall be carried out in various locations as per guidelines given below :

(a) Cutting of chases in one brick thick and above load bearing walls.

(i) As far as possible services should be planned with the help of vertical chases. Horizontal chases should be avoided.

(ii) The depths of vertical chases and horizontal chases shall not exceed one-third and one-sixth of the thickness of the masonry respectively.

(iii) When narrow stretches of masonry (or short length of walls) such as between doors and windows, cannot be avoided they should not be pierced with openings for soil pipes or waste pipes or timber joints, etc. Where there is a possibility of load concentration such narrow lengths of walls shall be checked for stresses and high strength bricks in mortar or concrete walls provided, if required.

(iv) Horizontal chases when unavoidable should be located in the upper or lower one-third of height of storey and not more than three chases should be permitted in any stretch of a wall. No continuous horizontal chase shall exceed one metre in length. Where unavoidable, stresses in the affected area should be checked and kept within the permissible limits.

(v) Vertical chases should not be closer than 2 m in any stretch of a wall. These shall be kept away from bearings of beams and lintels. If unavoidable, stresses in the affected area should be checked and kept within permissible limits.

(vi) Masonry directly above a recess, if wider than 30 cm horizontal dimension) should be supported on lintel. Holes in masonry may be provided upto 30 cm width and 30 cm height without any lintel. In the case of circular holes in the masonry, no lintel need be provided for holes upto 40 cm in diameter.

(b) Cutting of chases in half brick load bearing walls. No chase shall be permitted in half brick load bearing walls and as such no reccessed conduits and concealed pipes shall be provided with half brick thick load bearing walls.

(c) Cutting of chases in half brick non-load bearing wall : Services should be planned with the help of vertical chases. Horizontal chase should be provided only when unavoidable.

5.5 Joints

The thickness of all types of joints including brick wall joints and cross joints shall be such that four course and three joints taken consecutively shall measure as follows:

(i) In case of modular bricks conforming to IS 1077 specification for common burnt clay buildings bricks, equal to 39 cm.

(ii) In case of non-modular bricks, it shall be equal to 31 cm. Note : Specified thickness of joints shall be of 1 cm. Deviation from the specified thickness of all joints shall not exceed one-fifth of specified thickness.

5.5.1 **Finishing of Joints:** The face of brick work may be finished flush or by pointing. In flush finishing either the face joints of the mortar shall be worked out while still green to give a finished surface flush with the face of the brick work or the joints shall be squarely raked out to a depth of 1 cm while the mortar is still green for subsequently plastering. The faces of brick work shall be cleaned with wire brush so as to remove any splashes of mortar during the course of raising the brick work. In pointing, the joints shall be squarely raked out to a depth of 1.5 cm while the mortar is still green and raked joints shall be brushed to remove dust and loose particles and well wetted, and shall be later refilled with mortar to give ruled finish. Some such finishes are 'flush', 'weathered', ruled, etc.

5.6 **Curing:** The brick work shall be constantly kept moist on all faces for a minimum period of seven days. Brick work done during the day shall be suitably marked indicating the date on which the work is done so as to keep a watch on the curing period.

5.7 **Scaffolding:** Scaffolding shall be strong to withstand all dead, live and impact loads which are likely to come on them. Scaffolding shall be provided to allow easy approach to every part of the work.

5.7.1 **Single Scaffolding:** Where plastering, pointing or any other finishing has been indicated for brick work, single scaffolding may be provided, unless otherwise specified. In single scaffolding, one end of the put logs/pole shall rest in the hole provided in the header course of brick masonry. Not more than one header for each put-log/pole shall be left out. Such holes shall not be allowed in the case of pillars, brick work less than one metre in length between the openings or near the skew backs of arches or immediately under or near the structural member supported by the walls. The holes for putlogs/poles shall be made good with brick work and wall finishing as specified.

5.7.2 **Double Scaffolding:** Where the brick work or tile work is to be exposed and not to be finished with plastering etc. double scaffolding having two independent supports, clear of the work, shall be provided.

5.8 Measurements

5.8.1 Brick work shall be measured in cubic metres unless otherwise specified. Any extra work over the specified dimensions shall be ignored. Dimensions shall be measured correct to the nearest 0.01 m i.e. 1 cm.

Areas shall be calculated to the nearest 0.01 sq mtrs and the cubic contents shall be worked out to the nearest 0.01 cubic metres. 6.2.8.2 Brick work shall be measured separately in the following stages:

(a) From foundation to floor one level (Plinth level)

(b) Plinth (floor one) level to floor two level

(c) Between two specified floor levels above floor two level

Note : (i) Brick work in parapet walls, mumty, lift machine room and water tanks constructed on the roof upto 1.2 m height above roof shall be measured together with the corresponding work of the floor next below.

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5.8.3 No deductions or additions shall be done and no extra payment made for the following :

Note: Where minimum area is defined for deduction of an opening, void or both, such areas shall refer only to opening or void within the space measured.

(a) Ends of dissimilar materials (that is, joists, beams, lintels, posts, girders, rafters, purlins, trusses, corbels, steps, etc.); up to 0.1 m2 in section;
(b) Opening up to 0.1 m2 in area (see Note);
(c) Wall plates, bed plates, and bearing of slabs, chajjas and the like, where thickness does not exceed 10 cm and bearing does not extend over the full thickness of wall;
(d) Cement concrete blocks as for hold fasts and holding down bolts;
(e) Iron fixtures, such as wall ties, pipes upto 300 mm diameter and hold fasts for doors and windows; and
(f) Chases of section not exceeding 50 cm in girth.
(g) Bearing portion of drip course, bearing of moulding and cornice.

Note : In calculating area of an opening, any separate lintel or sills shall be included with the size of the opening but end portions of lintel shall be excluded. Extra width of rebated reveals, if any, shall also be excluded.

5.8.4 Walls half brick thick and less shall each be measured separately in square metres stating thickness.

5.8.5 Walls beyond half brick thickness shall be measured in multiples of half brick which shall be deemed to be inclusive of mortar joints. For the sizes of bricks specified in 5.1.1, half brick thickness shall mean 100 mm for modular and 115 mm for non-modular bricks. Where fractions of half brick occur due to architectural or other reasons, measurement shall be as follows :

(a) upto 1/4th brick-actual measurements and
(b) exceeding 1/4 brick-full half bricks. 6.2.8.6 String courses, projecting pilasters, aprons, sills and other projections shall be fully described and measured separately in running metres stating dimensions of each projection.

5.8.7 Square or rectangular pillars shall be measured separately in cubic metres in multiple of half brick.

5.8.8 Circular pillars shall be measured separately in cubic metres as per actual dimensions.

5.8.9 Brick work curved on plan shall be measured like the brick work in straight walls and shall include all cutting and wastage of bricks, tapered vertical joints and use of extra mortar, if any. Brick work curved on plan to a mean radius not exceeding six metres shall be measured separately and extra shall be payable over the rates for brick work in straight walls. Nothing extra shall be payable if the mean radius of the brick work curved in plan exceeds six metres.

5.8.10 Tapered walls shall be measured net as walls and extra payment shall be allowed for makingtapered surface for brick work in walls. 6.2.8.11 Brick work with brick tiles shall be measured and paid for separately. 6.2.9 Rate The rate shall include the cost of materials and labour required for all the operations described above except the vertical reinforcement and its encasement in cement mortar or cement concrete. The rate shall also include the following :

(a) Raking out joints or finishing joints flush as the work proceeds;
(b) Preparing tops of existing walls and the like for raising further new brick work.

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(c) Rough cutting and waste for forming gables, splays at eaves and the like.
(d) Leaving holes for pipes upto 150 mm dia. and encasing hold fasts etc.
(e) Rough cutting and waste for brick work curved in plan and for backing to stone or other types of facing.
(f) Embedding in ends of beams, joists, slabs, lintels, sills, trusses etc.
(g) Bedding wall plates, lintels, sills, roof tiles, corrugated sheets, etc. in or on walls if not covered in respective items and
(h) Leaving chases of section not exceeding 50 cm in girth or 350 sq cm in cross-section.
(i) Brick on edge courses, cut brick corners, splays reveals, cavity walls, brick works curved on plan to a mean radius exceeding six metres.

6. HALF BRICK WORK

Brick work in half brick walls shall be done in the same manner as described above in 5.4 except that the bricks shall be laid in stretcher bond. When the half brick work is to be reinforced, 2 Nos. M.S. bars of 6 mm dia., shall be embedded in every third course as given in the item (the dia of bars shall not exceed 8 mm). These shall be securely anchored at their end where the partitions end. The free ends of the reinforcement shall be keyed into the mortar of the main brick work to which the half brick work is joined. The mortar used for reinforced brick work shall be rich dense cement mortar of mix 1:4 (1 cement: 4 coarse sand). Lime mortar shall not be used. Over laps in reinforcement, if any shall not be less than 30 cm.

The mortar interposed between the reinforcement bars and the brick shall not be less than 5 mm.
The mortar covering in the direction of joints shall not be less than 15 mm.

6.1 Measurements

The length and height of the wall shall be measured correct to a cm. The area shall be calculated in sq.m. where half brick wall is joined to the main walls of one brick or greater thickness and measurements for half brick wall shall be taken for its clear length from the face of the thicker wall.

6.2 Rate

The rate includes the cost of the materials and labour involved in all the operations described above except reinforcement which is to be paid for separately.

7. JOINING OLD BRICK WORK WITH NEW BRICK WORK

7.1 In case the height of the bricks of old as well as new work is same, the old work shall be toothed to the full width of the new wall and to the depth of a quarter of brick in alternate courses. In case the height of the bricks is unequal, then the height of each course of new work shall be made equal to the height of the old work by adjusting thickness of horizontal mortar joints in the new wall. Where necessary, adjustment shall be made equal to thickness of old wall by adjusting the thickness of vertical joints.

7.2 For joining new cross wall to old main walls, a number of rectangular recesses of width equal to the thickness of cross wall, three courses in height and half a brick in depth shall be cut in the main walls. A space of the three courses shall be left between two consecutive recesses. The new cross wall shall be bonded into the recesses to avoid any settlement.

7.3 Joining of old brick work with the new brick work shall be done in such a way that there shall not be any hump or projection at the joint.

7.4 Measurement

The height and thickness of vertical face in contact with new work shall be measured to the nearest 0.01 m and the area shall be calculated to the nearest 0.01 sqm.

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7.5 **Rate** The rate includes the cost of labour and material involved in all the operations described above.

8. Granite Stone

It shall be of any colour and size as directed by Engineer-in -Charge. Granite shall be plain machine cut and mirror polished. The stone shall be smooth and of even surface without holes or pits.

8.1 SIZES ANDTOLERANCES

The size of marble blocks, slabs and tiles shall be as mentioned in Table 8.1.

TABLE 8.1

Sl.No	Type	*Length*	*Width*	*Thickness*
1.	Blocks	30 to 250	30 to 100	30 to 90
2.	Slabs	70 to 250	30 to 100	2 to 15
3.	Tiles	10 to 60	10 to 60	0.8 to 2.4

(1) All dimensions are in centimetre.
(2) The length and width, of the blocks shall be in multiple of 30 cm.
(3) Length and width of slab shall be in multiple of 10 cm. and thickness in multiple of 1 cm.
(4) Tiles shall be square cut and linear dimensions in multiple of 10 cm.
(5) Only slabs and tiles shall be machine cut and factory made.
(6) For 8 mm thick tiles, special precautions will be required for fixing them like using special adhesive as per manufacturer's specifications. Such tiles are not suitable for outside veneering work exposed to rains/sun if used in large areas in continuous stretches. For tiles of thickness 20 mm and above cramps may be provided if approved by Engineer-in- Charge.

Tolerance

The following tolerances shall be allowed in the dimension of blocks, slabs and tiles:

Type	**Tolerance**
Blocks	
(a) Length	+ 2 per cent
(b) Width	+ 2 per cent
(c) Thickness	+ 2 per cent
Slabs	
(a) Length	+ 2 per cent
(b) Width	+ 2 per cent
(c) Thickness	+ 3 per cent
Tiles	
(a) Linear dimension	+ 3 per cent
(b) Thickness	+ 1 per cent

The sizes other than those mentioned above may be provided as directed by the Engineer-in- Charge and nothing extra shall be payble on this account.

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8.2 PHYSICAL PROPERTIES

8.2.1 The physical properties of marble for blocks, slabs and tiles and method of tests are mentioned in Table 8.2.

TABLE 8.2

Physical Properties of Marble & Granite

Characteristic	**Marble**		**Granite**	
(1)Moisture absorp-tion after 24 hrs immersion in cold water	Max. 0.4%	IS 1124	Max. 0.50% by weight	IS 1124
(2) Hardness	Min. 3	Mhos scale	-	-
(3) Specific Gravity	Min. 2.5	IS 1122	Min. 2.6	IS 1122

8.3 Approval of Sample

Before starting the work, the contractor shall get samples of marble approved by the Engineer- in-Charge. Approved samples shall be kept in the custody of the Engineer-in-Charge and the marble supplied and used on the work shall conform to samples with regard to soundness, colour, veining and general texture.

8.4 SAMPLING

In any consignment all the blocks/slabs/tiles of the same group, size and finish shall be grouped together to constitute a lot. Sample shall be selected and tested separately for each lot for determining its conformity or otherwise to the requirements of the specification. The number of blocks/slabs/tiles to be selected for the samples shall depend upon the size of the lot and shall be in accordance with the Table 8.3.

TABLE 8.3

Sample Size and Criteria for Conformity

Number of Blocks slabs/Tiles in the lot	*Number of blocks slabs/ Tiles to be selected in sample*	*Permissible number of defectives*	*Sub Sample size in no.*
(1)	*(2)*	*(3)*	*(4)*
Up to 25	3	0	2
26 to 100	5	0	2
101 to 200	8	0	3
201 to 500	13	0	4
501 to 1000	20	1	5

Note: The blocks/slabs/tiles in the sample shall be taken at random and in order to ensure to randomness of selection, random tables may be used.

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Explanation 1 : All the blocks/slabs/tiles, selected in the sample, shall be examined for dimensions workmanship and general requirements.

Any block/slab/tile failing in any one or more of the above requirements shall be considered as defective. A lot shall be considered as conforming to these requirements if the number of defectives obtained is not more than permissible no. of defectives given in Col. 3 of table 4.3

Explanation 2 : The lot having been found satisfactory with respect to dimensions, workmanship and general requirement shall be tested for physical properties of the marble. For this purpose a sub sample of the size given in Col. 4 of Table 4.3 shall be selected at random. These blocks/slabs/tiles in the sub sample shall be tested for moisture absorption, hardness and specified gravity. The lot shall be considered having satisfied the requirements of the physical properties if none of the blocks/ slabs/tiles tested for the requirements fails in any of these tests.

9. MARBLE WORK - TABLE RUBBED AND POLISHED (PLAIN WORK)

Marble work in steps, jambs, columns and other plain work shall be as specified below:

Joints in staircase treads, kitchen platforms shall be permitted only at curvature or when width/ length is more than 0.6/2 mtrs. respectively. Number of joints in each direction shall not be more than one number for every 2 mtrs. length beyond the initial 2.00 m length. Additional joints due to curvature or for providing fixture shall be provide judiciously.

9.1 Dressing, Cutting and Rubbing

Every marble stone shall be gang saw/machine cut to the required size and shape, chisel dressed machine finished on all beds and joints, so as to be free from any waviness and to give truly vertical, horizontal, radial or circular joints as required. The exposed faces and sides of stones forming joints up to 6mm. from the face shall be fine tooled machine cut such that a straight edge laid along the face of the stone is in contact with every point on it. All window sills, tread of steps, counters vanities moulding edges etc. shall be machine cut & polished to give high gloss mirror finish as per direction of Engineer-in-Charge. These surfaces shall then be rubbed smooth. All visible angles and edges shall be true, square and free from chipping. Beyond the depth of 6 mm from face, the joints shall be dressed with a slight splay so that the thickness of joint increases, in an inverted V shape as shown in Fig. below. The surfaces of the stones coming in contact with backing need not be chisel dressed.

INVERTED V-SHAPE JOINT

A sample of dressed and rubbed stone shall be prepared for approval and it shall be kept on worksite after being approved by the Engineer-in Charge.

9.2 Mortar

The mortar used for jointing shall be as specified.

9.3 Laying

All marble stones shall be wetted before placing in position. These shall then be floated on mortar and bedded properly in position with wooden mallets without the use of chips or under pinning of any sort.

The walls and pillars shall be carried up truely in plumb or battered as shown in the drawings. All courses shall be laid truely horizontal and all vertical joints shall be truely vertical.

In case of work without backing of brick work or coursed rubble masonry, face stone shall be laid in headers and stretchers alternatively unless otherwise directed. The headers shall be arranged to come as nearly as possible in the middle of stretchers above and below. Stone shall be laid in regular courses of not less than 15 cm in height and all courses shall be of the same height unless otherwise specified.

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For work facing with backing of brick work or coursed rubble masonry, face stone shall be laid in alternate courses of header and stretchers unless otherwise directed. Face stone and bond stone courses shall have break joint on the face of atleast half the height of the standard course and the bond shall be carefully maintained through out. All the connected masonry in a structure shall be carried up nearly at one uniform level throughout but where breaks are unavoidable the joints shall be made in good long steps so as to prevent cracks developing between new and old work.

When necessary jib crane or other mechanical appliances shall be used to hoist the heavy pieces of stones and place these in to correct positions, care being taken that the corners of the stone are not damaged. Stone shall be covered with gunny bags, before putting chain or rope is passed over it, and it shall be handled carefully. No piece which has been damaged shall be used in work. The matching of grains shall be carried out as directed by the Engineer-in-Charge.

9.4 Bond Stone

Bond or through stones running right through the thickness of walls, shall be provided in walls upto 60 cm thick and in case of wall above 60 cm thickness a set of two or more bond stones overlapping each other by atleast 15 cm shall be provided in a line from face to back.

At least one bond stone or a set of bond stones shall be provided for every 0.5 sqm of the wall surface. All bond stones shall be marked suitably as directed by the Engineer-in-Charge.

9.5 Joints

The depth of joints 6 mm from the face shall be uniform and as fine as possible but shall be not more than 1.5 mm thick on the exposed face. Beyond the depth of 6 mm from face, the thickness of joints shall increase in an inverted V shape so as to give good mortar bond between two stones. The inverted portion of the joints shall be filled with bedding mortar and the face 6 mm portion with pointing mortar.

9.6 Curing

The work shall be kept constantly moist on all faces for a period of at least seven days.

9.7 Finishing

After the marble work is cured, it shall be rubbed with carborandum stone of different grades no. 60, 120 and 320 in succession or with electrical rubbing machines rubbed with carborandum items 0 to 6 nos.in succession, so as to give a plane true and highly smooth surface. It shall then be cleaned with a solution of oxalic acid, washed and finished clean.

9.8 Protection

Green work shall be protected from rain by suitable coverings. The work shall also be suitably protected from damage during construction.

9.9 Scaffolding

Double scaffolding having two sets of vertical supports shall be provided where necessary. The supports shall be sound and strong, tied together by horizontal pieces over which the scaffolding plank shall be fixed.

9.10 Tolerances

As per para 8.2

9.11 Measurements

For plain work: Measurements shall be taken correct to a cm in length and breadth and correct to 0.5 cm in thickness.

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9.11.1 In the case of radially dressed or circular stone used in the work, the dimensions of the circumscribing rectangle of the dressed stone, shall be measured correct to a centimeter and thickness, correct to 0.5 cm.
The cubical contents shall be calculated in cubic decimetre nearest to two places of decimal.

9.11.2 The marble work in arches and domes shall be measured as for plain work, but extra shall be allowed for such work over the rate for plain work.

9.11.3 Sunk or moulded work in marble shall be measured by volume as per plain marble work or work in arches or domes as the case may be on the basis of circumscribed rectangular block of the finished work but extra shall be paid for such work over the rate for plain work for work in arches and domes. For the purpose of extra payment, volume of every stone sunk or moulded shall be considered.

9.12 Rate

The rate includes the cost of materials and labour required for all the operations i/c cutting of recesses in wall cutting moulding corners edge rounding finishing & polishing as specified.

9.13 Use of Finished Marble Slabs and Tiles

In case such finished tiles are used, these shall be measured and paid for separately.

10 WALL LINING/VENEERWORK

Unless and otherwise specified in the nomenclature of the item, the marble slabs used for wall lining/veneer work shall be gang saw cut (polished & machine cut) and conform to dimensions given in Table 8.2 above.Back shall not be polished/ cut in order to ensure a good grip with the hearting of backing. The cut slabs shall be of the thickness as specified with a tolerance permissible under para 4.2 above. The tolerance in wall lining when straight edge of 3 m length is placed should more not than 2mm.

10.1 Laying

The stone shall be wetted before laying. They shall then be fixed with mortar in position without the use of chips or under pinning of any sort. Care shall be taken to match the grains of veneer work as directed by the Engineer-in-Charge. For purpose of matching the grains, the marble slabs shall be selected judiciously having uniform pattern of veins/streaks. Preferably the slabs shall be those got out of the same block from the quarry. The area to be veneered shall be reproduced on the ground and the marble slabs laid in position and arranged in the manner to give the desired matching of grains. Any adjustment needed for achieving the best results shall be then carried out by replacing or interchanging the particular slabs. Special care shall be taken to achieve the continuity of grains between the two slabs one above the other along the horizontal joints. This shall then be got approved by the Engineer-in-Charge and each marble slabs numbered properly and the same number shall be marked on a separate drawing as well as on the surface to be actually veneered, so as to ensure the fixing of the particular slabs in the correct location.

For the facing of the columns also the same procedure as mentioned above shall be followed.

10.1.1 Where so desired, the adjoining stones shall be secured to each other by means of copper pins 75 mm long and 6 mm diameter or as specified.

10.1.2 The stones shall be secured to the backing by means of cramps. The material for cramps shall have high resistance to corrosion under conditions of dampness and against the chemical action of mortar or concrete in which cramps are usually embedded.

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Cramps shall be of 25 × 6 mm and 30 cm long in case of backing of stone masonry walls and brick masonry walls thicker than 230 mm. In case of backing with brick masonry walls 230 mm or less thick or RCC members cramps shall be of 25 × 6 mm and length as per requirement made out of gun metal or any other metal specified in para 8.6.2.6. Generally the outer length of cramp in half brick work backing shall be 115 mm and in one brick work backing it shall be 150 mm. Typical shape & details of cramps for such backing are as indicated in Fig. 8.2 for general guidance. This can be modified as directed by the Engineer-in-Charge if so, required at site. Cramps shall be spaced not more 60 cm apart horizontally.

Alternatively the stone may be secured to the backing by means of stone dowels 10 x 5 x 2.5 cm as per shape indicated in Fig. 8.1.

10.1.3 The adjoining stones shall be secured to each other by means of gun metal cramps or copper pins of the specified size. Cramps may be attached to its side or top and bottom or sides, top and bottom. The general arrangement of cramps required for fixing facing unit to the wall are illustrated in Fig 4.3. The actual number of cramps and their sections, however, shall be as per requirements of design to carry the loads.

10.1.4 Where cramps are used to hold the unit in position only, the facings shall be provided with a continuous support on which the stones rest at the ground level and other storey levels, the support being in the form of projection from or recess into the concrete floor slab, or a beam between the columns or a metal angle attached to the floor slab or beams. These supports shall preferably be at vertical intervals not more than 3.5 m apart and also over the heads of all openings. Such supports shall also be provided where there is transition from thin facing below to thick facings above.

10.1.5 Alternatively cramps may be used to hold the units in position and in addition to support the units thus transferring the weight of the units to the backing. Such cramps should be properly designed as per IS 4101 (Part 1).

10.1.6 The cramps may be of copper alloyed with zinc, tin, nickel, lead or stainless steel.

10.1.7 The pins, cramps and dowels shall be laid in cement mortar 1:2 (1 cement : 2 fine sand) and their samples got approved by the Engineer-in-Charge and kept at site.

10.2 Joints

All joints shall be full of mortar. Special care shall be taken to see that groundings for veneer work are full of mortar. If any hollow groundings are detected by tapping the face stones, these shall be taken out and relaid. The thickness of the face joints shall be uniform, straight and as fine as possible, not more than 1.5 mm and in the face joint, the top 6 mm depth shall be filled with mortar specified for the pointing.

10.3 Mortar

The mortar used for jointing slabs shall be as specified.

10.4 Curing, Finishing, Protection and Scaffolding

It shall be as specified under 5.6, 5.7, 5.8 and 5.9.

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10.5 Measurements

The length and breadth shall be measured correct to a cm. In case of radially dressed or circular slabs used in the work, the dimensions of the circumscribing rectangles of the dressed stone used in the work, shall be measured & paid for. The area shall be calculated in sqm nearest to two places of decimal.

Marble work in lining upto 4 cm thickness shall be paid by area under veneer work and lining of greater thickness paid by volume under plain marble work.

10.6 Rate

The rate includes the cost of materials and labour required for all the operations described above except for the cost of providing and fixing of dowel and cramps which shall be paid for separately, unless otherwise stipulated in the item of work.

When factory made finished slabs and tiles are used, no further finishing as mentioned in para 5.7 shall be required nor anything extra shall be payable.

11 PRESSED CERAMIC TILES IN SKIRTING AND DADO

11.1 The tiles shall be of approved make and shall generally conform to IS 15622. The tiles shall be pressed ceramic covered by a glaze thoroughly matured and fitted to the body. The tiles shall be sound, true to shape, flat and free from flaws and other manufacturing defects affecting their utility.
The top surface of the tiles shall be glazed. The underside of the tiles shall not have glaze on more than 5% of the area in order that the tile may adhere properly to the base. The edges of the tiles shall be free from glaze, however, any glaze if unavoidable shall be permissible on only upto 50 per cent of the surface area of edges.

The glaze shall be free from welts, chips, craze, specks, crawlings or other imperfections detracting from the appearance when viewed from a distance of one metre. The glaze shall be either glossy or matt as specified. The glaze shall be white in colour except in the case of coloured tiles when colours shall be specified by the Engineer-in-Charge. There may be more than one colour on a tile.

11.1(a). Dimensions and Tolerances

Glazed pressed cramic tiles shall be made square or rectangular in sizes Table 1, 3, 5 & 7 of IS 15622 give the modular sizes and table 2, 4, 6 & 8 of IS 15622 gives the sizes of non modular tiles. The tiles shall conform to IS 15622 for dimensional tolerance, physical and chemical properties.

Half tiles for use as full tiles shall have dimensions which shall be such as to make the half tiles when jointed together (with 1 mm joint) match with dimensions of full tiles. Tiles may be manufactured in sizes other than those specified. above.

The thickness of the tiles shall be 5 mm or 6 mm or as specified.

The dimensions of fittings associated with the glazed tiles namely cover base, round edge tile, angles corner cups, ridge and legs, cronices and capping beads shall be of the shape and dimensions as required and the thickness of fittings shall be the same as the thickness of tiles given above.

11.2 Preparation of Surfaces

The joints shall be raked out to a depth of at least 15 mm in masonry walls.

In case of concrete walls, the surface shall be hacked and roughened with wire brushes. The surface shall be cleaned thoroughly, washed with water and kept wet before skirting is commenced.

SD/-

11.3 Laying

12 mm thick plaster of cement mortar 1:3 (1 cement : 3 coarse sand) mix of as specified shall be applied and allowed to harden. The plaster shall be roughened with wire brushes or by scratching diagonal at closed intervals.

The tiles should be soaked in water, washed clean, and a coat of cement slurry applied liberally at the back of tiles and set in the bedding mortar. The tiles shall be tamped and corrected to proper plane and lines. The tiles shall be set in the required pattern and jointed. The joints shall be as fine as possible. Top of skirting or dado shall be truly horizontal and joints truly vertical except where otherwise indicated. Odd

size/cut size of tile shall be adjusted at bottom to take care of slope of the flooring. Skirting and dado shall rest on the top of the flooring. Where full size tiles cannot be fixed these shall be cut (sawn) to the required size and their edges rubbed smooth. Skirting /dado shall not project from the finished "surface of wall" by more than the tile thickness, undulations if any shall be adjusted in wall.

11.4 Curing and Finishing

The joints shall be cleaned off the grey cement grout with wire/coir brush or trowel to a depth of 2 mm to 3 mm and all dust and loose mortar removed. Joints shall then be flush pointed with white cement added with pigments if required to match the colour of tiles. The work shall then be kept wet for 7 days.

After curing, the surface shall be washed and finished clean. The finished work shall not sound hollow when tapped with a wooden mallet.

11.5 Measurements

Length shall be measured correct to a cm. Height shall be measured correct to a cm in the case of dado and 5 mm in the case of riser and skirting. The area shall be calculated in square metre, correct to two places of decimal. Length and height shall be measured along the finished face of the skirting or dado including curves where specials such as coves, internal and external angles and beads are used. Where cornices are used the area of dado shall be measured excluding the cornices. Nothing extra will be paid for cutting (sawn) the tiles to sizes.

Areas where coloured tiles or different types of decorative tiles are used will be measured separately to be paid extra over and above the normal rate for white tiles.

11.6 Rates

The rate shall include the cost of all material and labour involved in all the operations described above, for tiles of sizes upto 0.14 sqm. unless otherwise specified in the description of the item. The specials such as coves, internal and external angles and beading shall be measured and paid for separately. The rate shall not include cost of cornices which shall be measured and paid for in running meters separately.

12. VITRIFIED TILES FLOORING, DADO

12.1 Vitrified Tiles

The tiles shall be of approved make and shall generally conform to IS 15622. They shall be flat, and true to shape and free from blisters crazing, chips, welts, crawling or other imperfections detracting from their appearance. The tiles shall be tested as per IS 13630. Classification and Characteristics of pressed ceramic tiles shall be as per IS 13712.

SD/-

The tiles shall be square or rectangular of nominal size. Table 1,3,5, and 7 of IS 15622 give the modular preferred sizes and table 2,4,6 and 8 give the most common non modular sizes. Thickness shall be specified by the manufacturer. It includes the profiles on the visible face and on the rear side. Manufacturer/ supplier and party shall choose the work size of tiles in order to allow a nominal joint width up to 2mm for unrectified floor tiles and up to 1mm for rectified floor tiles. The joint in case of spacer lug tile shall be as per spacer. The tiles shall conform to table10 of IS 15622 with water absorption 3 to 6% (Group BII).

The top surface of the tiles shall be glazed. Glaze shall be either glossy or matt as specified. The underside of the tiles shall not have glaze on more than 5% of the area in order that the tile may adhere properly to the base. The edges of the tiles shall be preferably free from glaze. However, any glaze if unavoidable, shall be permissible on only up to 50 per cent of the surface area of the edges.

12.2 Preparation of Surface and Laying

12.4.1 Base concrete or the RCC slab on which the tiles are to be laid shall be cleaned, wetted and mopped. The bedding for the tile shall be with cement mortar 1:4 (1 cement : 4 coarse sand) or as specified. The average thickness of the bedding shall be 20 mm or as specified while the thickness under any portion of the tiles shall not be less than 10 mm.

12.4.2 Mortar shall be spread, tamped and corrected to proper levels and allowed to harden sufficiently to offer a fairly rigid cushion for the tiles to be set and to enable the mason to place wooden plank across and squat on it.

12.4.3 Over this mortar bedding neat grey cement slurry of honey like consistency shall be spread at the rate of 3.3 kg of cement per square metre over an area upto one square metre. Tiles shall be soaked in water washed clean and shall be fixed in this grout one after another, each tile gently being tapped with a wooden mallet till it is properly bedded and in level with the adjoining tiles. The joints shall be kept as thin as possible and in straight lines or to suit the required pattern.

12.4.4 The surface of the flooring during laying shall be frequently checked with a straight edge about 2 m long, so as to obtain a true surface with the required slope. In bath, toilet W.C. kitchen and balcony/verandah flooring, suitable tile drop or as shown in drawing will be given in addition to required slope to avoid spread of water. Further tile drop will also be provided near floor trap.

12.4.5 Where full size tiles cannot be fixed these shall be cut (sawn) to the required size, and their edge rubbed smooth to ensure straight and true joints. Tiles which are fixed in the floor adjoining the wall shall enter not less than 10 mm under the plaster, skirting or dado.

12.4.6 After tiles have been laid surplus cement slurry shall be cleaned off.

12.5 Pointing and Finishing

The joints shall be cleaned off the grey cement slurry with wire/coir brush or trowel to a depth of 2 mm to 3 mm and all dust and loose mortar removed. Joints shall then be flush pointed with white cement added with pigment if required to match the colour of tiles. Where spacer lug tiles are provided, the half the depth of joint shall be filled with polysulphide or as specified on top with under filling with cement grout without the lugs remaining exposed. The floor shall then be kept wet for 7 days. After curing, the surface shall be washed and finished clean. The finished floor shall not sound hollow when tapped with a wooden mallet.

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12.6 Measurements

Length and breadth shall be measured correct to a cm before laying skirting, dado or wall plaster and the area calculated in square metre correct to two places of decimal. Where coves are used at the junctions, the length and breadth shall be measured between the lower edges of the coves. No deduction shall be made nor extra paid for voids not exceeding 0.20 square metre. Deductions for ends of dissimilar materials or other articles embedded shall not be made for areas not exceeding 0.10 square metre. Areas, where glazed tiles or different types of decorative tiles are used will be measured separately.

12.7 Rate

The rate for flooring shall include the cost of all materials and labour involved in all the operations described above, For tiles of sizes upto 0.16 sqm. unless otherwise specified in the description of the item. Nothing extra shall be paid for the use of cut (sawn) tiles in the work. Extra over and above the normal rate for white tiles shall be paid where coloured or any other type of decorative tiles have been used.

13. CEMENT CONCRETE GOLA

13.1 Cement Concrete The specifications for concrete shall be the same as described in subhead 4.0 of concrete work.

13.2 Gola

A chase of 75 mm wide and 75 mm deep shall be cut in the parapet wall just above the junction of mud phuska or lime concrete with parapet wall and it shall be filled with cement concrete 1:2:4 (1 cement : 2 coarse sand : 4 stone aggregate 10 mm and down gauge) the external face finish with a slope of 1 : 0.75 and the exposed surface of the gola shall be plastered with cement mortar 1 : 3 (1 cement : 3 fine sand).

Expansion joint at every 3.5 to 4.5 metres shall be provided and filled with bitumen filler. The bitumen filler shall be prepared by mixing bitumen, cement and coarse sand in the ratio of 80 : 1 : 0.25 (80 kg of hot bitumen : 1 kg of cement and 0.25 cum of coarse sand).

13.3 Curing

The finished surface shall be cured for at least 7 days.

13.4 Measurements

The length of the finished gola shall be measured at its junction with the wall face correct to a cm. No deduction shall be made in measurements for gaps for water outlets.

13.5 Rate

The rate shall include the cost of all materials and labour involved in all the operations described above including the cost of bitumen filler in expansion joint. The rate includes for all turnings and roundings at all the corners and risers.

14. KHURRAS

The khurras shall be constructed before the brick masonry work in parapet wall is taken up and it shall be of size 45 cm x 45 cm unless otherwise specified in the description of the item and shall be made of cement concrete 1:2:4 mix (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm nominal size) or other mix as stipulated in the description of the item.

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14.1 Laying

14.1.1 A PVC sheet of size 1 m x 1 m x 400 micron (alternatively, aluminium foil of 32 SWG) shall be laid under the khurra and then cement concrete shall be laid over it to average thickness of 50 mm with its top surface lower than the level of adjoining roof surface by not less than 50 mm.

14.1.2 The concrete shall be laid to a size greater than the stipulated size of the khurra in such a way that the adjoining terracing shall overlap the concrete on its three edges by not less than 7.5 cm. The concrete will slope uniformly from the edges to the outlet, the slope being as much as possible and in no case less than 20 mm cement concrete at the outlet. The concrete shall be continued at the same slope through the width of the wall into the outlet opening to ensure a water tight joint.

14.1.3 The khurras and the sides of the outlet shall then be rendered with 12 mm coat of cement plaster 1:3 mix (1 cement : 3 coarse sand) or other mix as stipulated in the description of the item. This shall be done when the concrete is still green and shall be finished. The sides of the khurras and sides of the outlet opening shall be well rounded. The size of the finished outlet opening shall be 10 cm wide and by 20 cm high or as directed by the Engineer-in-Charge.

14.1.4 In cases where rain water is to be disposed off through rain water pipes, iron grating shall be provided at the outlet as a safeguard against choking, if so directed by the Engineer- in- Charge. Iron gratings, shall be of overall size 20 × 25 cm. with an outer frame of 15 × 3 mm M.S. flat to which 4 Nos M.S. bars of 10 mm dia shall be welded in a vertical direction keeping equal clear spacing of 2.5 cm. or as directed by the Engineer in Charge.

14.2 Measurements

Khurras shall be counted in numbers.

14.3 Rate

The rate is for each completed khurra of the specified size and is inclusive of the cost of all materials and labour in forming the khurras and outlet opening as described above, except for iron gratings which shall be paid for separately.

15. RAIN WATER SPOUTS

The sectional area of rain water spouts provided shall be generally at the rate of 1 square cm per 70 to 80 square decimetre of roof area drained. However in locations subject to excessive and high intensities of rainfalls, the area of spouts provided may be suitably increased to suit local conditions. No spout shall be less than 80 mm in diameter. The spacing of spouts shall be arranged to suit the position of openings in the wall.

16. UNPLASTICISED POLYVINYL CHLORIDE PIPES AND FITTINGS

16.1 UPVC Pipes

Pipes shall conform to Type A pipes of IS 13592. The internal and external surfaces of the pipes shall be smooth and clean and free from groovings and other defects. The end shall be clearly cut and shall be square with the axis of the pipe. The end may be chamfered on the plain sides. Slight shallow longitudinal grooves or irregularities in the wall thickness shall be permissible provided the wall thickness remains within the permissible limit.

16.2 Colour of Pipe

Surface colour of the pipes shall be dark shade of grey or as specified.

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16.3 Marking

Each pipe shall be clearly and indelibly marked with the following informations at intervals not more than 3 meter.

(a) Manufacturer's name or trade mark.

(b) Nominal outside dia of pipe.

(c) Type 'A' (d) Batch number.

16.4 Dimensions

16.4.1 Diameter and Wall Thickness: Mean outside diameter, outside diameter at any point and wall thickness for type –A manufactured plain or with socket shall be as given in Table- 1 of IS 13592. UPVC rain water pipes shall be of the dia, specified in the description of the item and shall be in nominal lengths of 2,3,4 or 6 metres either plain or with sliding/grooved socket unless shorter lengths are required at junctions with fittings. Tolerances on specified length shall be + 10 mm and – 0 mm.

16.5 Fixing and Jointing

Pipes shall be either fixed on face of wall or embedded in masonry as required in the description of the item. Plain pipes shall be secured to the walls at all joints with PVC Pipes clips by means of 50 x 50 x 50 mm hard wood plugs, screwed with M.S. screws of required length i/c cutting brick work and fixing in cement mortar 1:4 (1 cement : 4 coarse sand). The clips shall be kept about 25 mm clear off finished face of wall, so as to facilitate cleaning of pipes. Pipes shall be fixed perfectly vertical or to the lines as directed. The pipes shall be fitted to fittings with seal ring conforming to IS 5382 allowing 10 mm gap for thermal expansion.

16.6 Installation in Wall/Concrete The walls/concrete slots should allow for a stress free installation. Pipes and fittings to be inserted into the slots without a cement base have to be applied first with a thin coat of PVC solvent cement followed by sprinkling of dry sand (medium size). Allow it to dry. The process gives a sound base for cement fixation. This process is repeated while joining PVC material to CI/AC materials.

16.7 Fittings

Fittings used shall be of the same make as that of the PVC pipes Injeciton moulded or fabricated by the manufacturer and shall have a minimum wall thickness of 3.2 mm. The fittings shall be supplied with grooved socketted ends with square grooves and provided with Rubber Gasket conforming to IS 5382. The plain ends of the fittings should be chamfered. The fittings shall be joined with the help of Rubber lubricant. The details of fittings refer IS 13592.

16.8 Measurements

The fittings shall be measured by numbers. The pipes shall be measured net when fixed correct to a cm. excluding all fittings along its length.

16.9 Rate

The rate shall include the cost of all materials and labour involved in all the operations described above including jointing but excluding the supply and fixing of wall plugs and PVC clips which shall be paid for separately.

Note : These pipes shall be used only in shaft or unexposed location to avoid damage to these pipes due to willful act.

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17. ROOF INSULATION

40 mm thick impervious sprayed, closed cell free Rigid Polyurethane foam over deck insulation conforming to IS - 12432 Pt. III (density of foam being 40-45 kg/ cum), over a coat of polyurethane primer applied @ 6-8 sqm per litre, laying 400 G polythene sheet.

17.1 Laying

Laying over PUF spray and providing a wearing course of 40 mm thick cement screed 1:2:4 (1 cement : 2 coarse sand : 4 stone aggregate 20 mm nominal size) in chequered rough finish, in panels of 2.5 m x 2.5 m and embedding with 24 G wire netting and sealing the joints with polymerized mastic, all complete as per direction of Engineer-in-Charge.

17.2 Measurements

Length and breadth of superficial areas of the finished work shall be measured correct to a cm. The area shall be calculated in square metre correct to two places of decimal. No deduction shall be made nor extra paid for voids not exceeding 0.20 square metre. Deductions for ends of dissimilar materials or other articles embedded shall not be made for areas not exceeding 0.10 square metre.

17.3 Rate

The rate for Roof insulation shall include the cost of all materials and labour involved in all the operations described above.

18. CEMENT PLASTER

The cement plaster shall be 12 mm, 15 mm or 20 mm thick as specified in the item.

18.1 Scaffolding

For all exposed brick work or tile work double scaffolding independent of the work having two sets of vertical supports shall be provided. The supports shall be sound and strong, tied together with horizontal pieces over which scaffolding planks shall be fixed. For all other work in buildings, single scaffolding shall be permitted. In such cases the inner end of the horizontal scaffolding pole shall rest in a hole provided only in the header course for the purpose. Only one header for each pole shall be left out. Such holes for scaffolding shall, however, not be allowed in pillars/columns less than one metre in width or immediately near the skew backs of arches. The holes left in masonry works for scaffolding purposes shall be filled and made good before plastering. Note : In case of special type of brick work, scaffolding shall be got approved from Engineer-incharge in advance.

18.2 Preparation of Surface

The joints shall be raked out properly. Dust and loose mortar shall be brushed out. Efflorescence if any shall be removed by brushing and scrapping. The surface shall then be thoroughly washed with water, cleaned and kept wet before plastering is commenced. In case of concrete surface if a chemical retarder has been applied to the form work, the surface shall be roughened by wire brushing and all the resulting dust and loose particles cleaned off and care shall be taken that none of the retarders is left on the surface.

18.3 Mortar

The mortar of the specified mix using the type of sand described in the item shall be used. It shall be as specified in CPWD Specification Subhead 3.0. For external work and under coat work, the fine aggregate

shall conform to grading IV. For finishing coat work the fine aggregate conforming to grading zone V shall be used.

18.4 Application of Plaster

18.4.1 Ceiling plaster shall be completed before commencement of wall plaster.

18.4.2 Plastering shall be started from the top and worked down towards the floor. All putlog holes shall be properly filled in advance of the plastering as the scaffolding is being taken down. To ensure even thickness and a true surface, plaster about 15 × 15 cm shall be first applied, horizontally and vertically, at not more than 2 metres 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 shall then 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. This shall be brought to a true surface, by working a wooden straight edge reaching across the gauges, with small upward and sideways movements at a time. Finally the surface shall be finished off true with trowel or wooden float according as a smooth or a sandy granular texture is required. Excessive troweling or over working the float shall be avoided.

18.4.3 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, provision of grooves at junctions etc. where required shall be done without any extra payment. Such rounding, chamfering or grooving shall be carried out with proper templates or battens to the sizes required.

18.4.4 When suspending work at the end of the day, the plaster shall be left, cut clean to line both horizontally and vertically. When recommencing the plastering, the edge of the old work shall be scrapped cleaned and wetted with cement slurry before plaster is applied to the adjacent areas, to enable the two to properly join together. Plastering work shall be closed at the end of the day on the body of wall and not nearer than 15 cm to any corners or arrises. It shall not be closed on the body of the features such as plasters, bands and cornices, nor at the corners of arrises. Horizontal joints in plaster work shall not also occur on parapet tops and copings as these invariably lead to leakages. The plastering and finishing shall be completed within half an hour of adding water to the dry mortar. No portion of the surface shall be left out initially to be patched up later on. The plastering and finishing shall be completed within half an hour of adding water to the dry mortar.

18.5 Thickness

Where the thickness required as per description of the item is 20 mm the average thickness of the plaster shall not be less than 20 mm whether the wall treated is of brick or stone. In the case of brick work, the minimum thickness over any portion of the surface shall be not less than 15 mm while in case of stone work the minimum thickness over the bushings shall be not less than 12 mm.

18.6 Curing

Curing shall be started as soon as the plaster has hardened sufficiently not to be damaged when watered. The plaster shall be kept wet for a period of at least 7 days. During this period, it shall be suitably protected from all damages at the contractor's expense by such means as the Engineer-in-Charge may approve. The dates on which the plastering is done shall be legibly marked on the various sections plastered so that curing for the specified period thereafter can be watched.

SD/-

18.7 Finish

The plaster shall be finished to a true and plumb surface and to the proper degree of smoothness as required. The work shall be tested frequently as the work proceeds with a true straight edge not less than 2.5 m long and with plumb bobs. All horizontal lines and surfaces shall be tested with a level and all jambs and corners with a plumb bob as the work proceeds.

18.8 Precaution

Any cracks which appear in the surface and all portions which sound hollow when tapped, or are found to be soft or otherwise defective, shall be cut out in rectangular shape and redone as directed by the Engineer-in-Charge. (i) When ceiling plaster is done, it shall be finished to chamfered edge at an angle at its junction with a suitable tool when plaster is being done. Similarly when the wall plaster is being done, it shall be kept separate from the ceiling plaster by a thin straight groove not deeper than 6 mm drawn with any suitable method with the wall while the plaster is green. (ii) To prevent surface cracks appearing between junctions of column/beam and walls, 150 mm wide chicken wire mesh should be fixed with U nails 150 mm centre to centre before plastering the junction. The plastering of walls and beam/column in one vertical plane should be carried out in one go. For providing and fixing chicken wire mesh with U nails payment shall be made separately.

18.9 Measurements

18.9.1 Length and breadth shall be measured correct to a cm and its area shall be calculated in square metres correct to two places of decimal.

18.9.2 Thickness of the plaster shall be exclusive of the thickness of the key i.e. grooves, or open joints in brick work.

18.9.3 The measurement of wall plaster shall be taken between the walls or partitions (the dimensions before the plaster shall be taken) for the length and from the top of the floor or skirting to the ceiling for the height. Depth of coves or cornices if any shall be deducted.

18.9.4 The following shall be measured separately from wall plaster.

(a) Plaster bands 30 cm wide and under

(b) Cornice beadings and architraves or architraves moulded wholly in plaster.

(c) Circular work not exceeding 6 m in radius.

18.9.5 Plaster over masonry pilasters will be measured and paid for as plaster only.

18.9.6 A coefficient of 1.63 shall be adopted for the measurement of one side plastering on honey comb work having 6 x 10 cm. opening.

18.9.7 Moulded cornices and coves.

(a) Length shall be measured at the centre of the girth.

(b) Moulded cornices and coves shall be given in square metres the area being arrived at by multiplying length by the girth.

(c) Flat or weathered top to cornices when exceeding 15 cm in width shall not be included in the girth but measured with the general plaster work.

(d) Cornices which are curved in their length shall be measured separately.

18.9.8 Exterior plastering at a height greater than 10 m from average ground level shall be measured separately in each storey height. Patch plastering (in repairs) shall be measured as plastering new work, where the patch exceed 2.5 sqm. extra payment being made for preparing old wall, such as dismantling old plaster, raking out the joints and cleaning the surface. Where the patch does not

exceed 2.5 sqm in area it shall be measured under the appropriate item under sub head 'Repairs to Buildings.'

18.9.9 Deductions in measurements, for opening etc. will be regulated as follows:

(a) No deduction will be made for openings or ends of joists, beams, posts, girders, steps etc. upto 0.5 sqm in area and no additions shall be made either, for the jambs, soffits and sills of such openings. The above procedure will apply to both faces of wall.

(b) Deduction for opening exceeding 0.5 sqm but not exceeding 3 sqm each shall be made for reveals, jambs, soffits sills, sills, etc. of these openings.

(i) When both faces of walls are plastered with same plaster, deductions shall be made for one face only.

(ii) When two faces of walls are plastered with different types of plaster or if one face is plastered and other is pointed or one face is plastered and other is unplastered, deduction shall be made from the plaster or pointing on the side of the frame for the doors, windows etc. on which width of reveals is less than that on the other side but no deduction shall be made on the other side. Where width of reveals on both faces of wall are equal, deduction of 50% of area of opening on each face shall be made from area of plaster and/or pointing as the case may be.

(iii) For opening having door frame equal to or projecting beyond thickness of wall, full deduction for opening shall be made from each plastered face of wall.

(c) For opening exceeding 3 sqm in area, deduction will be made in the measurements for the full opening of the wall treatment on both faces, while at the same time, jambs, sills and soffits will be measured for payment. In measuring jambs, sills and soffits, deduction shall not be made for the area in contact with the frame of doors, windows etc.

18.10 Rate

The rate shall include the cost of all labour and materials involved in all the operations described above.

19. 1st QUALITY ACRYLIC DISTEMPER

19.1 Materials

1st quality acrylic distemper having VOC content less than 50 gms/litre of approved brand and manufacture shall be used. The acrylic distemper shall be diluted with water or any other prescribed thinner in a manner recommended by the manufacturer. Only sufficient quantity of distemper required for day's work shall be prepared. The distemper shall be brought by the contractor in sealed tins in sufficient quantities at a time to suffice for a fortnight's work, and the same shall be kept in the joint custody of the contractor and the Engineer-in-Charge. The empty tins shall not be removed from the site of work, till this item of work has been completed and passed by the Engineer-in-Charge.

19.2 Preparation of the Surface

19.2.1 For new work the surface shall be thoroughly cleaned of dust, old white or colour wash by washing and scrubbing. The surface shall then be allowed to dry for at least 48 hours. It shall then be sand papered to give a smooth and even surface. Any unevenness shall be made good by applying putty, made of plaster of paris mixed with water on the entire surface including filling up the undulations and then sand papering the same after it is dry.

19.2.2 In the case of old work, all loose pieces and scales shall be removed by sand papering. The surface shall be cleaned of all grease, dirt etc. Pitting in plaster shall be made good with plaster of paris mixed with the colour to be used. The surface shall then be rubbed down again with a fine grade sand paper

and made smooth. A coat of the distemper shall be applied over the patches. The patched surface shall be allowed to dry thoroughly before the regular coat of distemper is applied.

19.3 Application

19.3.1 In the case of new work, the treatment shall consist of a priming coat of whiting followed by the application of two or more coats of distemper till the surface shows an even colour.

19.3.2 For old work, the surface prepared shall be applied one or more coats of distemper till the surface attains an even colour.

19.3.3 The application of each coat shall be as follows: The entire surface shall be coated with the mixture uniformly, with proper distemper brushes (ordinary white wash brushed shall not be allowed) in horizontal strokes followed immediately by vertical ones which together shall constitute one coat.

19.3.4 The subsequent coats shall be applied only after the previous coat has dried.

19.3.5 The finished surface shall be even and uniform and shall show no brush marks.

19.3.6 Enough distemper shall be mixed to finish one room at a time. The application of a coat in each room shall be finished in one operation and no work shall be started in any room, which cannot be completed the same day.

19.3.7 After each day's work, the brushes shall be washed in hot water and hung down to dry. Old brushes which are dirty or caked with distemper shall not be used.

19.3.8 **Priming Coat :** The priming coat shall be with distemper primer or cement primer, as required in the description of the item.

Note : If the wall surface plaster has not dried completely, cement primer shall be applied before distempering the walls. But if distempering is done after the wall surface is dried completely, distemper primer shall be applied. For old work no primer coat is necessary.

19.3.9 **Distemper Coat :** For new work, after the primer coat has dried for at least 48 hours, the surface shall be lightly sand papered to make it smooth for receiving the distemper, taking care not to rub out the priming coat. All loose particles shall be dusted off after rubbing. One coat of distemper properly diluted with thinner (water or other liquid as stipulated by the manufacturer) shall be applied with brushes in horizontal strokes followed immediately by vertical ones which together constitutes one coat.

The subsequent coats shall be applied in the same way. Two or more coats of distemper as are found necessary shall be applied over the primer coat to obtain an even shade.

A time interval of at least 24 hours shall be allowed between successive coats to permit proper drying of the preceding coat.

For old work the distemper shall be applied over the prepared surface in the same manner as in new work. One or more coats of distemper as are found necessary shall be applied to obtain an even and uniform shade.

15 cm double bristled distemper brushes shall be used. After each days work, brushes shall be thoroughly washed in hot water with soap solution and hung down to dry. Old brushes which are dirty and caked with distemper shall not be used on the work.

19.4 Protective Measures

Doors, windows, floors, articles of furniture etc. and such other parts of the building not to be white washed, shall be protected from being splashed upon.

Splashings and droppings, if any shall be removed by the contractor at his own cost and the surfaces cleaned. Damages if any to furniture or fittings and fixtures shall be recoverable from the contractor.

SD/-

19.5 Measurements

19.5.1 Length and breadth shall be measured correct to a cm. and area shall be calculated in sqm correct to two places of decimals.

19.5.2 Deductions in measurements, for opening etc. will be regulated as follows:

(a) No deduction will be made for openings or ends of joists, beams, posts, girders, steps etc. upto 0.5 sqm in area and no additions shall be made either, for the jambs, soffits and sills of such openings. The above procedure will apply to both faces of wall.

(b) Deduction for opening exceeding 0.5 sqm but not exceeding 3 sqm each shall be made for reveals, jambs, soffits sills, sills, etc. of these openings.

(i) When both faces of walls are plastered with same plaster, deductions shall be made for one face only.

(ii) When two faces of walls are plastered with different types of plaster or if one face is plastered and other is pointed or one face is plastered and other is unplastered, deduction shall be made from the plaster or pointing on the side of the frame for the doors, windows etc. on which width of reveals is less than that on the other side but no deduction shall be made on the other side. Where width of reveals on both faces of wall are equal, deduction of 50% of area of opening on each face shall be made from area of plaster and/or pointing as the case may be.

(iii) For opening having door frame equal to or projecting beyond thickness of wall, full deduction for opening shall be made from each plastered face of wall.

(c) For opening exceeding 3 sqm in area, deduction will be made in the measurements for the full opening of the wall treatment on both faces, while at the same time, jambs, sills and soffits will be measured for payment. In measuring jambs, sills and soffits, deduction shall not be made for the area in contact with the frame of doors, windows etc.

19.5.3 Corrugated surfaces shall be measured flat as fixed and the area so measured shall be increased by the following percentages to allow for the girthed area.

Corrugated non-asbestos cement sheet 20%
Semi corrugated non-asbestos cement sheet 10%

19.5.4 Cornices and other such wall or ceiling features, shall be measured along the girth and included in the measurements.

19.5.5 The number of coats of each treatment shall be stated. The item shall include removing nails, making good holes, cracks, patches etc. not exceeding 50 sq. cm. each with material similar in composition to the surface to be prepared.

19.5.6 Work on old treated surfaces shall be measured separately and so described

19.6 Rate

The rate shall include the cost of all labour and materials involved in all the above operations (including priming coat) described above.

TABLE 19.1
Equivalent Plain Areas of Uneven Surface

S. No	Description of work	How measured	Multiplying coefficient
1	2	3	4
I. Wood work doors, windows Etc.			
1.	Panelled or framed and braced doors, windows etc.	Measured flat (not girthed including)	1.30 (for each side)

SD/-

2.	Ledged and battened or ledged, battened and braced doors, windows etc.	Chowkhat or frame, Edges, chocks, cleats, etc. shall be deemed to be included in the item.	-do-
3.	Flush doors etc.	-do-	1.20 (for each side)
4.	Part panelled and part glazed or gauzed doors, window etc. (Excluding painting of wiregauze portion)	-do-	1.00 (for each side)
5.	Fully glazed or gauzed doors, windows etc. (Excluding painting of wire gauze portion)	-do-	0.80 (for each side)
6.	Fully venetioned or louvered doors, windows etc.	-do-	1.80 (for each side)
7.	Trellis (or Jaffri) work one way or two way	Measured flat overall, no deduction shall be made for open spaces, supporting members shall not be measured separately	2 (for painting all over)
8.	Carved or enriched work	Measured flat	
9.	Weather boarding	Measured flat (not girthed supporting frame work shall not be measured separately	1.20 (for each side)
10.	Wood shingle roofing	Measured flat (not girthed)	1.10 (for each side)
11.	Boarding with cover fillets and match boarding	Measured flat (not girthed)	1.05 (for each side)
12.	Tile and slate battening	Measured flat overall no deductions shall be made for open spaces	0.80 (for painting all over)
II. Steel work doors, windows Etc.			
13.	Plain sheeted steel doors or windows	Measured flat (not girthed) including frame edges etc.	1.10 (for each side)
14.	Fully glazed or gauzed steel doors and windows (excluding painting of wiregauze portion)	-do-	0.50 (for each side)
15.	Partly panelled and partly glazed or gauzed doors and windows (excluding painting of wire gauze portion)	-do-	0.80 (for each side)
16.	Corrugated sheeted steel doors or windows	-do-	1.25 (for each side)
17.	Collapsible gates	Measured flat	1.50 (for painting all over)
18.	Rolling shutters of interlocked laths	Measured flat (size of opening) all over; jamb guides, bottom rails and locking arrangement etc. shall be included in the item (top cover shall be measured separately)	1.10 (for each side)
III. General			

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19.	Expanded metal, hard drawn steel wire fabric of approved quality, grill works and gratings in guard bars, balustrades, railing partitions and MS Bars in windows frames.	Measured flat overall; no deduction shall be made for open spaces; supporting members shall not be measured separately	1 (for Paint all over)
20.	Open palisade fencing and gates including standards, braces, rails stays etc. in timber or steel	-do- (See note No.12)	1 (for Paint all over)
21.	Corrugated iron sheeting in roofs, side cladding etc.	-do- Measured flat (not girthed)	1.14 (for each side)
22.	AC corrugated sheeting in roofs, side cladding etc.	-do-	1.20 (for each side)
23.	AC semi corrugated sheeting in roofs, side cladding etc. or Nainital pattern using plain sheets	-do-	1.10 (for each side)
24.	Wire gauze shutters including painting of wire gauze	-do-	1.00 (for each side)
25.	Hait Cut Bamboo fencing	-do-	1.38 (AV) (for each side)

Explanatory Notes for Table 19.1

(1) Measurements for doors windows etc., shall be taken flat (and not girthed) over all including chowkhuts or frames, where provided. Where Chowkhuts or frames are not provided, the shutter measurements shall be taken.

(2) Where doors, windows etc., are of composite types other than those included in Table 1 the different portion shall be measured separately with their appropriate coefficients, the centre line of the common rail being taken as the dividing line between the two portions.

(3) The coefficients for door and windows shall apply irrespective of the size of frames and shutter members.

(4) In case steel frames are used the area of doors, windows shutters shall be measured flat excluding frames.

(5) When the two faces of a door, window etc. are to be treated with different specified finishes, measurable under separate items, the edges of frames and shutters shall be treated with the one or the other type of finish as ordered by the Engineer-in-Charge and measurement of this will be deemed to be included in the measurement of the face treated with that finish.

(6) In the case where shutters are fixed on both faces of the frames, the measurement for the door frame and shutter on one face shall be taken in the manner already described, while the additional shutter on the other face will be measured for the shutter only excluding the frame.

(7) Where shutters are provided with clearance at top or/and bottom each exceeding 15 cm height, such openings shall be deducted from the overall measurements and relevant coefficient shall be applied to obtain the area payable.

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(8) Collapsible gates shall be measured for width from outside to outside of gate in its expanded position and for height from bottom to top of channel verticals. No separate measurements shall be taken for the top and bottom guide rails rollers, fittings etc.

(9) Coefficients for sliding doors shall be the same as for normal types of doors in the table. Measurements shall be taken outside to outside of shutters, and no separate measurements shall be taken for the painting guide rails, rollers, fittings etc.

(10) Measurements of painting as above shall be deemed to include painting all iron fittings in the same or different shade for which no extra will be paid.

(11) The measurements of guard bars, expanded metal, hard drawn steel wire fabric of approved quality, grill work and gratings, when fixed in frame work, painting of which is once measured else where shall be taken exclusive of the frames. In other cases the measurements shall be taken inclusive of the frames.

(12) For painting open palisade fencing and gates etc., the height shall be measured from the bottom of the lowest rail, if the palisades do not go below it, (or from the lower end of the palisades, if they project below the lowest rail), upto the top of rails or palisades whichever are higher, but not up to the top of standards when the latter are higher than the top rails or the palisades.

(13) Width of moulded work of all other kinds, as in hand rails, cornices, architraves shall be measured by girth.

(14) For trusses, compound girders, stanchions, lattice girders, and similar work, actual areas will be measured in sq. metre and no extra shall be paid for painting on bolt heads, nuts, washers etc. even whenthey are picked out in a different tint to the adjacent work.

(15) For trusses, compound girders, stanchions, lattice girders, and similar work, actual areas will be measured in sq. metre and no extra shall be paid for painting on bolt heads, nuts, washers etc. even whenthey are picked out in a different tint to the adjacent work.

20. PAINTING SYNTHETIC ENAMEL PAINT OVER G.S. SHEETS

Synthetic enamel

Paint, suitable for painting over G.S. sheets, of approved brand and manufacture and of the required shade shall be used. New or weathered G.S. sheets shall be painted with a priming coat of one coat of redoxide zinc chromate Paint. Primer shall be applied before fixing sheets in place.

a. Preparation of Surface

20.1.1 ***Painting New Surface :*** The painting of new G.S. sheets shall not usually be done till the sheets have weathered for about a year. When new sheets are to be painted before they have weathered they shall be treated with a mordant solution prepared by mixing 38 gm of copper acetate in a litre of soft water or 13 gm hydrochloric acid in a solution of 13 gm each of copper chloride, copper nitrate and ammonium chloride dissolved in a litre of soft water. This quantity of solution is sufficient for about 235 sqm. to 280 sqm of area and is applied for ensuring proper adhesion of Paint. The painting with the mordant solution will be paid for separately.

Before painting on new or weathered G.S. sheets, rust patches shall be completely cleaned with coarse emery paper and brush. All grease marks shall also be removed and the surface washed and dried and rusted surface shall be touched with synthetic enamel paint of approved brand, manufacturer and shade.

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20.1.2 **Painting *Old Surface:*** If the old Paint is firm and sound, it shall be cleaned of grease, smoke etc. The surface shall then be rubbed down with sand paper and dusted. Rusty patches shall be cleaned up and touched with synthetic enamel paint.

If the old Paint is blistered and flaked, it shall be completely removed as described in CPWD Specification 13.41. Such removal shall be paid for separately and painting shall be treated as on new work.

b. Application

The number of coats to be applied shall be as in the description of item. In the case of C.G.S. sheets, the crowns of the corrugations shall be painted first and when these get dried the general coat shall be given to ensure uniform finish over the entire surface without the crowns showing signs of thinning.

The second or additional coats shall be applied when the previous coat has dried.

21. DISMANTLING W.C. PAN OF ALL SIZES

21.1 Dismantling W.C. Pan of all sizes including disposal of dismantled materials i/c malba all complete as per directions of Engineer-in-Charge. The W.C. seat is taken out along with trap and the area is to be cleaned off all dust and rubbish etc. Thereafter the hole left in the flooring is to be leveled by cement concrete 1:5:10 and floor tiles of same shade are also to be provided over it to match the floor of the toilet room.

21.2 Measurement & Rate

The measurements and payment of dismantling W.C. Pan of all sizes shall be made on each basis.

22. DISMANTLING 15 TO 40MM DIA G.I. PIPE

22.1 Dismantling 15 to 40mm dia G.I. pipe including stacking of dismantled pipes (within 50 metres lead) as per direction of Engineer-in-Charge. The pipe dismantling is done from tap point to main line. The 15mm dia is to be dismantled first and thereafter the dismantling/taking out the pipe shall proceed towards bigger dia pipe at the last. The pipe is removed from its joints/sockets/T-section gently with pipe wrench/tool so that the old pipe is not get damaged and the same can be reused where required. The old dismantle pipe will be stacked dia wise and connected fittings are also to be stored properly for reuse.

22.2 Measurement & Rate

The measurements and payment of **Dismantling G.I. pipe** shall be made on meter.

23. In-situ Reinforced Concrete

23.1 Before commencing demolition, the nature and condition of the concrete, the condition and position of reinforcement, and the possibility of lack of continuity of reinforcement should be ascertained.

23.2 Attention should be paid to the principles of the structural design to determine which parts of the structure depend on each other to maintain overall stability.

23.3 Demolition should be commenced by removing partitions and external non-load bearing cladding. It should be noted that in some buildings the frame may rely on the panel walls for stability.

23.4 Where hard demolition methods are to be used, the following procedures should be used.

(a) Reinforced Concrete Beams For beams a supporting rope should be attached of preferably at two or three locations to the beam. Then the concrete should be removed from both ends by pneumatic drill and the reinforcement exposed. The reinforcement should then be cut in such a way as to allow the beam to be lowered under control to the floor.

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(b) Reinforced Concrete Columns For columns, the reinforcement should be exposed at the base after restraining wire guy ropes have been placed round the member at the top. The reinforcement should then be cut in such a way as to allow the column to be pulled down to the floor under control.

(c) Reinforced Concrete Walls Reinforced concrete walls should be cut into strips and demolished as for columns.

23.5 MEASUREMENTS

23.5.1. All work shall be measured net in the decimal system, as fixed in its place, subject to the following limits, unless otherwise stated hereinafter.

(a) Dimensions shall be measured correct to a cm.
(b) Areas shall be worked out in sqm correct to two places of decimal.
(c) Cubical contents shall be worked out to the nearest 0.01 cum.

23.5.2 Parts of work required to be dismantled and those required to be demolished shall be measured separately.

23.5.3. Measurements of all work except hidden work shall be taken before demolition or dismantling and no allowance for increase in bulk shall be allowed.

23.5.4. Specifications for deduction for voids, openings etc. shall be on the same basis as that adopted for new construction of the work.

23.5.5. Work executed in the following conditions shall be measured separately.
(a) Work in or under water and/or liquid mud
(b) Work in or under foul position.

24. ROOFS

(i) Roof coverings generally including battens boarding, mats, bamboo jaffari or other subsidiary supports shall be measured in square metres except lead sheet roof covering which shall be measured in quintals and stone slab roof covering which shall be measured in cubic metres.
(ii) Ridges, hips and valleys shall be girthed and included with the roof area. Corrugated or semi corrugated surfaces shall be measured flat and not girthed.
(iii) Mud phuska on roofs shall be measured in cubic metres.
(iv) Lead sheets in roofs shall be measured in quintals and hips, valleys, flashings, lining to gutter etc. shall be included in this weight.
(v) R.B. or R.C.C. roofs shall be measured as specified in Cubic metres.
(vi) Supporting members, such as rafters, purlins, beams joists, trusses etc. of wood shall be measured in cubic metres and steel or iron sections, in quintals.

25. CEILING

(i) The stripping of ceilings shall be measured in square metres.
(ii) Dismantling of supporting joists, beams, etc. shall be measured in cubic metres or in quintals.
(iii) Height above floor level, if it exceeds 3.5 m shall be paid for separately.

26. Flooring and Pavings

Dismantling of floors (except concrete and brick floors) shall be measured in square metres. Supports such as joints, beams etc. if any shall be measured in Cubic metres. Concrete and bricks paving shall be measured in Cubic metres.

27. Concrete and Brick Roofs and Suspended Floors

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Demolition of floors and roofs of concrete or brick shall be measured in cubic metres. Beams cantilevers or other subsidiary supports of similar materials, shall be included in the item. In measuring thickness of roofs provided with water proofing treatments with bitumen felts, the thickness of water proofing treatment shall be ignored.

28. Walls and Piers

(i) Taking down walls and independent piers or columns of brick, stone or concrete shall be measured, in cubic metres. All copings, corbels, cornices and other projections shall be included with the wall measurements.

(ii) In measuring thickness of plastered walls, the thickness of plaster shall be ignored.

(iii) Ashlar face stones, dressed stone work, pre-cast concrete articles, etc. if required to be taken down intact shall be so stated and measured separately in cubic metres.

(iv) Cleaning bricks stacking for measurements including all extra handling and removal and disposing off the rubbish as stated shall be enumerated in thousand of cleaned bricks.

(v) Cleaning stone obtained from demolished/dismantling stone masonry of any description including ashlar facing dressed stone work, stone slabs or flagging and pre-cast concrete blocks including all extra handling and disposing off the rubbish as stated shall be measured in cubic meters of cleaned stone.

(vi) Honey comb works or cavity walls of bricks stone or concrete shall be measured as solid.

29. Reinforced Concrete and Brick Work

Reinforced concrete structures and reinforced brick roofs and walls shall be measured in cubic meters and if reinforcement is required to be salvaged, it shall be so stated. Where reinforcement is required to be separated, scraped and cleaned, the work shall be measured separately in quintal of salvaged steel.

30. Partitions, Trellis Work etc.

Partitions or light walls, of lath and plaster, trellis work, expanded metal, thin concrete or terracotta slabs and other similar materials including frame work if any shall be measured in square meters stating the overall thickness.

31. Wood Work

All wood work including karries average 40 sq cm or over in section, shall be measured in cubic meters, while that under 40 sq cm in section, in running meters. Ballies shall be measured in running meters. Boarding including wooden chajjas and sun shades along with supports shall be measured in square meters in its plane.

32. Steel and Iron Work

(i) All steel and iron work shall be measured in quintals. The weight shall be computed from standard tables unless the actual weight can readily be determined.

(ii) Riveted work, where rivets are required to be cut, shall be measured separately.

(iii) Marking of structural steel required to be re-erected shall be measured separately.

(iv) In framed steel items, the weight or any covering material or filling such as iron sheets and expanded metal shall be included in the weight of the main article unless such covering is not ordered to be taken out separately.

33. Doors and Windows

Dismantling of doors, windows, clerestory windows, ventilators etc. (wood or metal) whether done separately or along with removal of wall by making recess in the wall shall be enumerated. Those exceeding 3 sqm each in area shall be measured separately. The item shall include removal of chowkhats architraves, holdfasts and other attachments. If only shutters are to be taken out it shall be measured separately.

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34. Flushing Cisterns

The flushing cisterns shall be automatic or manually operated high level or low level as specified, for water closets and urinals. A high level cistern is intended to operate with minimum height of 125 cm and a low level cistern with a maximum height of 30 cm between the top of the pan and the under side of the cistern.

Cisterns shall be of following type (i) Vitreous China (IS 774) for Flushing type (ii) Automatic Flushing Cistern (IS 2326) and (iii) Plastic cisterns (IS 7231).

34.1. Vitreous Chine Cisterns *:*

The thickness of the body including cover shall be not less than 6 mm for vitreous China cisterns. The outlet of each syphon or stand pipe shall be securely connected to the cistern by means of lock nut. The cistern shall be free from manufacturing faults and other defects affecting their utility. All working parts shall be designed to operate smoothly and efficiently. Cistern shall be mosquito proof. A cistern shall be considered mosquito proof only if there is no clearance any where which would permit a 1.6 mm wire to pass through in the permanent position of the cistern i.e. in the flushing position or filling position.

The breadth of a low level cistern, from front to back shall be such that the cover or seat, or both, of water closet pan shall come to rest in a stable position when raised.
The cistern shall be supported on two cast iron brackets of size as approved by the Engineerin- Charge and embedded in cement concrete 1:2:4 block 100 x 75 x 150 mm. These shall be properly protected by suitable impervious paint. Alternatively the cisterns shall have two holes in the back side above the overflow level for screwing into the wall, supplemented by two cast iron wall supports. A 5 litres cistern, however, may be supported by larger brackets cast on the body of the cistern.

The cistern shall have a removable cover which shall fit closely on it and be secured against displacement. In designs where the operating mechanism is attached to the cover this may be made in two sections, but the section supporting the mechanism shall be securely bolted or screwed to the body. The outlet fitting of each cistern shall be securely connected to the cistern. The nominal internal diameter of cistern outlet shall be not less than 38 ± 1mm for low level cisterns respectively. The length of the outlet of the cistern shall be 37 ± 2 mm.

Ball valve shall be of screwed type 15 mm in diameter and shall conform to IS 1703. The float shall be made of polyethylene as specified in IS 9762. (The design shall permit the cistern to fill in rapidly and close effectively when the level of water reaches the working water level.)
In the case of manually operated cisterns the siphonic action of the flushing cistern shall be capable of being rapidly brought into action by the operating lever, but shall not self siphon or leak. When tested according to IS 774 the discharge rate shall be 10 ± 0.5 litre in 6 seconds and 5 ± 0.5 litre in 3 seconds for cisterns of capacities 10 litre and 5 litre respectively.

The cisterns shall be so designed that there is not appreciable variation in the force of flush during the discharge of the required quantity of water. The cistern shall have a discharge capacity of 5 & 10 litres as specified. When required to give a full flush, they shall respectively discharge 5 litres and 10 litres with variation of ± 0.5 litres.

The flush pipe shall be of (a) medium quality galvanised iron having internal diameter of 38 ± 1 mm for low level cistern. The flush pipe shall be of suitable length with bends etc. as required for fixing it with front or back inlet W.C. Pan. (b) Polyethylene pipes low density conforming to IS 3076 or high density (c) Unplasticised PVC pipes. For high density polyethylene and unplasticised PVC pipes, the outside diameter of the pipes shall be 40 mm. When PVC plumbing pipes are used the outside diameter of the pipe shall be 40 mm for high level cisterns and 50 mm for low level cisterns.

In case of low level cistern the flush pipe shall be a vertical pipe 30 cm long and having a nominal internal dia 38 ± 1 mm (except plastic flush pipes).

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Over Flow Pipe

(a) GI overflow pipe shall be of not less than 20 mm nominal bore and shall incorporate a non-corrodible mosquito proof brass cover having 1.25 mm dia perforation, screwed in a manner which will permit it to be readily cleaned or renewed when necessary. No provision shall be made whereby the overflow from the cistern shall discharge directly into the water closet or soil pipe without being detected. The invert of the overflow pipe in the case of high level and low level cisterns shall be 19 mm minimum above the working water level. In case of overflow due to any reason water should drain out through the over flow pipe and not through the siphon pipe.

(b) The plastic overflow pipes shall be manufactured from high density polyethylene conforming

Inlet and Overflow Holes:

The cistern shall be provided with inlet and overflow holes, situated one at each end which shall be capable of accommodating an overflow pipe of not less than 20 mm nominal bore and a 15 mm size ball valve. The holes shall be cleanly cast or drilled and the adjacent surfaces shall be smooth.

34.2. PVC Cisterns :

Plastic flushing cisterns for WC and Urinals shall be as per IS 7231.

The materials for manufacturing various components of the flushing cisterns shall conform to the requirements given in Table 17.1 below:

34.3. Flush Pipe Connection to Cistern

The flush pipe shall be securely connected to cistern outlet and made airtight by means of a coupling nut. The nuts made of injection-molded HDPE/Polyacetal may be used only if the end pipe is also made of plastic. The nominal internal diameter of the cistern outset shall be not less than 32 mm and 38 mm for high-level and low-level cisterns respectively.

The screw thread for connection to the flush pipe shall not be less than size 1½ of IS 2643 (Part 3). In the case of polyethylene and unplasticised PVC flush pipes, the upper end of the flush pipe shall be provided with suitable means of ensuring and maintaining a watertight and airtight joint to the flushing cistern. When ordered for use with a flush pipe, the outlet connection may be supplied with coupling nut made of copper based alloy or other non-corrodible material and a plain tail piece having a minimum length of 60 mm. The centre of the outlet hole shall be generally central to the length of the cistern. The length of the outlet shall be 37±2 mm in case of interchangeable siphon; however, where integral siphon is provided, the outlet length shall be 20±2 mm.

Note: The length of the cistern outlet shall be the dimension from the bottom surface of the cistern to the end of the outlet after the cistern with siphon/stand pipe has been duly fitted with all washers, lock-nuts, etc.

35. Toilet Paper Holder

The toilet paper holder shall be of CP brass or vitreous china as specified and of size and design as approved by the Engineer-in-Charge. It shall be fixed in position by means of C.P. brass screws and rawl plugs embedded in the wall.

36. Urinals

36.1 Bowl Type Urinal :

Urinal basins shall be of flat back or corner wall type lipped in front. These shall be of white vitreous china conforming to IS 2556-(Part 6). The urinals shall of one piece construction. Each urinal shall be provided with not less than two fixing holes of minimum dia 6.5 mm on each side. Each urinal shall have an integral flushing rim of suitable type and inlet or supply horn for connecting the flush pipe. The flushing rim and inlet shall be of the self draining type. It shall have a weep hole at the flushing inlet of the urinals.

At the bottom of the urinal an outlet horn for connecting to an outlet pipe shall be provided. The exterior of the outlet horn shall not be glazed and the surface shall be provided with grooves at right angles to the

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axis of the outlet to facilitate fixing to the outlet pipe. The inside surface of the urinal shall be uniform and smooth throughout to ensure efficient flushing. The bottom of pan shall have sufficient slope from the front towards the outlet such that there is efficient draining.

36.2. Urinal Partition Slabs :

Urinal Partition slabs shall be provided, as specified in the item of work.

37. Wash Basins

Wash basins shall be of white vitreous china conforming to IS 2556 (Part -I) and IS 2556 (Part-4). Wash basins either of flat back or angle back as specified shall be of one piece construction, including a combined overflow. All internal angles shall be designed so as to facilitate cleaning. Each basin shall have a rim on all sides, except sides in contact with the walls and shall have a skirting at the back. Basins shall be provided with single or double tap holes as specified. The tap holes shall be 28 mm square or 30 mm round or 25 mm round for pop up hole. A suitable tap hole button shall be supplied if one tap hole is not required in installation. Each basin shall have circular waste hole to which the interior of basin shall drain. The waste hole shall be either rebated or beveled internally with dia meter of 65 mm at top. Each basin shall be provided with a non-ferrous 32 mm waste fitting. Stud slots to receive the brackets on the underside of the wash basin shall be suitable for a bracket with stud not exceeding 13 mm diameter, 5 mm high and 305 mm from the back of basin to the centre of the stud. The stud slots shall be of depth sufficient to take 5 mm stud. Every basin shall have an integral soap holder recess or recesses, which shall fully drain into the bowl. A slot type of overflow having an area of not less than 5 sq. cm, shall be provided and shall be so designed as to facilitate cleaning of the overflow.

Where oval shape or round shape wash basins are required to be fixed these shall be fixed preferably in RCC platform with local available stone topping either fully sunk in stone top or top flush with the stone topping as directed by Engineer-in-Charge.

The wash basins shall be one of the following patterns and sizes as specified.

(a) Flat back: 660 x 460 mm (Surgeon's Basin)
630 × 450 mm
550 × 400 mm
450 × 300 mm

(b) Angle back: 600 × 480 mm 400 × 400 mm

White glazed pedestals for wash basins, where specified shall be provided. The quality of the glazing of the pedestal shall be exactly the same as that of the basin along with which it is to be installed. It shall be completely recessed at the back to accommodate supply and waste pipes and fittings. It shall be capable of supporting the basin rigidly and adequately and shall be so designed as to make the height from the floor to top of the rim of basin 75 to 80 cm.All the waste fittings shall be brass chromium plated, or as specified.

38. Waste Fittings for Wash Basins and Sinks.

The waste fittings shall be of nickel chromium plated brass, with thickness of plating not less than service grade 2 of IS 4827 which is capable of receiving polish and will not easily scale off. The fitting shall conform in all respect to IS 2963 and shall be sound, free from laps, blow holes and fittings and other manufacturing defects. External and internal surfaces shall be clean and smooth. They shall be neatly dressed and be truly machined so that the nut smoothly moves on the body.

Waste fitting for wash basins shall be of nominal size of 32 mm. Waste fittings for sinks shall be of nominal size 50 mm.

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39. INSTALLATION OF MIRROR

39.1. Fixing

The mirror shall be mounted on backing with environmentally friendly material other than asbestos cement sheet shall be fixed in position by means of 4 C.P. brass screws and C.P. brass washers, over rubber washers and wooden plugs firmly embedded in walls. C.P. brass clamps with C.P. brass screws may be an alternative method of fixing, where so directed. Unless specified otherwise the longer side shall be fixed horizontally.

39.2. Measurements

Mirror shall be measured in numbers.

39.3. Rate

Rate shall include the cost of all the materials and labour involved in all the operations described above.

40. INSTALLATION OF SINK

40.1. The installation shall consist of assembly of sink C.I. brackets, union and G.I. or P.V.C. waste pipe.

40.2. Fixing

The sink shall be supported on C.I. cantilever brackets, embedded in cement concrete (1:2:4) block of size 100 x 75 x 150 mm. Brackets shall be fixed in position before the dado work is done. The C.P. brass or P.V.C. union shall be connected to 40 mm nominal bore G.I. or PVC waste pipe which shall be suitably bent towards the wall and shall discharge into a floor trap. C.P. brass trap and union and waste shall be paid separately. The height of front edge of sink from the floor level shall be 80cm.

40.3. Measurements

The sinks shall be measured in numbers.

40.4. Rate

Rate shall include the cost of all materials and labour involved in all the operations described above but shall not included the cost of waste fitting and brackets which shall be paid for separately. Make sure the sensor is located min 60cm(23 inch) above everthing bellow to prevent false triggers. Never install hand dryer onto a wooden or plastic wall finish. Before installation, make sure the power source complies with specification of the machine.

41. SENSOR OPERATED OPTIMUM HAND DRYERS

This machine is equipped with an infrared sensor for automatic activation. Connect only to a circuit protected by a Ground-Fault Circuit Interrupter (GFCI) or Earth-Leakage Circuit-Breaker (ELCB). Disconnect power before servicing.

Activation	Activated by an infared sensor. The machine operates automatically.
Dimensions WXHXD	305 225 206mm (12'0"x 8'9"x8'1")
Voltage/Power	220-240V, 50/60Hz, 2400~2800W
Detection Distance	30 cm for A4 white paper
Air Temperature	65 to 75 degree (149 F to 167 F) Ambient temperature 25 degree (77 F)

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Operation Duration	60 (Self-protection automatic shutoff)
Motor Type	Induction Type (Brushless)
Air Velocity	AC 220V 50Hz 14m/s AC 220V 60Hz 17m/s 10%

41.1. INSTALLATION KIT

i. Wrench- 01 No.
ii. Plastic Dowel- 04 Nos.
iii. Fixing Screw- 04 Nos.
iv. Washer- 04 Nos.
v. Spring Washer- 04 Nos.

41.2. INSTALLATION

Drill four holes, dia 10mm insert plastic dowels. Insert screws into dowels and tighten them. Connect AC power cable. Check AC power cable connection. Check if AC power on. Put outer cover back. Insert security screws and tighten them.

41.3. OPERATION INSTRUCTIONS

1. The machine starts operating automatically when user s hands are put approximately 20cm (7.78") below the sensor located next to air louver. Whenever the hands are moved out of sensing range, the machine will stop after approx. 2 sec.
2. The 0.5 sec time delay helps avoid false triggers by unexpected movements.
3. When the air temperature is over 120 C or any fault has occurred, the security device will shut off the power of the heater.
4. For safety reasons, the machine will immediately stop operating when it is used continuously over 60seconds. The machine resumes to standard function when hands are moved away.

41.4. Adjustment of Sensor

1. Loosen Security Screws and remove Casing. (Use the Security Wrench from the attached package in the carton.)
2. Refer to drawing for the location of power board.
3. Use a tiny flat screwdriver to turn adjustment screw in clockwise direction to lengthen the sensing distance. To shorten the sensing distance turn in counter-clockwise direction.
4. After finishing the adjustment, put back Outer Case and fasten it.

42. WALL MOUNTED PAPER TOWEL DISPENSERS

42.1. Material

Cast brass construction for durability and reliability

42.2. Features

- Soap dispensing volume can be adjusted to 0.8 mL, 1.2 mL, 1.6 mL, or 2.0 mL.
- 54 oz. (1600 ml) high capacity soap reservoir.
- Optional 27 oz. (800 ml) low-capacity soap reservoir (sold separately).
- Sensor range adjustable from 1" to 4" (25 to 101 mm). Default set at approximately 2-3/4" (69 mm).
- Maintenance/cleaning mode is activated for 30 seconds when sensor is blocked for 10 seconds.
- Vandal-resistant sensor delays dispensing for twenty seconds if activated 4 times in under 5 seconds.
- Low soap above-the-counter indicator.
- Easy below-the-counter refill.
- AC-powered operation—no batteries to replace.
- Requires low (1-20 cps or gr/m-s) viscosity foam soap with no suspended particles. Please see Installation Guide or Maintenance and Use Guide for specific soap recommendations.
- Kohler Soap (sold separately) recommended for optimized performance and longevity.

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42.3. Installation

Optional deep rough-in mounting hardware kit for counters greater than 2" (50 mm) thick and less than 4-1/2" (114.3 mm) thick sold separately.

42.4 Required Electrical Service

One dedicated circuit required, protected with Class A Ground Fault Circuit-Interrupter (GFCI). Outside North America, this device may be known as a Residual Current Device (RCD). 120/240 V, 50/60 Hz

42.5. Technical Information

All product dimensions are nominal.
Installation Type : Deck-mount
Material : Brass

Notes: Install this product according to the installation instructions. ADA, OBC,\CSA B651 compliant when installed to the specific requirements of these regulations.

43. INSTALLATION OF TOWEL RAIL

It shall be fixed in position by means of C.P. brass screws on wall surface by PVC dash fasteners, firmly embedded in wall.

43.1. Measurements

Tower rails shall be measured in numbers.

43.2. Rate

Rate shall include the cost of all the materials and labour involved in all the operations described above.

44. MINERAL FIBRE FALSE CEILING (BEVELED TEGULAR MINERAL FIBRES)

44.1. Materials

44.1.1 Tiles

Mineral Fiber Ceiling Tiles shall be made of granulated high-density Mineral Wool as the main material and top production technique which gives it superior features of fire-proofing, sound absorption, heat insulation & sag resistance. They are cost effective and are mainly used for acoustics and decoration.

Tiles shall be appropriate class and of finished thickness as specified in the description of the item. Only selected tiles of uniform width shall be used. Unless otherwise specified in the description of the item or shown in the drawings, the width of tiles selected for use shall not be less than 595 x 595mm in size and of approved texture, design and patterns and patterns and shall be of 16mm/20mm thick Beveled Tegular edge type.

Where width of room/ corridor is in multiple of standard width of tiles, same pattern shall be maintained throughout the length. Where the width of rooms/ corridor is not in multiple of standard width of tiles, borders with appropriate width and material of boards shall be provided in design approved by the Engineer-in-charge and maintained uniformly throughout of the length/ width of room/ corridor. Mineral Fibre tiles shall have the following properties:

(a) **Surface:** Shall be of approved texture, design and pattern.
(b) **Dimensions:** 595mm x 595mm x 16mm (20mm) thick Beveled Tegular edge type. Size referred to are always module sizes. The nominal panel size may differ depending on the suspension system used.
(c) **Relative humidity:**99% RH resistant.

SD/-

(d) **Fire resistance:** Fire performance as per BS:476 (Part-6 & 7)
(e) **Thermal conductivity:** 0.052 W/m–K – 0.057 W/m–K
(f) **Acoustic control:** Noise reduction coefficient (NRC) = 0.50 to 0.60
(g) **Light reflectance:**>85%.
(h) **Weight:** 3.10 Kg/m2 (for 16mm thick) & 5.29 Kg/m2 (for 20mm thick)
(i) **Suspension system:** Suspension system shall be made of interlocking metal T-grids of hot-dipped all round galvanized steel.

44.2. Frame

Frame is made up of interlocking metal T-grids of hot dipped all round galvanized steel sections of 0.33mm thick (Galvanized @ 120 grams per sqm including both sides) comprising of main T runners of size 15 x 32mm of length 3000mm, cross T of size 15 x 32mm of length 1200mm and secondary intermediate cross T of size 15 x 32mm of length 600mm to form grid modules of size 600 x 600mm. This grid shall be suspended from ceiling using galvanized mild steel members (Galvanized @ 80 gms/m2 including all sides) i.e. 50mm long, 8mm outer diameter M-6 dash fasteners, 6mmdia fully threaded hanger rod upto 1000 mm length and L-shaped level adjuster of size 85 x 25 x 2mm. Frame also consist of galvanized iron perimeter wall angle of size 24 x 24 x 0.40mm of length 3000mm to be fixed on periphery wall/ partition with the help of plastic rawl plugs at 450mm centre to centre and 40mm long dry wall SS screws. The bottom surface of the frame shall be checked and corrected to true plans and slopes.

44.3. Fixing

Outer wall angle shall be fixed accurately and truly at required height and level, parallel and close to the wall. Thereafter all the T members shall be placed and fixed carefully to form the grid. The grid comprises of main T-runners at 1200mm centres securely fixed to the structural soffit by approved and adjustable hanger rods at 1200mm maximum centres and not more than 150mm from spliced joints of main T-runners. The last hanger at the end of each runner should not be greater than 600mm from the adjacent wall. Similarly, cross T-runners of 1200mm length shall be placed at 600mm centre to centre. 600x600mm modules to be formed by fitting 600mm long flush fitting cross Tees (secondary cross T) centrally between 1200mm cross T-runners. The tiles shall then be placed properly in the grids as per required pattern, texture and design/ drawing and as per directions of the Engineer-in-Charge. If required, level of the false ceiling grid shall be checked after placing of calcium silicate tiles and necessary adjustment shall be made wherever required through level adjuster.

44.4. Finishing

Care should be taken while placing calcium silicate tiles into the grid so that there will be no displacement to grid and stains/ dirty marks put by the workers.

44.5. Measurements

Length and breadth shall be measured correct to a cm. Areas shall be worked out to nearest 0.01sqm. The superficial area of the finished work ceiling shall be measured in square metres. No deduction in measurements shall be made for openings of areas upto0.36 Sqm. Nothing extra shall be payable either for any extra material or labour involved in forming such openings. For openings exceeding 0.36 sqm in area, deductions in measurements for the full opening in multiple of area of each tile (0.36 Sqm) will be made.

45. FALSE CEILING- GYPSUM TYPE

45.1 Frame

Providing and fixing false ceiling at all height including providing and fixing of frame work made of special sections, power pressed from M.S. sheets and galvanized with zinc coating of 120 gms/sqm (both side inclusive) as per IS : 277 and consisting of angle cleats of size 25 mm wide x 1.6 mm thick with flanges of 27 mm and 37mm, at 1200 mm centre to centre, one flange fixed to the ceiling with dash fastener 12.5 mm dia x 50mm long with 6mm dia bolts other flange of cleat fixed to the angle hangers of 25x10x0.50 mm of required length with nuts & bolts of required size and other end of angle hanger fixed with intermediate G.I. channels 45x15x0.9 mm running at the rate of 1200 mm centre to centre to which the ceiling section

SD/-

0.5 mm thick bottom wedge of 80 mm with tapered flanges of 26 mm each having lips of 10.5 mm, at 450 mm centre to centre, shall be fixed in a direction perpendicular to G.I. intermediate channel with connecting clips made out of 2.64 mm dia x 230 mm long G.I. wire at every junction, including fixing perimeter channels 0.5 mm thick 27 mm high having flanges of 20 mm and 30 mm long, the perimeter of ceiling fixed to wall/partition with the help of rawl plugs at 450 mm centre, with 25mm long dry wall screws @ 230 mm interval, including fixing of gypsum board to ceiling section and perimeter channel with the help of dry wall screws of size 3.5 x 25 mm at 230 mm c/c, including jointing and finishing to a flush finish of tapered and square edges of the board with recommended jointing compound, jointing tapes , finishing with jointing compound in 3 layers covering up to 150 mm or both sides of joint and two coats of primer suitable for board, all as per manufacturer's specification and also including the cost of making openings for light fittings, grills, diffusers, cutouts made with frame of perimeter channels suitably fixed, all complete as per drawings, specification and direction of the Engineer in Charge but excluding the cost of painting with :

45.2. Measurements

Length and breadth of superficial area of the finished work shall be measured correct to a cm. Area shall be calculated in square metre correct to two places of decimal. No deduction will be made to openings of areas upto 40 square decimetre nor shall extra payment be made either for any extra material or labour involved in forming such openings.

45.3. Rate

The rate shall include the cost of all the materials and labour involved in all the operations described above including scaffolding etc.

46. Wooden Study Table

Providing Wooden Study Table , Top made of 18mm thick ISI Mark pre laminated MDF Board IS : 14587-1998 in approved shade with half round lipping with thinner polish or touch wood polish, Structure made of M.S. Angle Iron Frame 32x32x3/2.5mm thick duly welded. Two coats of air drying synthetic enamel paints made over two coat of metal primer for pipe structure. as per approved design & shade, all complete as per direction of SBSC/ Consultant.

47. Wooden Professor Chair

Providing Wooden Professor Chair Frame made of ERW round pipe 25mmdia x 2.0mm thick in one piece. Seat & Back made of Teak wood section 45 x 22mm.Duly polished shining black enamel Paint the best quality high strength Nylon/Plastic Cane wire shall be used The 6 no. of cane wire Shall be passed in each hole of back and seat. In seat, front section to be doubled and rounded. Seat shall be fitted over flate size 25x4mm thick in depth wise of frame on both side with minimum 3 no. screws on each side. Back rest shall be fitted by round head steel screws 3 ns. On each side as per approved design & shade, all complete as per direction of SBSC/ Consultant.

48. Wooden Study Chair

Providing Wooden Study Chair Top made of 18mm thick ISI Mark pre laminated MDF Board IS : 14587-1998 in approved shade with half round lipping with thinner polish or touch wood polish. Structure Made of M.S. Angle Iron Frame 32x32x3/2.5mm thick duly welded. Two coats of air drying synthetic enamel paints made over two coat of metal primer for pipe structure. As per approved design & shade, all complete as per direction of SBSC/ Consultant.

49. Wooden Professor Table

Providing Woodan Proffessor Table Table top made of 25mm thick ISI Marked Pre Laminated MDF Board IS-14587-1998, Teak wood half round 50mm wide, Lipping supported from inside by Jungle wood 25mm

SD/-

x 25mm, DRAWER BOX CUBOARD :- CR sheet 0.80mm thick Confirming to IS-513, DRAWER SIZE :- 500(L)X100mm(D) Minimum, FRAME & STRUCTRUE :- ERW Square pipe25x25x1.25mm in size 1100 (L) x 600(W)x732(H) mm, CUPBOARD SHUTTER :- BOX TYPE made of 0.80mm CR sheet Confirming to IS-513. FOOT REST :-ERW square pipe 25x25x1.25mm in full length and gap between two pipes approx. 85.mm. as per approved design & shade, all complete as per direction of SBSC/ Consultant.

50. Roller Blinds

Providing & fixing of Roller Blinds- The Blind system consist of a coated aluminium tube of 38 mm diameter with provision of fabric clamping. The Fabric is rolled up and down through a chain drive system with built in drive gear and an over run brake system. The side brackets are universal type suitable both for wall and ceiling mounting. The bottom end of the fabric is rolled over an oval shape aluminium tube with provision to lock the fabric, all complete as per direction of SBSC/ Consultant.

51. CURTAIN GLAZING AND ALUMINIUM COMPOSITE PANEL CLADDING SYSTEMS

Movement of building components to which the curtain glazing system is attached including long term and short term movements due to thermal effect, structural effect, wind pressure, seismic forces, erection or dead loads, creep, column shortening, deflection, torsion and vibrations etc shall be free and noiseless. This shall be achieved without any strain or stress being transferred to the glass, without buckling of any components, without excessive stress to any members or assemblies and without compromising on any of the performance requirement of the curtain wall.

52. CHIPPING OF UNSOUND / WEAK CONCRETE:

52.1 **Precaution, Preparation and procedure**

The Chipping of unsound work / concrete / delaminated layer of gunniting etc. shall be done by chipping(after properly supporting the member with false works) , in regular shape, with sides parallel or normal to the direction of the reinforcement. The chipping shall be done minimum 50 mm beyond the perimeter of the spell. For a single spell, the repair area should have a minimum width of 100 mm in any direction. If a number of spells are closely located to each other, these should be included in a single area marked for repair. The cut shall be made normal to the surface of member. The minimum depth of cut should be 12 mm. Adequate care is to be taken not to cut the reinforcement steel and a cover metre could be used to estimate the depth of cover, for which nothing extra shall be paid. Chipping should be done upto the required depth as decided by the Engineer-in- Charge to produce sound concrete surface to a near uniform depth for the repair areas. Removal of concrete should begin at the interior of the repair areas and progress towards the boundaries. All edges and cavities shall be square shouldered.

52.2 **Measurements**

Dimensions of area chipped off for RCC slabs, beams, columns etc. shall be measured in centimeters after the chipping / dismantling operation is completed for different thicknesses as specified in the item separately. The area of the chipped / exposed RCC surface shall be measured in sq. m correct to second place of decimal for different thicknesses as specified in the item separately .

52.3 Rate:-

The rate shall include the cost of all the T&P required, labour involved and cost of all the operations as described above.

53. CLEANING OF EXISTING REINFORCEMENT AND PASSIVATING ITS SURFACE

SD/-

53.1 Material:-

The alkaline chemical rust remover as approved by the Engineer-in Charge and should be procured in sealed containers indicating the batch number and the date of manufacture etc.

53.2 Surface preparation

The rust has to be removed from the surface of the reinforcement manually using chisels, wire brush, emery paper etc. as directed by Engineer-in-Charge at no extra cost, till the steel surface is cleared of all rust that could be removed manually or mechanically.

53.3 Application:-

Then alkaline chemical rust remover, as approved by the Engineer-in Charge shall be applied with brush over the reinforcement surface thoroughly along the full length of rusted reinforcement. After 24 hours of its application the surface shall be cleaned with wire brush and all loose particles removed. It should then be washed clean, with water, thoroughly and allowed to dry. alkaline chemical rust remover should be applied to the reinforcement approximately one litter for 6 to 7 sqm. Of the steel area (assuming the surface of the reinforcement of rough) the consumption of the alkaline chemical rust remover should be about 0.40 liters per 10 Sqm. Area of RCC unit.

53.4 Measurements: -

The length of the reinforcement bar cleaned shall be measured correct to a centimeter in two categories i.e. i) Bars upto 12mm dia. ii) Bars above 12mm dia.

53.5 Rates :-

Shall include cost of all materials, labour, T&P etc. involved in all the operations as described above.

54. DRILLING SUITABLE HOLES IN RCC OR PLAIN CEMENT CONCRETE

54.1 Preparation and Procedure For introducing additional reinforcement bars for new structural connections or supplementing additional steel area to the existing RCC member, the cross sectional area (diameter and no. of bars) and length required shall be approved by the Engineer-in-Charge. Also the depth of embedment of reinforcement bar shall be approved by the Engineer-in-Charge. The holes have to be power drilled in RCC. The drilled hole in dry state has to be cleaned with round brush and by blowing air through a tube inserted in the hole and connected to hand operated blower. Then epoxy is to be injected from foil pack with help of epoxy dispenser and epoxy cartridge holder and disposable PVC mixing nozzle inserted inside the drilled hole to fill it from bottom of hole and upwards. Then the reinforcement bar is to be inserted and allowed to remain undisturbed for minimum 24 hours and allow epoxy adhesive to be air cured. Epoxy resin anchor grout shall be approved by the Engineer-in Charge.

54.2 Measurements:-

Holes shall be enumerated.

54.3 Rates :-

Shall include cost of all inputs of material, labour and T&P etc. involved in all the operations except the cost of reinforcement.

55. BONDING COAT

55.1 Material:-

SD/-

SBR polymer modified cementitious bond coat and epoxy bonding adhesive shall be approved by the Engineer-in Charge.

55.2 Surface Preparation:-

Bonding coat is required to be applied for adhesion of applied repair concrete or mortar to the parent concrete. For this, the surface should be thoroughly cleaned by brushes and by blowing air from hand operated pump. The surface shall then be saturated with water (but without excess water).

55.3 Application:-

The components of bonding coat shall be weigh batched and mixed in specific proportions, in a clean container, as directed by the Engineer-in-Charge. They should then be blended to a uniform and homogeneous mixture, lump free and of creamy consistency.

The specified bond coat should be applied by stiff nylon bristle brush. The bonding material should be worked well onto the concrete surface of the parent concrete including reinforcement surface ensuring that no pinholes are visible. The SBR polymer modified bonding cement slurry shall be applied to a thickness not more than 2 mm. A second coat shall be applied within 15 to 20 minutes of application of the first coat at right angles to the first coat to ensure complete coverage and absence of pin holes.

55.4 Measurements

Area of exposed RCC unit shall be measured in sqm correct to two decimal places for the purpose of payment.

55.5 Rates :-

Shall include cost of all inputs of material, labour and T&P etc. involved in all the operations as described above.

56. PROVIDING, MIXING AND APPLYING SBR POLYMER MODIFIED CEMENT MORTAR

56.1 Procedure and application

Fresh mortar shall be applied while the bond coat is still tacky and well within setting period. If adhesive cured to the extent of loosing its tack or has set before mortar is applied. The same shall be removed or slightly abraded and another coat of bond coat shall to be applied by the contractor at his own cost. Freshly placed mortar shall be thoroughly consolidated to ensure full bonding of the fresh mortar with the parent concrete. If there is a failure of bond of fresh mortar/ plaster with parent concrete surface and it sounds hollow on tapping, the repair work shall be dismantled and redone by the contractor at his own cost and to the entire satisfaction of the Engineer-in-Charge.

56.2 Testing :

75mm size cube of the mortar, crushing strength at the end of 28 days to be not less than 30 N/Sqmm2.

56.3 Measurement

Length and breadth of the application shall be measured correct to a cm and area worked out to in sqm upto 2 decimal places, separately for different thicknesses specified in the item.

56.4 Rates

Rates shall include all the materials, labour, T&P in all the operations as described above.

57. APPLYING SBR POLYMER MODIFIED CEMENT CONCRETE FOR STRUCTURAL MEMBERS

57.1 Material:

SD/-

SBR polymer or equivalent material shall be approved by Engineer-in-charge.

57.2 Preparation & application

After bonding coat pre fabricated shuttering shall then be erected immediately. Fresh concrete shall be placed /applied while the bond coat is still tacky and well within pot - life / setting period. If adhesive cures to the extent of loosing its tack or has set before concrete is placed / applied, the same shall be removed or slightly abraded and another coat of adhesive / bond coat shall have to be applied by the contractor at his own cost. Freshly placed concrete shall be thoroughly consolidated to ensure full bonding of the fresh concrete with the parent concrete. If there is a failure of bond of fresh concrete with parent concrete surface and it sounds hollow on tapping, the repair work shall be dismantled and redone by the contractor at his own cost and to the entire satisfaction of the Engineer-in-Charge. Thickness and grade of concrete: As specified in the item with graded stone aggregate of 10 mm maximum size in proportion as per design criteria.

SD/-

SPECIFICATIONS

FOR

ELECTRICAL

WORK

SD/-

1 TECHNICAL SPECIFICATION FOR CONDUIT AND WIRING

1.1 PVC CONDUIT

Conduits shall be heavy gauge rigid PVC of minimum thickness of 2mm. Conduits shall be ISI marked confirming to IS: 9537 (Part-3)-1983. All conduit and conduit accessories shall be of PVC. Conduit shall be jointed together by vinyl type cement/solvents. Minimum size of conduit shall be 25mm unless otherwise mentioned in drawing. Conduit shall be fixed on ceiling or wall. All conduits shall be concealed in wall/ceiling etc. or fixed on surface of wall with clamps at regular interval as called for elsewhere. For termination of PVC conduits into switch outlet box, PVC female adopters shall be used. Wherever conduit run exceeds 10 metre, circular junction boxes shall be provided to facilitate pulling & inspection of wires. Inspection boxes shall be suitably located in co-ordination with the PM NBCC. Conduits shall be bended using suitable size springs. Long radius bends shall be provided. Heating shall not be used to bend the conduits. Size of conduit shall depend upon number and size of wires to be drawn.

1.2 M.S. CONDUIT

All conduit pipes shall be of approved gauge (not less than 16 SWG for conduits of sizes up to 32mm diameter and not less than 14 SWG for conduit of size above 32mm diameter) solid drawn or reamed by welding finished with stove enamelled surface. All conduit accessories shall be of threaded type and under no circumstances pin grip type accessories shall be used. The maximum number of PVC insulated 650/1100 volts grade copper conductor cable that can be drawn in conduit of various sizes shall be as per IS code. No steel conduit less than 20mm in diameter shall be used unless otherwise stated.

1.3 CONDUIT JOINTS

Conduit pipes shall be joined by means of threaded couplers, and threaded accessories only. In long distance straight run of conduits, inspection type couplers at reasonable intervals shall be provided or running threads with couplers and jam nuts shall be provided. In the later case the bare threaded portion shall be treated with anti-corrosive preservative. Threads on conduit pipes in all cases shall be between 13mm to 19mm long sufficient to accommodate pipes to full threaded portion of couplers or accessories. Cut ends of conduit pipe shall have no sharp edges or any burrs left to avoid damage to the insulation of conductor while pulling them through such pipes.

Wherever conduit passes a building expansion joint, galvanized flexible metallic conduit shall be provided for connecting rigid M.S. Conduit in either slab.

1.4 PROTECTION AGAINST CONDENSATION

The layout of conduit should be such that any condensation or sweating inside the conduit is drained out. Suitable precaution should also be taken to prevent entry of insects inside the conduit.

1.5 PROTECTION OF CONDUIT AGAINST RUST

The outer surface of conduit including all bends, unions, tees, junction boxes etc forming part of conduit system shall be adequately protected against rust when such system is exposed to weather by being

painted with two coats of oxide paint applied before they are fixed. In all cases, no bare threaded portion of conduit pipe shall be allowed. Unless such bare thread portion of conduit is treated with anticorrosive preservative or covered with approved plastic compound.

1.6 PAINTING OF CONDUIT AND ACCESSORIES

After installation, all accessible surface of conduit pipes, fittings, switch and regulator boxes etc. shall be painted with two coats of approved enameled paint or aluminium paint as required to match the finish of surrounding wall, trusses etc.

1.7 FIXING OF CONDUITS

1.7.1 SURFACE CONDUIT

Conduit pipes shall be fixed by heavy gauge saddles, secured to suitable wood plugs or other approved plugs with screws in an approved manner at an interval of not more than one meter but on either side of the couplers or bends or similar fittings, saddles shall be fixed at a distance of 30cm from the centre of such fittings. The saddles should not be less than 24 gauge for conduits up to 25mm dia and not less than 20 gauge for larger diameter conduits. The corresponding widths shall be 19mm & 25mm. Where conduit pipes are to be laid along the trusses, steel joint etc. the same shall be secured by means of special clamps made of MS. Where as it is not possible to drill holes in the trusses members suitable clamps with bolts and nuts shall be used. All fixing arrangement like saddles, special purpose clamps, nuts, bolts etc. shall deemed to be included in quoted rates of conduit.

For 25mm diameter conduit width of clip shall be 19mm and of 20 SWG. For conduit of 32mm and above, width of clip shall be 25mm and of 18 SWG.

Where conduit pipes are to be laid above false ceiling, either conduit pipes shall be clamp to false ceiling frame work or suspended with suitable supports from the soffit of slab. For conduit pipe run along with wall, the conduit pipe shall be clamped to wall above false ceiling in uniform pattern with special clamps if required to be approved by the PM NBCC at site.

1.7.2 RECESS / CONCEALED CONDUIT

The chase in the wall shall be neatly made and of ample dimensions to permit the conduit to be fixed in the manner desired. In the case of building under construction, conduit shall be buried in the wall before plastering and shall be finished neatly after erection of conduit. In case of exposed brick/rubble masonry work, special care shall be taken to fix the conduit and accessories in position along with the building work. Entire work of chasing the wall, fixing the conduit in chases, and during the conduit in mortar before plastering shall form part of point wiring work. (For chase cutting-chase cutting machine shall be used and no manual cutting shall be allowed).
The conduit pipe shall be fixed by means of stapples or by means of saddles not more than 60cm apart or by any other approved means of fixing. Fixing of standard bends and elbows shall be avoided as far as practicable and all curves maintained by bending the conduit pipe itself with the long radius which shall permit easy drawing in of conductors. All threaded joint of conduit pipe shall treated with some approved preservative compound to secure protection against rust. Suitable inspection boxes to the barest minimum requirements shall be provided to permit periodical inspection and to facilitate replacement of wires, if necessary. These shall be mounted flush with the wall. Suitable ventilating

holes shall be provided in the inspection box covers. Wherever the length of conduit run is more than 10 metres, then circular junction box shall be provided to facilitate pulling of wires. The chicken wire mesh shall be provided by civil agency.

1.8 OUTLET BOXES:-

Switch/outlet boxes shall be made of metal on all sides except on the front. Boxes shall be hot dip galvanized mild steel. Up to 20 x 30cm size M.S. Box shall have wall thickness of 16 SWG and MS boxes above 20x30cm size shall be of 14 SWG. The metallic boxes shall be painted with anticorrosive paint before erection. Clear depth of the box shall not be less than 60mm. All fitting shall be fitted in flush pattern. Switch/outlet boxes shall be suitable to house modular type light and power accessories. Earthing stud to be provided for connection of earthing wire in side of box at near any corner. Nakka shall be 3 mm thick.

1.9 FAN BOX:-

Fan Box shall be made out of 14 gauge M.S. sheet in hexagonal shape. The dia of box shall be 150 mm and depth of box shall be 80 mm. A M.S. cover plate size 160 mm x 160mm x 16 gauge to be provided in the back of fan box. 12 mm dia M.S. Rod to be provided for fan hanging arrangement in the box. A 28 mm dia knockout To be made in all six hexagonal vertical part for conduit entry in the box. The box shall be painted with 2 coat of primer. A 180 mm dia , 2 mm thick hylam sheet Cover to be provided. (The sample to be approved before procurement / execution by owner / consultant.)

1.10 JUNCTION TEE / DEEP TEE :-

The tee shall be made out of C.I. material. The dia of tee shall be 60 mm and the Depth of tee shall be 70 mm. The thickness of deep tee wall shall be 1.3mm to 1.5mm. (The sample to be approved before procurement/execution by owner / consultant.)

1.11 ERECTION AND EARTHING OF CONDUITS:-

The conduit of each circuit or section shall be completed before conductors are drawn in. The entire system of conduit after erection shall be tested for mechanical and electrical continuity throughout and permanently connected to earth conforming to the requirement by means of special approved type of earthing clamp effectively fastened to conduit pipe in a workmen like manner for a perfect continuity between the earth and conduit. Gas, water pipe shall not be used as earth medium.

2 LIGHT & POWER ACCESSORIES:-

2.1 GENERAL

All light & power accessories shall be of modular range of plate switch type and shall be of one manufacturer (brand) and type.

2.2 LIGHT SWITCHES

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All switches for control of light shall be of 6/10 Amp unless otherwise stated. All switches shall be modular range of plate switch type. The switches shall be rocker mechanism type with silver contract. All switches shall be of white finish or as sample approved by owner/consultant.

2.3 6/16 AMP SWITCH SOCKET OUTLET.

Switch socket outlet on lighting circuit shall be of 3 pin 6Amp outlet shall have safety shutters. The switch shall be of rocker mechanism type with silver contact. Socket outlet shall be shutter type and of modular range of plate type and having white finish. Switch and socket outlet shall be mounted on a suitable size GI box with suitable size modular cover plate.

Switch socket outlet on power circuit shall be of 6 pin 16/6 Amp outlet (Universal Socket) shall have safety shutters. The switch shall be of rocker mechanism type with silver contacts. Socket outlet shall be shutter type and of modular range of plate type and having white finish. Switch and socket outlet shall be mounted on a suitable size G I box with suitable size modular cover plate.

2.4 DATA & TELEPHONE OUTLET & WIRING

Each Telephone outlet location shall be provided with 1 No. telephone Jack type outlet (Cat 6A Socket). The telephone outlet shall be of modular range of plate switch type and shall be mounted on a suitable size G I Box with modular range cover plate. Wiring for the same shall be done through Cat 6A cable.

2.5 WIRING

All FRLS insulated copper conductor multi-stranded wires shall conform to relevant IS codes. Cable conductor size and material shall be as specified.

All internal wiring shall be carried out with FRLS insulated wires of 1100 volts grade. The circuit wiring for points shall be carried out in looping in system and no joint shall be allowed in the length of the conductors. Circuit wiring shall be laid in separate conduit originating from distribution board to switch board for light/fan. A light/fan switch board may have more than one circuit but shall have to be of same phase. Looping circuit wiring shall be drawn in same conduit as for point wiring. Each circuit shall have a separate neutral wire. Neutral looping shall be carried out from point to point or in light/fan switch boards. A separate earth wire shall be provided along with circuit wiring for each circuit. For point wiring red or yellow or blue colour wire shall be used for phase and black colour wire for neutral. Circuit wiring shall be carried out with red, yellow or blue colour FRLS insulated wire for RYB phase wire respectively and black colour FRLS insulated wire for the neutral wires. FRLS insulated green colour wire shall be used as earth continuity conductor and shall be drawn along with other wires. No wire shall be drawn into any conduit until all work of any nature, that may cause injury to wire is completed. Care shall be taken in pulling the wires so that no damage occurs to the insulation of the wire.

Before the wires are drawn into the conduit, the conduits shall be thoroughly cleaned of moisture, dust and dirt. Drawing & jointing of copper conductor wires & cables shall be as per CPWD specifications.

2.6 JOINTS

All joints shall be made at main switches, distribution board socket and switch boxes only. No joint shall be made in conduits & junction boxes. Conductors shall be continuous from outlet to outlet.

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2.7 SUB MAINS

Sub-main wiring shall be carried out with FRLS Insulated Copper multi-stranded wires/cables in suitable M.S Conduit unless otherwise specified in drawing.

Sub-main cable where called for shall be of the rated capacity and approved make. Every sub-main shall be drawn into an independent adequate size conduit. Adequate size draw boxes shall be provided at convenient locations to facilitate easy drawings of the sub-main cables. Cost of junction box/drawn box is deemed to be included in the rates of sub-main wiring. An independent FRLS insulated copper earth wire of proper rating shall be provided for every sub-main. Single phase sub-main shall have single earth wire whereas three phase sub-main shall be provided with two earth wire.

Where sub-mains cables are connected to the switchgear, sufficient extra lengths of sub-main and mains cable shall be provided to facilitate easy connections and maintenance. For termination of cables crimping type cable socket/lugs shall be provided. Same color code as for circuit wiring shall be followed.

2.8 LOAD BALANCING

Balancing of circuits in three phase installation shall be planned before the commencement of wiring and shall be strictly adhered to.

3 CONDUITING AND WIRING FOR AMTV SYSTEM:-

3.1 CONDUITING

Conduiting for SMATV system shall be carried out in M.S. Conduit. Conduiting shall be carried out as specified in point wiring head.

3.2 OUTLETS

All SMATV outlets shall be provided with modular range of cover plate, box and coaxial outlet. Cover plate shall match in shape & finish with other light and power accessories.

3.3 JUNCTION BOX

Suitable size of metallic junction box shall be provided for termination of conduit for SAMTV system. Box shall be made of 1.6mm thick MS sheet and shall be treated before painting. Front of the junction box shall be provided with 3mm thick phenolic laminated sheet cover.

3.4 COAXIAL CABLES

The coaxial cable shall be of wideband type (RG-11 for Riser & RG-6 for distribution)

3.5 TAP OFF

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These shall be of ultra wide bandwidth and of hybrid type. These shall have a flat frequency response over the entire operating range. These shall have a aluminium cast housing for high frequency radiation resistance.
The Tap offs shall be in one way, two way and four way configurations.

3.6 SPLITTERS

These shall be of ultra wide band width and of hybrid type. These shall have a flat frequency response over the entire operating range. These shall have a aluminium cast housing for high frequency radiation resistance.

The splitters shall be in 2 way, 3 way & 4 way configurations

4 TECHNICAL SPECIFICATION FOR DISTRIBUTION BOARDS:

4.1 GENERAL

a) Distribution Board shall be double door type with extended loose wire box & M.S. Junction Box at the top and suitable for flush installation. All distribution boards shall be of three phases (415 Volts) or single phase (240 Volts) type with incoming isolator or MCB and/or RCCB as in Bill of Quantities. Distribution boards shall contain plug in type miniature circuit breaker mounted on bus bars. Miniature circuit breakers shall be quick make & quick break type with trip free mechanism. MCB shall have thermal & magnetic short circuit protection. MCB shall conform with IS 8828-1978 & IS 8828 - 1996. Bus bars shall be of electrolytic copper. Neutral bus bars shall be provided with the same number of terminals as there are single ways on the board, in addition to the terminals for incoming mains. An earth bar of similar size as the neutral bar shall also be provided. Separate neutral & earth bus bar link to be provided for each phase. Phase barrier shall be fitted and all live parts shall be screened from the front. Ample clearance shall be provided between all live metal and the earth case and adequate space for all incoming and outgoing cables. All distribution board enclosures shall have an etched zinc base stove painted followed by synthetic stove enamel, colour light gray. A circuit identification card in clear plastic cover shall be provided for each distribution board. IK (Mechanical Stress) rating of distribution board enclosure shall not be less than IK –07/ 08 / 09.

b) Distribution Board with single phase outgoings requirement shall be Horizontal type. Distribution Board with three phase outgoings requirement shall be Vertical/ Horizontal type. Distribution Board installed in indoor dry locations shall conform to IP-42. Distribution Board installed in outdoor & wet locations shall conform to IP- 65.

c) Miniature Circuit Breakers for lighting circuits shall be of "B" series where as the circuits feeding discharge lamps (HPMV or HPSV) halogen lamps, all power outlet points, equipment/ machinery shall be of "C/D" series (Motor circuit) types. All miniature circuit breakers shall be of not less than 10KA rated rupturing capacity. All miniature circuit breaker terminal shall have safety shutter.

d) Distribution board shall be provided with isolator or MCB and/or earth leakage circuit breaker as mentioned in drawings. Earth leakage circuit breaker shall be current operated type and of 30mA sensitivity unless otherwise stated. RCCB shall be mounted within distribution board box for single phase distribution board while in three phase distribution board RCCB shall be either mounted within

distribution board box or in a separate MS box below distribution board. Width and depth of RCCB box shall be same as that of distribution board box and of same finish. Height of RCCB box shall be sufficient to accommodate RCCB & termination of incoming & outgoing wires. Distribution board box, isolator, MCB'S used shall be of one/same manufacturer. Standard size manufactured by approved manufacturer shall be used. In case size specified is not standard size of manufacturer, in that case next standard size distribution board box shall be used with incoming & outgoing MCB as specified. Additional cutout/space for outgoing MCB shall be plugged with blank plates. No extra cost shall be paid for using bigger/higher size distribution board box and blank plates.

SD/-

LIST OF APPROVED BRAND NAMES

All material specified in the schedule of quantities, specifications and conditions of contract must conform to the following brand names, be factory made and be of first quality, BIS /IS marked wherever available. Fabricated items shall be manufactured in accordance with the CPWD / ISI specifications and be first quality. Samples of all materials to be used must be submitted and got approved before actual procurement and Owner / Architect reserves the right to select any of the brand names specified herein for use.

S. No:	MATERIAL DESCRIPTION	BRAND / TRADE NAME OR EQUIVALENT APPROVED BY ENGINEER IN CHARGE
1	Paints	ASIAN, ICI, BERGER OR EQUIVALENT APPROVED BY ARCHITECT/CONSULTANT.
2	Water proof paint	APEX, ASIAN,BERGER WEATHER PROOF PAINT OR EQUIVALENT APPROVED BY ARCHITECT/CONSULTANT.
3	White Cement	BIRLA, J.K, ACC OR EQUIVALENT APPROVED BY ARCHITECT/CONSULTANT.
4	Ordinary Portland Cement (43/53 Grade)	ULTRATECH, ACC, JK, JAYPEE, EQUIVALENT APPROVED BY ARCHITECT/CONSULTANT.
5	Steel Reinforcement Bars	TATA TISCON, SAIL, RINL OR EQUIVALENT APPROVED BY ARCHITECT/CONSULTANT.
6	Structural steel sections	TISCO, SAIL, OR EQUIVALENT APPROVED BY ARCHITECT/CONSULTANT.
7	Stone Aggregate(Blue/Black)	LOCALLY APPROVED OR EQUIVALENT APPROVED BY ARCHITECT/CONSULTANT.
8	Blocks/ Bricks & Brick Tiles	LOCALLY BEST AVAILABLE OR EQUIVALENT APPROVED BY ARCHITECT/CONSULTANT.
9	Anti Termite Treatment	PCI TERMEX OR EQUIVALENT APPROVED BY ARCHITECT/CONSULTANT.
10	Water Proof Shuttering Plywood	INDIAN PLYWOOD MFG.LTD, NATIONAL PLYWOOD, DURO, GREENPLY OR EQUIVALENT APPROVED BY ARCHITECT/CONSULTANT.
11	Teak Wood	1ST CLASS BURMA TEAK OR GHANA TEAK, KERALA TEAK OR EQUIVALENT APPROVED BY ARCHITECT/CONSULTANT.
12	Water proofing	DR. FIXIT, CICO, DURA OR EQUIVALENT APPROVED BY ARCHITECT/CONSULTANT.
13	Vitrified Tiles	KAJARIA / SOMANY / NITCO OR EQUIVALENT APPROVED BY ARCHITECT/CONSULTANT.
14	Ceramic Tiles	KAJARIA / SOMANY / NITCO OR EQUIVALENT APPROVED BY ARCHITECT/CONSULTANT.
15	Sanitary Fitting	JAQUAR/ PARRYWARE/ HINDWARE OR EQUIVALENT APPROVED BY ARCHITECT/CONSULTANT.
16	Gypsum Board	GYPROC/ ARMSTRONG/ USG BOREL OR EQUIVALENT APPROVED BY ARCHITECT/CONSULTANT.
17	Mineral Fiber Tiles	ARMSTRONG/ GYPROC/ JITEX OR EQUIVALENT APPROVED BY ARCHITECT/CONSULTANT.
18	Aluminum Composite Panel	ALUDECOR/ EUROBOND/ ALSTRONG OR EQUIVALENT APPROVED BY ARCHITECT/CONSULTANT.
19	Waterproofing Compound	DR. FIXIT/ FOSROC/ CICO OR EQUIVALENT APPROVED BY ARCHITECT/CONSULTANT

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20	Roller Blinds	VISTA/ HUNTER DOUGLES/ D'DECOR OR EQUIVALENT APPROVED BY ARCHITECT/CONSULTANT
21	Wooden Furniture	GODREJ/ FEATHERLITE/ DURIAN OR EQUIVALENT APPROVED BY ARCHITECT/CONSULTANT
14	Electrical Wires	FINOLEX / HAVELLS / POLYCAB /ANCHOR OR EQUIVALENT APPROVED BY ARCHITECT/CONSULTANT.
15	PVC Conduit	SUPREME / ASTRALL / FINOLEX OR EQUIVALENT APPROVED BY ARCHITECT/CONSULTANT.
16	Electrical Light & Fixtures	BAJAJ / HAVELLS / PHILLIPS OR EQUIVALENT APPROVED BY ARCHITECT/CONSULTANT.
17	MCCB & DB	L&T / HAVELLS / LEGRAND / SIEMENS OR EQUIVALENT APPROVED BY ARCHITECT/CONSULTANT.

Note:- For any other item required to be incorporated in work , sample shall be got approved from the Owner / Architect before actual procurement and commencement of that item of work.

SD/-

SCHEDULE OF QUANTITIES

Sl. No.	Item Description	Quantity	Units	Rate
1	CONSTRUCTION OF NEW BLOCK			
1.001	SUB HEAD :- EARTHWORK Earth work in excavation by mechanical means (Hydraulic excavator)/ manual means over areas (exceeding 30 cm in depth, 1.5 m in width as well as 10 sqm on plan) including getting out and disposal of excavated earth lead upto 50 m and lift upto 1.5 m, all complete as per direction of SBSC/ Consultant. All kinds of soil	65.00	Cubic Metre	
1.002	SUB HEAD :- EARTHWORK Filling available excavated earth (excluding rock) in trenches, plinth, sides of foundations etc. in layers not exceeding 20cm in depth, consolidating each deposited layer by ramming and watering, lead up to 50 m and lift upto 1.5 m., all complete as per direction of SBSC/ Consultant.	70.00	Cubic Metre	
1.003	SUB HEAD :- EARTHWORK Surface dressing of the ground including removing vegetation and in equalities not exceeding 15 cm deep and disposal of rubbish, lead up to 50 m and lift up to 1.5 m., all complete as per direction of SBSC/ Consultant. All kinds of soil	55.00	Square Metre	
1.004	SUB HEAD :- EARTHWORK Supplying chemical emulsion in sealed containers including delivery as specified, all complete as per direction of SBSC/ Consultant. Chlorpyriphos/ Lindane emulsifiable concentrate of 20%	85.00	Litre	
1.005	SUB HEAD :- EARTHWORK Diluting and injecting chemical emulsion for POST-CONSTRUCTIONAL anti-termite treatment (excluding the cost of chemical emulsion) : Treatment of soil under existing floors using chemical emul sion @ one litre per hole, 300 mm apart including drilling 12 mm diameter holes and plugging with cement mortar 1 :2 (1 cement : 2 Coarse sand) to match the existing floor, all complete as per direction of SBSC/ Consultant. With Chlorpyriphos/Lindane E.C. 20% with 1% concentration.	50.00	Square Metre	

SD/-

1.006	**SUB HEAD ;- PCC & RCC WORK** **Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level, all complete as per direction of SBSC/ Consultant.** **1:4:8 (1 Cement : 4 coarse sand (zone-III) derived from natural sources : 8 graded stone aggregate 40 mm nominal size derived from natural sources)**	**3.00**	**Cubic Metre**	
1.007	**SUB HEAD ;- PCC & RCC WORK** **Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level, all complete as per direction of SBSC / Consultant. 1:5:10 (1 cement : 5 coarse sand (zone-III) derived from natural sources : 10 graded stone aggregate 40 mm nominal size derived from natural sources)**	**3.00**	**Cubic Metre**	
1.008	**SUB HEAD ;- PCC & RCC WORK** **Providing and laying in position specified grade of reinforced cement concrete, excluding the cost of centering, shuttering, finishing and reinforcement - All work up to plinth level, all complete as per direction of SBSC/ Consultant.** **1:1.5:3 (1 cement : 1.5 coarse sand (zone-III) derived from natural sources : 3 graded stone aggregate 20 mm nominal size derived from natural sources)**	**12.00**	**Cubic Metre**	
1.009	**SUB HEAD ;- PCC & RCC WORK** **Reinforced cement concrete work in walls (any thickness), including attached pilasters, buttresses, plinth and string courses, fillets, columns, pillars, piers, abutments, posts and struts etc. above plinth level up to floor five level, excluding cost of centering, shuttering, finishing and reinforcement, all complete as per direction of SBSC/ Consultant.** **1:1.5:3 (1 cement : 1.5 coarse sand(zone-III) derived from natu ral sources : 3 graded stone aggregate 20 mm nominal size derived from natural sources)**	**16.00**	**Cubic Metre**	
1.010	**SUB HEAD ;- PCC & RCC WORK** **Reinforced cement concrete work in beams, suspended floors, roofs having slope up to 15° landings, balconies, shelves, chajjas, lintels, bands, plain window sills, staircases and spiral stair cases above plinth level up to floor five level, excluding the cost of centering, shuttering, finishing and reinforcement with 1:1.5:3 (1 cement : 1.5 coarse sand(zone-III) derived from natural sources : 3 graded stone aggregate 20 mm nominal size derived from natural sources), all complete as per direction of SBSC/ Consultant.**	**10.00**	**Cubic Metre**	
1.011	**SUB HEAD ;- PCC & RCC WORK** **Centering and shuttering including strutting, propping etc. and removal of form for Foundations, footings, bases of columns, etc. for mass concrete**	**20.00**	**Square Metre**	

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1.012	**SUB HEAD ;- PCC & RCC WORK** **Centering and shuttering including strutting, propping etc. and removal of form for Suspended floors, roofs, landings, balconies and access platform**	**90.00**	**Square Metre**	
1.013	**SUB HEAD ;- PCC & RCC WORK** **Centering and shuttering including strutting, propping etc. and removal of form for Lintels, beams, plinth beams, girders, bressumers and cantilevers**	**90.00**	**Square Metre**	
1.014	**SUB HEAD ;- PCC & RCC WORK** **Centering and shuttering including strutting, propping etc. and removal of form for Columns, Pillars, Piers, Abutments, Posts and Struts**	**110.00**	**Square Metre**	
1.015	**SUB HEAD ;- PCC & RCC WORK** **Steel reinforcement for R.C.C. work including straightening, cutting, bending, placing in position and binding all complete below plinth level, all complete as per direction of SBSC/ Consultant.** **Thermo-Mechanically Treated bars of grade Fe-500D or more.**	**1000.00**	**Kilogram**	
1.016	**SUB HEAD ;- PCC & RCC WORK** **Steel reinforcement for R.C.C. work including straightening, cutting, bending, placing in position and binding all complete above plinth level, all complete as per direction of SBSC/ Consultant.** **Thermo-Mechanically Treated bars of grade Fe-500D or more.**	**2500.00**	**Kilogram**	
1.017	**SUB HEAD ;- BRICK WORK** **Brick work with common burnt clay F.P.S. (non modular) bricks of class designation 7.5 in superstructure above plinth level up to floor V level in all shapes and sizes in :** **Cement mortar 1:6 (1 cement : 6 coarse sand)**	**30.00**	**Cubic Metre**	
1.018	**SUB HEAD ;- STONE WORK** **Providing and fixing 18 mm thick gang saw cut, mirror polished, premoulded and prepolished, machine cut for kitchen platforms, vanity counters, window sills, facias and similar locations of required size, approved shade, colour and texture laid over 20 mm thick base cement mortar 1:4 (1 cement : 4 coarse sand), joints treated with white cement, mixed with matching pigment, epoxy touch ups, including rubbing, curing, moulding and polishing to edges to give high gloss finish etc. complete at all levels, all complete as per direction of SBSC/ Consultant.** **Granite of any colour and shade** **Area of slab over 0.50 sqm**	**10.00**	**Square Metre**	
1.019	**SUB HEAD ;- STONE WORK** **Providing and fixing 18 mm thick gang saw cut, mirror polished, premoulded and prepolished, machine cut for kitchen platforms, vanity counters, window sills, facias and**	**10.00**	**Square Metre**	

SD/-

	similar locations of required size, approved shade, colour and texture laid over 20 mm thick base cement mortar 1:4 (1 cement : 4 coarse sand), joints treated with white cement, mixed with matching pigment, epoxy touch ups, including rubbing, curing, moulding and polishing to edges to give high gloss finish etc. complete at all levels, all complete as per direction of SBSC/ Consultant. Granite of any colour and shade Area of slab over 0.50 sqm			
1.020	**SUB HEAD ;- STONE WORK Providing edge moulding to 18 mm thick marble stone counters, Vanities etc., including machine polishing to edge to give high gloss finish etc. complete as per design approved by Engineer-in-Charge, all complete as per direction of SBSC/ Consultant.**	**65.00**	**Running Metre**	
1.021	**SUB HEAD ;- WOOD & PVC WORK Providing wood work in frames of doors, windows, clerestory windows and other frames, wrought framed and fixed in position with hold fast lugs or with dash fasteners of required dia & length (hold fast lugs or dash fastener shall be paid for separately). Second class teak wood**	**25.00**	**Cubic Metre**	
1.022	**SUB HEAD ;- WOOD & PVC WORK Providing and fixing ISI marked flush door shutters conforming to IS : 2202 (Part I) decorative type, core of block board construction with frame of 1st class hard wood and well matched teak 3 ply veneering with vertical grains or cross bands and face veneers on both faces of shutters. 35 mm thick including ISI marked Stainless Steel butt hinges with necessary screws**	**12.00**	**Square Metre**	
1.023	**SUB HEAD ;- WOOD & PVC WORK Extra for providing lipping with 2nd class teak wood battens 25 mm minimum depth on all edges of flush door shutters (over all area of door shutter to be measured).**	**12.00**	**Square Metre**	
1.024	**SUB HEAD ;- WOOD & PVC WORK Extra for providing vision panel not exceeding 0.1 sqm in all type of flush doors (cost of glass excluded) (overall area of door shutter to be measured): Rectangular or square**	**12.00**	**Square Metre**	
1.025	**SUB HEAD ;- WOOD & PVC WORK Providing and fixing nickel plated M.S. pipe curtain rods with nickel plated brackets : 25 mm dia (heavy type)**	**20.00**	**Metre**	
1.026	**SUB HEAD ;- WOOD & PVC WORK Providing and fixing bright finished brass handles with screws etc. complete: 125 mm**	**16.00**	**Each**	

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1.027	**SUB HEAD ;- WOOD & PVC WORK** **Providing and fixing bright finished brass hanging type floor door stopper with necessary screws, etc. complete.**	**3.00**	**Each**	
1.028	**SUB HEAD ;- WOOD & PVC WORK** **Providing and fixing aluminium die cast body tubular type universal hydraulic door closer (having brand logo with ISI, IS : 3564, embossed on the body, door weight upto 35 kg and door width upto 700 mm), with necessary accessories and screws etc. complete.**	**3.00**	**Each**	
1.029	**SUB HEAD ;- WOOD & PVC WORK** **Providing and fixing bright finished brass hasp and staple (safety type) with necessary screws etc. complete :** **150 mm**	**3.00**	**Each**	
1.030	**SUB HEAD ;- WOOD & PVC WORK** **Providing and fixing factory made uPVC white colour sliding glazed window upto 1.50 m in height dimension comprising of uPVC multi-chambered frame with in-built roller track and sash extruded profiles duly reinforced with 1.60 ± 0.2 mm thick galvanized mild steel section made from roll forming process of required length (shape & size according to uPVC profile), appropriate dimension of uPVC extruded glazing beads and uPVC extruded interlocks, EPDM gasket, wool pile, zinc alloy (white powder coated) touch locks with hook, zinc alloy body with single nylon rollers (weight bearing capacity to be 40 kg), G.I fasteners 100 x 8 mm size for fixing frame to finished wall and necessary stainless steel screws etc. Profile of frame & sash shall be mitred cut and fusion welded at all corners, including drilling of holes for fixing hardware's and drainage of water etc. After fixing frame the gap between frame and adjacent finished wall shall be filled with weather proof silicon sealent over backer rod of required size and of approved quality, all complete as per approved drawing & direction of Engineer-in-Charge. (Single / double glass panes, wire mesh and silicon sealent shall be paid separately). Variation in profile dimension in higher side shall be accepted but no extra payment on this account shall be made.** **Note: For uPVC frame and sash extruded profiles minus 5% tolerance in dimension i.e. in depth & width of profile shall be acceptable.** **Three track three panels sliding window with fly proof S.S wire mesh (Two nos. glazed & one no. wire mesh panels) made of (big series) frame 116 x 45 mm & sash 46 x 62 mm both having wall thickness of 2.3 ± 0.2 mm and single glazing bead / double glazing bead of appropriate dimension. (Area of window above 1.75 sqm).**	**25.00**	**Square Metre**	
1.031	**SUB HEAD ;- WOOD & PVC WORK** **Providing & fixing fly proof wire gauze to windows, clerestory windows & doors with**	**12.00**	**Square Metre**	

SD/-

	M.S. Flat 15x3 mm and nuts & bolts complete. Stainless steel (grade 304) wire gauze of 0.5 mm dia wire and 1.4 mm aperture on both sides			
1.032	**SUB HEAD ;- WOOD & PVC WORK** **Providing and fixing glazing in aluminium door, window, ventilator shutters and partitions etc. with EPDM rubber / neoprene gasket etc. complete as per the architectural drawings and the directions of engineer-in-charge . (Cost of aluminium snap beading shall be paid in basic item):** **With float glass panes of 5 mm thickness (weight not less than 12.50 kg/sqm)**	**25.00**	**Square Metre**	
1.033	**SUB HEAD :- FLOORING WORK** **Providing and laying Vitrified tiles in floor in different sizes (thickness to be specified by the manufacturer) with water absorption less than 0.08% and conforming to IS:15622, of approved brand & manufacturer, in all colours and shade, laid on 20 mm thick cement mortar 1:4 (1 cement: 4 coarse sand) jointing with grey cement slurry @3.3 kg/sqm including grouting the joints with white cement and matching pigments etc. The tiles must be cut with the zero chipping diamond cutter only . Laying of tiles will be done with the notch trowel, plier, wedge, clips of required thickness, leveling system and rubber mallet for placing the tiles gently and easily.** **Glazed Vitrified tiles Matt/Antiskid finish of size** **Size of Tile 800 x 1200 mm**	**90.00**	**Square Metre**	
1.034	**SUB HEAD :- FLOORING WORK** **Providing and laying Vitrified tiles in different sizes (thickness to be specified by manufacturer), with water absorption less than 0.08 % and conforming to I.S. 15622, of approved make, in all colours & shade, in skirting, riser of steps, over 12 mm thick bed of cement mortar 1:3 (1 cement: 3 coarse sand), jointing with grey cement slurry @ 3.3 kg/ sqm including grouting the joint with white cement & matching pigments etc. complete.** **Size of Tile 800x800 mm**	**10.00**	**Square Metre**	
1.035	**SUB HEAD :- ROOFING & FALSE CEILING WORK** **Providing gola 75x75 mm in cement concrete 1:2:4 (1 cement : 2 coarse sand : 4 stone aggregate 10 mm and down gauge), including finishing with cement mortar 1:3 (1 cement : 3 fine sand) as per standard design, all complete as per direction of SBSC/ Consultant.** **In 75x75 mm deep chase**	**45.00**	**Metre**	
1.036	**SUB HEAD :- ROOFING & FALSE CEILING WORK** **Making khurras 45x45 cm with average minimum thickness of 5 cm cement concrete 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate of 20 mm nominal size) over P.V.C. sheet 1 m x1 m x 400 micron, finished with 12 mm cement plaster 1:3 (1 cement : 3 coarse sand) and a coat of neat cement, rounding the edges and making and finishing**	**8.00**	**Each**	

SD/-

	the outlet, all complete as per direction of SBSC/ Consultant.			
1.037	**SUB HEAD :- ROOFING & FALSE CEILING WORK** **Providing and fixing on wall face unplasticised Rigid PVC rain water pipes conforming to IS : 13592 Type A, including jointing with seal ring conforming to IS : 5382, leaving 10 mm gap for thermal expansion, (i) Single socketed pipes.** **110 mm diameter** **Providing and fixing on wall face unplasticised Rigid PVC rain water pipes conforming to IS : 13592 Type A, including jointing with seal ring conforming to IS : 5382, leaving 10 mm gap for thermal expansion, (i) Single socketed pipes.** **110 mm diameter**	**80.00**	**Running Metre**	
1.038	**SUB HEAD :- ROOFING & FALSE CEILING WORK** **Providing and fixing on wall face unplasticised - PVC moulded fittings/ accessories for unplasticised Rigid PVC rain water pipes conforming to IS : 13592 Type A, including jointing with seal ring conforming to IS : 5382, leaving 10 mm gap for thermal expansion.** **Coupler- 110 mm**	**8.00**	**Each**	
1.039	**SUB HEAD :- ROOFING & FALSE CEILING WORK** **Single pushfit Coupler- 110 mm**	**8.00**	**Each**	
1.040	**SUB HEAD :- ROOFING & FALSE CEILING WORK** **Bend 87.5°-110 mm bend**	**8.00**	**Each**	
1.041	**SUB HEAD :- ROOFING & FALSE CEILING WORK** **Shoe (Plain)-110 mm shoe**	**8.00**	**Each**	
1.042	**SUB HEAD :- ROOFING & FALSE CEILING WORK** **Providing and fixing unplasticised -PVC pipe clips of approved design to unplasticised - PVC rain water pipes by means of 50x50x50 mm hard wood plugs, screwed with M.S. screws of required length, including cutting brick work and fixing in cement mortar 1:4 (1 cement : 4 coarse sand) and making good the wall etc., all complete as per direction of SBSC/ Consultant.** **110 mm diameter**	**8.00**	**Each**	
1.043	**SUB HEAD :- ROOFING & FALSE CEILING WORK** **Providing and fixing to the inlet mouth of rain water pipe cast iron grating 15 cm diameter and weighing not less than 440 grams.**	**8.00**	**Each**	
1.044	**SUB HEAD :- ROOFING & FALSE CEILING WORK** **Providing and fixing false ceiling at all height including providing and fixing of frame**	**20.00**	**Square Metre**	

SD/-

	work made of special sections, power pressed from M.S. sheets and galvanized with zinc coating of 120 gms/sqm (both side inclusive) as per IS : 277 and consisting of angle cleats of size 25 mm wide x 1.6 mm thick with flanges of 27 mm and 37mm, at 1200 mm centre to centre, one flange fixed to the ceiling with dash fastener 12.5 mm dia x 50mm long with 6mm dia bolts, other flange of cleat fixed to the angle hangers of 25x10x0.50 mm of required length with nuts & bolts of required size and other end of angle hanger fixed with intermediate G.I. channels 45x15x0.9 mm running at the spacing of 1200 mm centre to centre, to which the ceiling section 0.5 mm thick bottom wedge of 80 mm with tapered flanges of 26 mm each having lips of 10.5 mm, at 450 mm centre to centre, shall be fixed in a direction perpendicular to G.I. intermediate channel with connecting clips made out of 2.64 mm dia x 230 mm long G.I. wire at every junction, including fixing perimeter channels 0.5 mm thick 27 mm high having flanges of 20 mm and 30 mm long, the perimeter of ceiling fixed to wall/partition with the help of rawl plugs at 450 mm centre, with 25mm long dry wall screws @ 230 mm interval, including fixing of gypsum board to ceiling section and perimeter channel with the help of dry wall screws of size 3.5 x 25 mm at 230 mm c/c, including jointing and finishing to a flush finish of tapered and square edges of the board with recommended jointing compound , jointing tapes , finishing with jointing compound in 3 layers covering upto 150 mm on both sides of joint and two coats of primer suitable for board, all as per manufacturer's specification and also including the cost of making openings for light fittings, grills, diffusers, cutouts made with frame of perimeter channels suitably fixed, all complete as per drawings, specification and direction of the Engineer in Charge but excluding the cost of painting with : 12.5 mm thick tapered edge gypsum moisture resistant board			
1.045	**SUB HEAD :- ROOFING & FALSE CEILING WORK Providing and fixing mineral fibre false ceiling tiles at all heights of size 595X595mm of approved texture, design and pattern. The tiles should have Humidity Resistance (RH) of 99%, Light Reflectance ? 85%, Thermal Conductivity k = 0.052 - 0.057 w/m K, Fire Performance as per (BS 476 pt - 6 &7)in true horizontal level suspended on interlocking T-Grid of hot dipped all round galvanized iron section of 0.33 mm thick (galvanized @120gsm) comprising of main T runners of 15x32 mm of length 3000 mm, cross T of size 15x32mm of length 1200 mm and secondary intermediate cross T of size 15x32 mm of length 600 mm to form grid module of size 600x600 mm suspended from ceiling using galvanized mild steel item (galvanised@80gsm) 50 mm long 8mm outer diameter M-6 dash fasteners, 6 mm diameter fully threaded hanger rod up to 1000 mm length and L-shape level adjuster of size 85x25x2 mm, spaced at 1200 mm centre to centre along main**	**12.00**	**Square Metre**	

SD/-

	'T'. The system should rest on periphery walls /partitions with the help of GI perimeter wall angle of size24x24X3000 mm made of 0.40 mm thick sheet, to be fixed to the wall with help of plastic rawl plug at 450 mm centre to centre & 40 mm long dry wall S.S. screws. The exposed bottom portion of all T-sections used in false ceiling support system shall be pre-painted with polyester baked paint, for all heights. The work shall be carried out as per specifications, drawings and as per directions of the engineer-in-charge. **With 16 mm thick beveled tegular mineral fibre false ceiling tile (NRC 0.55 to 0.6)**			
1.046	**SUB HEAD :- ROOFING & FALSE CEILING WORK** **Providing and fixing Heat Resistant Terrace Tiles (300 mm x 300 mm x 20 mm) with SRI (solar refractive index) > 78, solar reflection > 0.70 and initial emittance > 0.75 on waterproof and sloped surface of terrace, laid on 20 mm thick cement sand mortar in the ratio of 1:4 (1 cement : 4 coarse sand) and grouting the joints with mix of white cement & marble powder in ratio of 1:1, including rubbing and polishing of the surface upto 3 cuts complete, including providing skirting upto 150 mm height along the parapet walls in the same manner.**	**100.00**	**Square Metre**	
1.047	**SUB HEAD :- ROOFING & FALSE CEILING WORK** **Providing and laying roof insulation with 40 mm thick impervious sprayed, closed cell free Rigid Polyurethane foam over deck insulation conforming to IS - 12432 Pt. III (density of foam being 40-45 kg/ cum), over a coat of polyurethane primer applied @ 6-8 sqm per litre, laying 400 G polythene sheet over PUF spray and providing a wearing course of 40 mm thick cement screed 1:2:4 (1 cement : 2 coarse sand : 4 stone aggregate 20 mm nominal size) in chequered rough finish, in panels of 2.5 m x 2.5 m and embedding with 24 G wire netting and sealing the joints with polymerized mastic, all complete as per direction of SBSC/ Consultant.**	**100.00**	**Square Metre**	
1.048	**SUB HEAD :- PLASTER & PAINTING WORK** **CEMENT PLASTER (IN COARSE SAND)** **12 mm cement plaster of mix :** **1:6 (1 cement: 6 coarse sand)**	**150.00**	**Square Metre**	
1.049	**SUB HEAD :- PLASTER & PAINTING WORK** **18 mm cement plaster in two coats under layer 12 mm thick cement plaster 1:5 (1 cement : 5 coarse sand) finished with a top layer 6 mm thick cement plaster 1:6 (1 cement : 6 fine sand), all complete as per direction of SBSC/ Consultant.**	**180.00**	**Square Metre**	
1.050	**SUB HEAD :- PLASTER & PAINTING WORK** **06 mm cement plaster of mix :** **1:3 (1 cement : 3 fine sand)**	**80.00**	**Square Metre**	

SD/-

1.051	**SUB HEAD :- PLASTER & PAINTING WORK** **Finishing with Deluxe Multi surface paint system for interiors and exteriors using Primer as per manufacturers specifications :** **Two or more coats applied on walls @ 1.25 ltr/10 sqm over and including one coat of Special primer applied @ 0.75 ltr /10 sqm**	**180.00**	**Square Metre**	
1.052	**SUB HEAD :- PLASTER & PAINTING WORK** **Finishing walls with 100% Premium acrylic emulsion paint having VOC less than 50 gm/litre and UV resistance as per IS 15489:2004, Alkali & fungal resistance, dirt resistance exterior paint of required shade (Company Depot Tinted) with silicon additives, all complete as per direction of SBSC/ Consultant.**	**250.00**	**Square Metre**	
1.053	**SUB HEAD :- PLASTER & PAINTING WORK** **Providing and applying white cement based putty of average thickness 1 mm, of approved brand and manufacturer, over the plastered wall surface to prepare the surface even and smooth complete.**	**400.00**	**Square Metre**	
1.054	**SUB HEAD :- PLASTER & PAINTING WORK** **Removing white or colour wash by scrapping and sand papering and preparing the surface smooth including necessary repairs to scratches etc. complete**	**70.00**	**Square Metre**	
1.055	**SUB HEAD :- PLASTER & PAINTING WORK** **Painting on G.S. sheet with synthetic enamel paint of approved brand and manufacture of required colour to give an even shade :** **Old work (one or more coats)**	**70.00**	**Square Metre**	
1.056	**SUB HEAD :- FURNITURE ITEMS** **Providing Woodan Study Chair Size- (890x395x480 mm), Top made of 18mm thick ISI Mark pre laminated MDF Board IS : 14587-1998 in approved shade with half round lipping with thinner polish or touch wood polish. Structure Made of M.S. Angle Iron Frame 32x32x3/2.5mm thick duly welded.Two coats of air drying synthetic enamel paints made over two coat of metal primer for pipe structure.as per approved design & shade, all complete as per direction of SBSC/ Consultant.**	**50.00**	**Nos**	
1.057	**SUB HEAD :- FURNITURE ITEMS** **Providing Woodan Study Table Size- (600x460x760mm), Top made of 18mm thick ISI Mark pre laminated MDF Board IS : 14587-1998 in approved shade with half round lipping with thinner polish or touch wood polish, Structure made of M.S. Angle Iron Frame 32x32x3/2.5mm thick duly welded. Two coats of air drying synthetic enamel paints made over two coat of metal primer for pipe structure. as per approved design & shade, all complete as per direction of SBSC/ Consultant.**	**50.00**	**Nos**	

SD/-

1.058	**SUB HEAD :- FURNITURE ITEMS** **Providing Woodan Proffessor Chair Size- (900x500x560 mm), Frame made of ERW round pipe 25mmdia x 2.0mm thick in one piece. Seat & Back made of Teak wood section 45 x 22mm.Duly polished shining black enamel Paint the best quality high strength Nylon/Plastic Cane wire shall be used The 6 no. of cane wire Shall be passed in each hole of back and seat. In seat, front section to be doubled and rounded. Seat shall be fitted over flate size 25x4mm thick in depth wise of frame on both side with minimum 3 no. screws on each side. Back rest shall be fitted by round head steel screws 3 ns. On each side as per approved design & shade, all complete as per direction of SBSC/ Consultant.**	**2.00**	**Nos**	
1.059	**SUB HEAD :- FURNITURE ITEMS** **Providing Woodan Proffessor Table Size- (1525x900x750 mm), Table top made of 25mm thick ISI Marked Pre Laminated MDF Board IS-14587-1998, Teak wood half round 50mm wide, Lipping supported from inside by Jungle wood 25mm x 25mm, DRAWER BOX CUBOARD :- CR sheet 0.80mm thick Confirming to IS-513, DRAWER SIZE :- 500(L)X100mm(D) Minimum, FRAME & STRUCTRUE :- ERW Square pipe25x25x1.25mm in size 1100 (L) x 600(W)x732(H) mm, CUPBOARD SHUTTER :- BOX TYPE made of 0.80mm CR sheet Confirming to IS-513. FOOT REST :-ERW square pipe 25x25x1.25mm in full length and gap between two pipes approx. 85.mm. as per approved design & shade, all complete as per direction of SBSC/ Consultant.**	**2.00**	**Nos**	
1.060	**SUB HEAD :- FURNITURE ITEMS** **Providing & fixing of Roller Blinds- The Blind system consist of a coated aluminium tube of 38 mm diameter with provision of fabric clamping. The Fabric is rolled up and down through a chain drive system with built in drive gear and an over run brake system. The side brackets are universal type suitable both for wall and ceiling mounting. The bottom end of the fabric is rolled over an oval shape aluminium tube with provision to lock the fabric, all complete as per direction of SBSC/ Consultant.**	**25.00**	**Square Metre**	
1.061	**SUB HEAD :- RE-BARING WORK** **Rebaring by using various Diameter 12 mm to 25 mm Dia, Hilti Make Chemical (Re- 500) max. depth 300 mm, all complete as per direction of SBSC/ Consultant.**	**360.00**	**Nos**	
1.062	**SUB HEAD :- REPAIRING WITH MICRO CONCRETE WORK** **Chipping of unsound/weak concrete material from slabs, beams, columns etc. with manual Chisel and/ or by standard power driven percussion type or of approved make including tapering of all edges, making square shoulders of cavities including cleaning the exposed concrete surface and reinforcement with wire brushes etc. and disposal of debris for all lead and lifts all complete as per direction of SBSC/ Consultant.**	**30.00**	**Square Metre**	

SD/-

	50mm average thickness			
1.063	**SUB HEAD :- REPAIRING WITH MICRO CONCRETE WORK** **Cleaning of reinforcement from rust from the reinforcing bars to give it a total rust free steel surface by using alkaline chemical rust remover of approved make with paint brush and removing loose particles after 24 hours of its application with wire brush and thoroughly washing with water and allowing it to dry, all complete as per direction of SBSC/ Consultant.** **Bars above 12 mm diameter**	**150.00**	**Metre**	
1.064	**SUB HEAD :- REPAIRING WITH MICRO CONCRETE WORK** **Drilling suitable holes in reinforced or plain cement concrete with power driven drill machine to a minimum depth of 100mm upto 200mm in RCC beams, lintels, columns and slabs to introduce steel bars for sunshades/balconies including fixing the steel bars in position using epoxy resin anchor grout of approved make but excluding the cost of reinforcement, all complete as per direction of SBSC/ Consultant.** **Upto and including 12mm dia.**	**75.00**	**Each**	
1.065	**SUB HEAD :- REPAIRING WITH MICRO CONCRETE WORK** **Providing, mixing and applying bonding coat of approved adhesive on chipped portion of RCC as per specifications and direction ofSBSC/ Consultant.** **Epoxy bonding adhesive having coverage 2.20 sqm/kg** **of approved make**	**30.00**	**Square Metre**	
1.066	**SUB HEAD :- REPAIRING WITH MICRO CONCRETE WORK** **Providing, mixing and applying SBR polymer (of approved make) modified Cement mortar in proportion of 1:4 (1 cement: 4 graded coarse sand with polymer minimum 2% by wt. of cement used) as per specifications and directions of SBSC/ Consultant. Note: Measurement and payment: The pre-measurement of thickness shall be done just after the surface preparation is completed and Payment under this item shall be made only after proper wet curing has been done and surface has been satisfactorily evaluated by sounding / tapping with a blunt metal instrument and/or the 75mm size cube crushing strength at the end of 28 days to be not less than 30 N/Sqmm2).** **25 mm average thickness in 2 layers.**	**30.00**	**Square Metre**	
1.067	**SUB HEAD :- REPAIRING WITH MICRO CONCRETE WORK** **Providing and injecting approved grout in proportion recommended by the manufacturer into cracks/honey-comb area of concrete/ masonry by suitable gun/pump at required pressure including cutting of nipples after curing etc. complete as per directions of SBSC/ Consultant.**	**50.00**	**Kg.**	

SD/-

	Epoxy injection grout in concrete/RCC work of approved make			
1.068	**SUB HEAD :- REPAIRING WITH MICRO CONCRETE WORK** **Providing, erecting, maintaining and removing temporary protective screens made out of specified fabric with all necessary fixing arrangement to ensure that it remains in position for the work duration as required of SBSC/ Consultant.** **Wooven PVC cloth**	**50.00**	**Square Metre**	
1.069	**SUB HEAD :- REPAIRING WITH MICRO CONCRETE WORK** **Cleaning of exposed concrete surface of sticking material including loose and foreign material by sand blasting with coarse sand followed by and including cleaning with oil free air blast as per direction ofSBSC/ Consultant.**	**30.00**	**Square Metre**	
1.070	**SUB HEAD :- REPAIRING WITH MICRO CONCRETE WORK** **Shotcreting R.C.C. columns, beams and slabs etc. in layers with approved design mix concrete having the specified minimum characteristic compressive strength [with ordinary portland cement, coarse sand and graded stone aggregate of 10 mm maximum size in proportion as per design criteria] including the cost of centering and shuttering at edges and corners etc. as directed by SBSC/ Consultant.** **50mm thick in Grade M 25 with cement content not less than 330 kg per cum**	**30.00**	**Square Metre**	
1.071	**SUB HEAD :- REPAIRING WITH MICRO CONCRETE WORK** **Providing and inserting 12mm dia galvanised steel injection nipple in honey comb area and along crack line including drilling of holes of required diametre (20mm to 30mm) up to depth from 30mm to 80mm at required spacing and making the hole & crack dust free by blowing compressed air, sealing the distance between injection nipple with adhesive chemical of approved make and allow it to cure complete as per direction of Engineer-In-Charge.**	**150.00**	**Nos**	
1.072	**SUB HEAD :- REPAIRING WITH MICRO CONCRETE WORK** **Providing and fixing hard drawn steel wire fabric of size 75 x25 mm mesh or other suitable size wire mesh to be fixed & firmly anchored to the concrete surface by means of "L" shaped mild steel shear key welded with existing reinforcement including the cost of materials, labour, tool & plants as approved by SBSC/ Consultant.**	**10.00**	**Square Metre**	
1.073	**SUB HEAD :- REPAIRING WITH MICRO CONCRETE WORK** **Providing & fixing Structural steel work riveted, bolted or welded in built up sections, , including cutting, hoisting, fixing in position for Column strengthening, all complete as per direction of SBSC/ Consultant.**	**200.00**	**Kilogram**	

SD/-

1.074	**SUB HEAD :- REPAIRING WITH MICRO CONCRETE WORK** **Providing and fixing double scaffolding system (cup lock type) on the exterior side, up to seven story height made with 40 mm dia M.S. tube 1.5 m centre to centre, horizontal & vertical tubes joining with cup & lock system with M.S. tubes, M.S. tube challies, M.S. clamps and M.S. staircase system in the scaffolding for working platform etc. and maintaining it in a serviceable condition for the required duration as approved and removing it there after .The scaffolding system shall be stiffened with bracings, runners, connection with the building etc wherever required for inspection of work at required locations with essential safety features for the workmen etc. complete as per directions and approval of SBSC/ Consultant .The elevational area of the scaffolding shall be measured for payment purpose .The payment will be made once irrespective of duration of scaffolding.**	**75.00**	**Square Metre**	
1.075	**INTERNAL WIRING** **Wiring for light point/ fan point/ exhaust fan point/ call bell point with 1.5 sq.mm FRLS PVC insulated copper conductor single core cable in surface / recessed medium class PVC conduit, with modular switch, modular plate, suitable GI box and earthing the point with 1.5 sq.mm. FRLS PVC insulated copper conductor single core cable etc as required. Group -C**	**25.00**	**Point**	
1.076	**INTERNAL WIRING** **Wiring for circuit/ submain wiring along with earth wire with the following sizes of FRLS PVC insulated copper conductor, single core cable in surface/ recessed medium class PVC conduit as required** **2 X 2.5 sq. mm + 1 X 2.5 sq. mm earth wire**	**150.00**	**Metre**	
1.077	**INTERNAL WIRING** **Wiring for circuit/ submain wiring along with earth wire with the following sizes of FRLS PVC insulated copper conductor, single core cable in surface/ recessed medium class PVC conduit as required** **2 X 4 sq. mm + 1 X 4 sq. mm earth wire**	**150.00**	**Metre**	
1.078	**INTERNAL WIRING** **Supplying and fixing suitable size GI box with modular plate and cover in front on surface or in recess, including providing and fixing 3 pin 5/6 amps modular socket outlet and 5/6 amps modular switch, connection etc. as required. (For light plugs to be used in non residential buildings).**	**6.00**	**Nos**	
1.079	**INTERNAL WIRING** **Supplying and fixing suitable size GI box with modular plate and cover in front on surface or in recess, including providing and fixing 6 pin 5/6 & 15/16 amps modular**	**6.00**	**Nos**	

SD/-

	socket outlet and 15/16 amps modular switch, connection etc. as required.			
1.080	**INTERNAL WIRING** **Supplying and fixing following modular switch/ socket on the existing modular plate & switch box including connections but excluding modular plate etc. as required** **2 way 5/6 A Switch**	**6.00**	**Nos**	
1.081	**INTERNAL WIRING** **Supplying and fixing following modular switch/ socket on the existing modular plate & switch box including connections but excluding modular plate etc. as required** **15/16 A Switch**	**6.00**	**Nos**	
1.082	**INTERNAL WIRING** **Supplying and fixing following modular switch/ socket on the existing modular plate & switch box including connections but excluding modular plate etc. as required** **3 Pin 5/6 Socket Outlet**	**6.00**	**Nos**	
1.083	**INTERNAL WIRING** **Supplying and fixing following modular switch/ socket on the existing modular plate & switch box including connections but excluding modular plate etc. as required** **3 Pin 15/16 Socket Outlet**	**6.00**	**Nos**	
1.084	**INTERNAL WIRING** **Supplying and fixing of following sizes of medium class PVC conduit along with accessories in surface/recess including cutting the wall and making good the same in case of recessed conduit as required.** **20mm dia PVC conduit**	**50.00**	**Metre**	
1.085	**INTERNAL WIRING** **Supplying and fixing of following sizes of medium class PVC conduit along with accessories in surface/recess including cutting the wall and making good the same in case of recessed conduit as required.** **25mm dia PVC conduit**	**50.00**	**Metre**	
1.086	**SUB-HEAD II - FANS & LIGHT FIXTURES:** **Supply of Recess mounted LED 2'x2' luminaire delivering an initial system lumen of 3300 lumens & the luminaire shall be with system efficacy ≥ 100 lm / W. Housing: CRCA, Rim: Engneering plastic / CRCA. Optics: polycarbonate / PMMA/ Polysterene, IP20 Protection. The operating CCT shall be 5700K with CRI of ≥80. The luminaire shall be with BIS Registered electronic driver with input voltage range of 150 to 270V , THD ≤ 10% & PF ≥ 0.95, 50,000 Hrs LED Life with L70 Criteria. The LED Driver shall be easily avaiable in India for repair and service. The LED shall be SMD type. Luminaire shall have minimum**	**8.00**	**Nos**	

SD/-

	surge protection of 2KV.The luminaire shall be with following certifications: LM79 & LM80 issued by LED manufacture along with Photo Biological Safety Standard. All complete as per direction ofSBSC/ Consultant.			
1.087	**SUB-HEAD II - FANS & LIGHT FIXTURES:** **Supply of Surface Mount Round Led Downlighter consuming a system wattage of 15W (±10%) & the luminaire shall be with system efficacy ≥ 100 lm / W. Housing: CRCA Powder Coated. IP20 , Optics: PMMA/Polysterene Diffuser. The operating CCT shall be 5700K with CRI of ≥80. The luminaire shall be with BIS Registered electronic driver with input voltage range of 150 to 270V , THD ≤ 10% & PF ≥ 0.9, 50,000 Hrs LED Life with L70 Criteria. The LED Driver shall be easily avaiable in India for repair and service. The LED shall be SMD type. Luminaire shall have minimum surge protection of 2KV.The luminaire shall be with following certifications: LM79 with NABL Own LAB & LM80 issued by LED manufacture along with Photo Biological Safety Standard. All complete as per direction of SBSC/ Consultant.**	**12.00**	**Nos**	
1.088	**SUB-HEAD II - FANS & LIGHT FIXTURES:** **Supply of 2ft Linear LED luminaire delivering an initial system lumen of 903 lumens & the luminaire shall be with system efficacy ≥ 90 lm / W. The luminaire Housing shall be made of PC & the diffuser shall be of polycarbonate/PMMA. The operating CCT shall be 6500K with CRI of ≥80. The luminaire shall be with BIS Registered electronic driver with input voltage range of 150 to 270V , THD ≤ 20% & PF ≥ 0.95 , 50,000 Hrs LED Life with L70 Criteria, IP20. The LED Driver shall be easily avaiable in India for repair and service. The LED shall be SMD type. Luminaire shall have minimum surge protection of 2KV.The luminaire shall be with following certifications: LM79 with NABL Own LAB & LM80 issued by LED manufacture along with Photo Biological Safety Standard. All complete as per direction of SBSC/ Consultant.**	**4.00**	**Nos**	
1.089	**SUB-HEAD II - FANS & LIGHT FIXTURES:** **Supplying, installation, Testing & Commissioning of 225 mm dia heavey duty Exhust fan, Power- 220-240 VAC,50/60 Hz, Speed- 1400 RPM,Power Source- Corded Electric, High Velocity including supply and fixing of all necessary supports. All complete with labour and materials as per drawings, specifications and directions of SBSC/ Consultant.**	**2.00**	**Nos**	
1.090	**SUB-HEAD II - FANS & LIGHT FIXTURES:** **Supply, installation, testing and commissioning of 400mm Wall Mounted 3 speed Fans with oscillation and tilt mechanisam, Aerodynamically designed and balanced blades including supply and fixing of the electronic regulators with all necessary supports. All complete with labour and materials as per drawings, specifications and directions of SBSC/ Consultant.**	**4.00**	**Nos**	

SD/-

1.091	**SUB HEAD - U.P.S. POINTS & CIRCUITS:** **P & F ups points in 2 mm thick PVC conduit with 2 X 2.5 sq. mm insulated copper wire along with 1 X 1.5 sq. mm PVC insulated wire for earthing including bends, nipples, junction, M.S. switch boxes each to have 3 nos. 6 A 5 pin modular socket 1 X 6 A indicator controlled by 1 X 16 A modular type switch compl fine finish incl. making necessary connection & start of equipment as per details. Complete in all respects as per direction of Engineer/ Architect. Make as specified above)** **DIRECT POINT**	**4.00**	**Nos**	
1.092	**SUB HEAD - AC POINT WIRING:** **Point wiring for power plug point with 4 sq.mm stranded PVC insulated copper wire including earthing the third pin with 2.5 sq. mm copper insulated earthing wire complete with supply and fixing of recessed mounted industrial type 3 pin 32 A metal clad socket and plug, 20A MCB (Motor duty) housed in a 16 gauge M.S. Box**	**2.00**	**Each**	
1.093	**SUB HEAD :- DISMANTLING & DEMOLISING WORK** **Demolishing brick work manually/ by mechanical means including stacking of serviceable material and disposal of unserviceable material within 50 metres lead, all complete as per direction of SBSC/ Consultant.** **In cement mortar**	**15.00**	**Cum**	
1.094	**SUB HEAD :- DISMANTLING & DEMOLISING WORK** **Dismantling tile work in floors and roofs laid in cement mortar including stacking material within 50 metres lead.** **For thickness of tiles 10 mm to 25 mm**	**50.00**	**Square Metre**	
1.095	**SUB HEAD :- DISMANTLING & DEMOLISING WORK** **Disposal of building rubbish / malba / similar unserviceable, dismantled or waste materials by mechanical means, including loading, transporting, unloading to approved municipal dumping ground or as approved by Engineer-in-charge, beyond 50 m initial lead, for all leads including all lifts involved, all complete as per direction of SBSC/ Consultant.**	**45.00**	**Cum**	
1.096	**SUB HEAD :- AIR CONDITIONING WORK** **Supply, installation , testing and commissioning of 1.5 TR 5 Star Invertor cassette type air conditioners including remote, mounting brackets for outdoor and indoor units with rotary compressor, copper condenser and first charge refrigerant R410A/R22/Other, including connection of copper pipe and material supplied with complete unit etc. as required (Excluding cost of copper pipe) within Refinery / Petrochemical Complex/ Refinery Township as per direction of Engineer-in-charge.**	**2.00**	**Nos**	

SD/-

1.097	**SUB HEAD :- AIR CONDITIONING WORK** **Supply & fixing of additional length of copper tube for split A/C commissioning including all accessories.**	**25.00**	**Metre**	
1.098	**SUB HEAD :- AIR CONDITIONING WORK** **Supply, Installation, Testing and Commissioning of Hard u-PVC condensate drain piping complete with fittings, support as per specification with 6mm thick closed cell elastomeric nitrile rubber tubular insulation (Supreme / Superflon) up to the nearest drain point .** **25 mm**	**20.00**	**Metre**	
1.099	**SUB HEAD :- AIR CONDITIONING WORK** **Supply, Installation, Testing and Commissioning of 2 core x 1.5 sq.mm copper conductor shielded communication cable as per requirement at site complete with supports etc. for control between indoor and outdoor unit in suitable PVC Conduit or communication between Indoor Unit & Remote Controllers in suitable PVC Conduit.** **2 C * 1.5 sq.mm Cable**	**30.00**	**Metre**	
1.100	**SUB HEAD :- AIR CONDITIONING WORK** **Wall Chiselling for Copper Piping / Drain Piping . Filling shall be in the Client Scope**	**20.00**	**Metre**	
1.101	**SUB HEAD :- AIR CONDITIONING WORK** **Supplying, fixing & painting of Heavy duty GI steel wall bracket stand Load carrying capacity up to 160 Kgs Powder Coating for Rust Prevention with fastner for Air conditioner outdoor unit.**	**2.00**	**Nos**	
2	**RENOVATION WORK OF STAFF ROOM & TOILETS (BLOCK B-6)**			
2.001	**SUB HEAD :- DISMANTLING & DEMOLISING WORK** **Dismantling W.C. Pan of all sizes including disposal of dismantled materials i/c malba all complete as per directions of Engineer-in-charge.**	**2.00**	**Each**	
2.002	**SUB HEAD :- DISMANTLING & DEMOLISING WORK** **Dismantling 15 to 40 mm dia G.I. pipe including stacking of dismantled pipes (within 50 metres lead) as per direction of Engineer in-Charge.** **(a) Internal Work- Exposed on wall**	**50.00**	**Metre**	
2.003	**SUB HEAD :- DISMANTLING & DEMOLISING WORK** **Demolishing cement concrete manually/ by mechanical means including disposal of material within 50 metres lead as per direction of Engineer - in - charge.** **Nominal concrete 1:4:8 or leaner mix (i/c equivalent design mix)**	**1.00**	**Cubic Metre**	

SD/-

2.004	**SUB HEAD :- DISMANTLING & DEMOLISING WORK** **Demolishing brick work manually/ by mechanical means including stacking of serviceable material and disposal of unserviceable material within 50 metres lead as per direction of Engineer-in-charge.** **In cement mortar**	**1.00**	**Cubic Metre**	
2.005	**SUB HEAD :- DISMANTLING & DEMOLISING WORK** **Dismantling doors, windows and clerestory windows (steel or wood)** **shutter including chowkhats, architrave, holdfasts etc. complete and stacking within 50 metres lead :** **Of area 3 sq. metres and below**	**4.00**	**Nos**	
2.006	**SUB HEAD :- DISMANTLING & DEMOLISING WORK** **Dismantling tile work in floors and roofs laid in cement mortar including stacking material within 50 metres lead.** **For thickness of tiles 10 mm to 25 mm**	**60.00**	**Square Metre**	
2.007	**SUB HEAD :- DISMANTLING & DEMOLISING WORK** **Dismantling G.I. pipes (external work) including excavation and refilling trenches after taking out the pipes, manually/ by mechanical means including stacking of pipes within 50 metres lead as per direction of Engineer-in-charge :** **15 mm to 40 mm nominal bore**	**50.00**	**Metre**	
2.008	**SUB HEAD :- DISMANTLING & DEMOLISING WORK** **Dismantling C.I. pipes including excavation and refilling trenches after taking out the pipes, manually/ by mechanical means breaking lead caulked joints, melting of lead and making into blocks including stacking of pipes & lead at site within 50 metre lead as per direction of Engineer-in-charge:** **Up to 150 mm diameter**	**50.00**	**Metre**	
2.009	**SUB HEAD :- DISMANTLING & DEMOLISING WORK** **Disposal of building rubbish / malba / similar unserviceable, dismantled or waste materials by mechanical means, including loading, transporting, unloading to approved municipal dumping ground or as approved by Engineer-in-charge, beyond 50 m initial lead, for all leads including all lifts involved.**	**75.00**	**Cum**	
2.010	**SUB HEAD :- RCC WORK:-** **Providing & Laying of Reinforced Cement Concrete 1:1.5:3 (1 Cement :1.5 Coarse Sand : 3 Aggregate) including neccessary Reinforcement & Proper Shuttering work, all complete as per direction of the Engineer- in Charge.**	**50.00**	**Square Metre**	
2.011	**SUB HEAD :- WALL & FLOOR TILES** **Providing and fixing Ist quality ceramic glazed wall tiles conforming to IS: 15622**	**80.00**	**Square Metre**	

SD/-

	(thickness to be specified by the manufacturer), of approved make, in all colours, shades except burgundy, bottle green, black of any size as approved by Engineer-in-Charge, in skirting, risers of steps and dados, over 12 mm thick bed of cement mortar 1:3 (1 cement : 3 coarse sand) and jointing with grey cement slurry @ 3.3kg per sqm, including pointing in white cement mixed with pigment of matching shade complete.			
2.012	**SUB HEAD :- WALL & FLOOR TILES** **Providing and laying rectified Glazed Ceramic floor tiles of size 300x300 mm or more (thickness to be specified by the manufacturer), of 1st quality conforming to IS : 15622, of approved make, in all colours, shades, except White, Ivory, Grey, Fume Red Brown, laid on 20 mm thick Cement Mortar 1:4 (1 Cement : 4 Coarse sand), jointing with grey cement slurry @ 3.3 kg/ sqm including pointing the joints with white cement and matching pigments etc., complete.**	**35.00**	**Square Metre**	
2.013	**SUB HEAD :- WALL & FLOOR TILES** **Providing and laying Vitrified tiles in floor in different sizes (thickness to be specified by the manufacturer) with water absorption less than 0.08% and conforming to IS:15622, of approved brand & manufacturer, in all colours and shade, laid on 20 mm thick cement mortar 1:4 (1 cement: 4 coarse sand) jointing with grey cement slurry @3.3 kg/sqm including grouting the joints with white cement and matching pigments etc. The tiles must be cut with the zero chipping diamond cutter only . Laying of tiles will be done with the notch trowel, plier, wedge, clips of required thickness, leveling system and rubber mallet for placing the tiles gently and easily.** **Glazed Vitrified tiles Matt/Antiskid finish of size.** **Size of Tile 800 x 1200 mm**	**120.00**	**Square Metre**	
2.014	**SUB HEAD :- WALL & FLOOR TILES** **Providing and laying Vitrified tiles in different sizes (thickness to be specified by manufacturer), with water absorption less than 0.08 % and conforming to I.S. 15622, of approved make, in all colours & shade, in skirting, riser of steps, over 12 mm thick bed of cement mortar 1:3 (1 cement: 3 coarse sand), jointing with grey cement slurry @ 3.3 kg/ sqm including grouting the joint with white cement & matching pigments etc. complete.** **Size of Tile 800x800 mm**	**15.00**	**Square Metre**	
2.015	**SUB HEAD :- BRICK WORK** **Half brick masonry with common burnt clay F.P.S. (non modular) bricks of class designation 7.5 in superstructure above plinth level up to floor V level.** **Cement mortar 1:4 (1 cement :4 coarse sand)**	**70.00**	**Square Metre**	
2.016	**SUB HEAD ;- STONE WORK** **Providing and fixing 18 mm thick gang saw cut, mirror polished, premoulded and**	**10.00**	**Square Metre**	

SD/-

	prepolished, machine cut for kitchen platforms, vanity counters, window sills, facias and similar locations of required size, approved shade, colour and texture laid over 20 mm thick base cement mortar 1:4 (1 cement : 4 coarse sand), joints treated with white cement, mixed with matching pigment, epoxy touch ups, including rubbing, curing, moulding and polishing to edges to give high gloss finish etc. complete at all levels, all complete as per direction of SBSC/ Consultant. Granite of any colour and shade Area of slab upto 0.50 sqm			
2.017	**SUB HEAD ;- STONE WORK Providing and fixing 18 mm thick gang saw cut, mirror polished, premoulded and prepolished, machine cut for kitchen platforms, vanity counters, window sills, facias and similar locations of required size, approved shade, colour and texture laid over 20 mm thick base cement mortar 1:4 (1 cement : 4 coarse sand), joints treated with white cement, mixed with matching pigment, epoxy touch ups, including rubbing, curing, moulding and polishing to edges to give high gloss finish etc. complete at all levels, all complete as per direction of SBSC/ Consultant. Granite of any colour and shade Area of slab over 0.50 sqm**	**10.00**	**Square Metre**	
2.018	**SUB HEAD ;- STONE WORK Providing edge moulding to 18 mm thick marble stone counters, Vanities etc., including machine polishing to edge to give high gloss finish etc. complete as per design approved by Engineer-in-Charge, all complete as per direction of SBSC/ Consultant. Granite Work**	**65.00**	**Metre**	
2.019	**WOOD WORK & PVC WORK Providing wood work in frames of doors, windows, clerestory windows and other frames, wrought framed and fixed in position with hold fast lugs or with dash fasteners of required dia & length (hold fast lugs or dash fastener shall be paid for separately). Second class teak wood**	**0.25**	**Cubic Metre**	
2.020	**WOOD WORK & PVC WORK Providing and fixing ISI marked flush door shutters conforming to IS : 2202 (Part I) decorative type, core of block board construction with frame of 1st class hard wood and well matched teak 3 ply veneering with vertical grains or cross bands and face veneers on both faces of shutters. 35 mm thick including ISI marked Stainless Steel butt hinges with necessary screws**	**12.00**	**Square Metre**	
2.021	**WOOD WORK & PVC WORK Extra for providing lipping with 2nd class teak wood battens 25 mm minimum depth on**	**12.00**	**Square Metre**	

SD/-

	all edges of flush door shutters (over all area of door shutter to be measured).			
2.022	**WOOD WORK & PVC WORK** **Extra for providing vision panel not exceeding 0.1 sqm in all type of flush doors (cost of glass excluded) (overall area of door shutter to be measured):** **Rectangular or square**	**12.00**	**Square Metre**	
2.023	**WOOD WORK & PVC WORK** **Providing and fixing nickel plated M.S. pipe curtain rods with nickel plated brackets :** **25 mm dia (heavy type)**	**25.00**	**Metre**	
2.024	**WOOD WORK & PVC WORK** **Providing and fixing bright finished brass handles with screws etc. complete:** **125 mm**	**20.00**	**Metre**	
2.025	**WOOD WORK & PVC WORK** **Providing and fixing bright finished brass hanging type floor door stopper with necessary screws, etc. complete.**	**4.00**	**Each**	
2.026	**WOOD WORK & PVC WORK** **Providing and fixing aluminium die cast body tubular type universal hydraulic door closer (having brand logo with ISI, IS : 3564, embossed on the body, door weight upto 35 kg and door width upto 700 mm), with necessary accessories and screws etc. complete.**	**4.00**	**Each**	
2.027	**WOOD WORK & PVC WORK** **Providing and fixing bright finished brass hasp and staple (safety type) with necessary screws etc. complete :** **150 mm**	**4.00**	**Each**	
2.028	**WOOD WORK & PVC WORK** **Providing and fixing factory made uPVC white colour sliding glazed window upto 1.50 m in height dimension comprising of uPVC multi-chambered frame with in-built roller track and sash extruded profiles duly reinforced with 1.60 ± 0.2 mm thick galvanized mild steel section made from roll forming process of required length (shape & size according to uPVC profile), appropriate dimension of uPVC extruded glazing beads and uPVC extruded interlocks, EPDM gasket, wool pile, zinc alloy (white powder coated) touch locks with hook, zinc alloy body with single nylon rollers (weight bearing capacity to be 40 kg), G.I fasteners 100 x 8 mm size for fixing frame to finished wall and necessary stainless steel screws etc. Profile of frame & sash shall be mitred cut and fusion welded at all corners, including drilling of holes for fixing hardware's and drainage of water etc. After fixing frame the gap between frame and adjacent finished wall shall be filled with weather proof silicon sealent over backer rod of required size and of approved quality,**	**10.00**	**Square Metre**	

SD/-

	all complete as per approved drawing & direction of Engineer-in-Charge. (Single / double glass panes, wire mesh and silicon sealent shall be paid separately). Variation in profile dimension in higher side shall be accepted but no extra payment on this account shall be made. **Note: For uPVC frame and sash extruded profiles minus 5% tolerance in dimension i.e. in depth & width of profile shall be acceptable.** **Three track three panels sliding window with fly proof S.S wire mesh (Two nos. glazed & one no. wire mesh panels) made of (big series) frame 116 x 45 mm & sash 46 x 62 mm both having wall thickness of 2.3 ± 0.2 mm and single glazing bead / double glazing bead of appropriate dimension. (Area of window above 1.75 sqm).**			
2.029	**WOOD WORK & PVC WORK** **Providing and fixing glazing in aluminium door, window, ventilator shutters and partitions etc. with EPDM rubber / neoprene gasket etc. complete as per the architectural drawings and the directions of engineer-in-charge . (Cost of aluminium snap beading shall be paid in basic item):** **With float glass panes of 5 mm thickness (weight not less than 12.50 kg/sqm)**	**20.00**	**Square Metre**	
2.030	**WOOD WORK & PVC WORK** **Providing and fixing Fiber Glass Reinforced plastic (FRP) Door Frames of cross-section 90 mm x 45 mm having single rebate of 32 mm x 15 mm to receive shutter of 30 mm thickness. The laminate shall be moulded with fire resistant grade unsaturated polyester resin and chopped mat. Door frame laminate shall be 2mm thick and shall be filled with suitable wooden block in all the three legs. The frame shall be covered with fiber glass from all sides. M.S. stay shall be provided at the bottom to steady the frame.**	**20.00**	**Metre**	
2.031	**WOOD WORK & PVC WORK** **Providing and fixing to existing door frames.** **30 mm thick Glass Fibre Reinforced Plastic (FRP) panelled door shutter of required colour and approved brand and manufacture, made with fire - retardant grade unsaturated polyester resin, moulded to 3 mm thick FRP laminate for forming hollow rails and styles, with wooden frame and suitable blocks of seasoned wood inside at required places for fixing of fittings, cast monolithically with 5 mm thick FRP laminate for panels conforming to IS: 14856, including fixing to frames.**	**8.00**	**Square Metre**	
2.032	**SUB HEAD :- ROOFING & FALSE CEILING WORK** **Providing gola 75x75 mm in cement concrete 1:2:4 (1 cement : 2 coarse sand : 4 stone aggregate 10 mm and down gauge), including finishing with cement mortar 1:3 (1 cement : 3 fine sand) as per standard design, all complete as per direction of SBSC/ Consultant.** **In 75x75 mm deep chase**	**45.00**	**Running Metre**	

SD/-

2.033	**SUB HEAD :- ROOFING & FALSE CEILING WORK** **Making khurras 45x45 cm with average minimum thickness of 5 cm cement concrete 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate of 20 mm nominal size) over P.V.C. sheet 1 m x1 m x 400 micron, finished with 12 mm cement plaster 1:3 (1 cement : 3 coarse sand) and a coat of neat cement, rounding the edges and making and finishing the outlet, all complete as per direction of SBSC/ Consultant.**	**8.00**	**Each**	
2.034	**SUB HEAD :- ROOFING & FALSE CEILING WORK** **Providing and fixing on wall face unplasticised Rigid PVC rain water pipes conforming to IS : 13592 Type A, including jointing with seal ring conforming to IS : 5382, leaving 10 mm gap for thermal expansion, (i) Single socketed pipes.** **110 mm diameter**	**80.00**	**Running Metre**	
2.035	**SUB HEAD :- ROOFING & FALSE CEILING WORK** **Providing and fixing on wall face unplasticised - PVC moulded fittings/ accessories for unplasticised Rigid PVC rain water pipes conforming to IS : 13592 Type A, including jointing with seal ring conforming to IS : 5382, leaving 10 mm gap for thermal expansion.** **Coupler- 110 mm**	**8.00**	**Each**	
2.036	**SUB HEAD :- ROOFING & FALSE CEILING WORK** **Single pushfit Coupler- 110 mm**	**8.00**	**Each**	
2.037	**SUB HEAD :- ROOFING & FALSE CEILING WORK** **Bend 87.5°-110 mm bend**	**8.00**	**Each**	
2.038	**SUB HEAD :- ROOFING & FALSE CEILING WORK** **Shoe (Plain)-110 mm shoe**	**8.00**	**Each**	
2.039	**SUB HEAD :- ROOFING & FALSE CEILING WORK** **Providing and fixing unplasticised -PVC pipe clips of approved design to unplasticised - PVC rain water pipes by means of 50x50x50 mm hard wood plugs, screwed with M.S. screws of required length, including cutting brick work and fixing in cement mortar 1:4 (1 cement : 4 coarse sand) and making good the wall etc., all complete as per direction of SBSC/ Consultant.** **110 mm diameter**	**8.00**	**Each**	
2.040	**SUB HEAD :- ROOFING & FALSE CEILING WORK** **Providing and fixing to the inlet mouth of rain water pipe cast iron grating 15 cm diameter and weighing not less than 440 grams.**	**8.00**	**Each**	
2.041	**SUB HEAD :- ROOFING & FALSE CEILING WORK** **Providing and fixing false ceiling at all height including providing and fixing of frame work made of special sections, power pressed from M.S. sheets and galvanized with zinc**	**20.00**	**Square Metre**	

SD/-

	coating of 120 gms/sqm (both side inclusive) as per IS : 277 and consisting of angle cleats of size 25 mm wide x 1.6 mm thick with flanges of 27 mm and 37mm, at 1200 mm centre to centre, one flange fixed to the ceiling with dash fastener 12.5 mm dia x 50mm long with 6mm dia bolts, other flange of cleat fixed to the angle hangers of 25x10x0.50 mm of required length with nuts & bolts of required size and other end of angle hanger fixed with intermediate G.I. channels 45x15x0.9 mm running at the spacing of 1200 mm centre to centre, to which the ceiling section 0.5 mm thick bottom wedge of 80 mm with tapered flanges of 26 mm each having lips of 10.5 mm, at 450 mm centre to centre, shall be fixed in a direction perpendicular to G.I. intermediate channel with connecting clips made out of 2.64 mm dia x 230 mm long G.I. wire at every junction, including fixing perimeter channels 0.5 mm thick 27 mm high having flanges of 20 mm and 30 mm long, the perimeter of ceiling fixed to wall/partition with the help of rawl plugs at 450 mm centre, with 25mm long dry wall screws @ 230 mm interval, including fixing of gypsum board to ceiling section and perimeter channel with the help of dry wall screws of size 3.5 x 25 mm at 230 mm c/c, including jointing and finishing to a flush finish of tapered and square edges of the board with recommended jointing compound , jointing tapes , finishing with jointing compound in 3 layers covering upto 150 mm on both sides of joint and two coats of primer suitable for board, all as per manufacturer's specification and also including the cost of making openings for light fittings, grills, diffusers, cutouts made with frame of perimeter channels suitably fixed, all complete as per drawings, specification and direction of the Engineer in Charge but excluding the cost of painting with : **12.5 mm thick tapered edge gypsum moisture resistant board**			
2.042	**SUB HEAD :- ROOFING & FALSE CEILING WORK** **Providing and fixing mineral fibre false ceiling tiles at all heights of size 595X595mm of approved texture, design and pattern. The tiles should have Humidity Resistance (RH) of 99%, Light Reflectance ? 85%, Thermal Conductivity k = 0.052 - 0.057 w/m K, Fire Performance as per (BS 476 pt - 6 &7)in true horizontal level suspended on interlocking T-Grid of hot dipped all round galvanized iron section of 0.33 mm thick (galvanized @120gsm) comprising of main T runners of 15x32 mm of length 3000 mm, cross T of size 15x32mm of length 1200 mm and secondary intermediate cross T of size 15x32 mm of length 600 mm to form grid module of size 600x600 mm suspended from ceiling using galvanized mild steel item (galvanised@80gsm) 50 mm long 8mm outer diameter M-6 dash fasteners, 6 mm diameter fully threaded hanger rod up to 1000 mm length and L-shape level adjuster of size 85x25x2 mm, spaced at 1200 mm centre to centre along main 'T'. The system should rest on periphery walls /partitions with the help of GI perimeter**	**14.00**	**Square Metre**	

SD/-

	wall angle of size24x24X3000 mm made of 0.40 mm thick sheet, to be fixed to the wall with help of plastic rawl plug at 450 mm centre to centre & 40 mm long dry wall S.S. screws. The exposed bottom portion of all T-sections used in false ceiling support system shall be pre-painted with polyester baked paint, for all heights. The work shall be carried out as per specifications, drawings and as per directions of the engineer-in-charge. **With 16 mm thick beveled tegular mineral fibre false ceiling tile (NRC 0.55 to 0.6)**			
2.043	**SUB HEAD :- PLASTER & PAINTING WORK** **CEMENT PLASTER (IN COARSE SAND)** **12 mm cement plaster of mix :** **1:6 (1 cement: 6 coarse sand)**	**100.00**	**Square Metre**	
2.044	**SUB HEAD :- PLASTER & PAINTING WORK** **18 mm cement plaster in two coats under layer 12 mm thick cement plaster 1:5 (1 cement : 5 coarse sand) finished with a top layer 6 mm thick cement plaster 1:6 (1 cement : 6 fine sand), all complete as per direction of SBSC/ Consultant.**	**50.00**	**Square Metre**	
2.045	**SUB HEAD :- PLASTER & PAINTING WORK** **6 mm cement plaster of mix :** **1:3 (1 cement : 3 fine sand)**	**50.00**	**Square Metre**	
2.046	**SUB HEAD :- PLASTER & PAINTING WORK** **Finishing with Deluxe Multi surface paint system for interiors and exteriors using Primer as per manufacturers specifications :** **Two or more coats applied on walls @ 1.25 ltr/10 sqm over and including one coat of Special primer applied @ 0.75 ltr /10 sqm**	**50.00**	**Square Metre**	
2.047	**SUB HEAD :- PLASTER & PAINTING WORK** **Finishing walls with 100% Premium acrylic emulsion paint having VOC less than 50 gm/litre and UV resistance as per IS 15489:2004, Alkali & fungal resistance, dirt resistance exterior paint of required shade (Company Depot Tinted) with silicon additives, all complete as per direction of SBSC/ Consultant.** **New work (Two or more coats applied @ 1.43 litre/ 10 sqm. Over and including priming coat of exterior primer applied @ 0.90 litre/10 sqm.**	**250.00**	**Square Metre**	
2.048	**SUB HEAD :- PLASTER & PAINTING WORK** **Providing and applying white cement based putty of average thickness 1 mm, of approved brand and manufacturer, over the plastered wall surface to prepare the surface even and smooth complete.**	**250.00**	**Square Metre**	
2.049	**SUB HEAD :- PLASTER & PAINTING WORK** **Removing white or colour wash by scrapping and sand papering and preparing the**	**250.00**	**Square Metre**	

SD/-

	surface smooth including necessary repairs to scratches etc. complete			
2.050	**SUB HEAD :- PLASTER & PAINTING WORK** **Painting on G.S. sheet with synthetic enamel paint of approved brand and manufacture of required colour to give an even shade :** **Old work (one or more coats)**	**50.00**	**Square Metre**	
2.051	**SUB HEAD :- FURNITURE ITEMS** **Supplying and placing Seat shall be made of 1.4cm thick hot pressed plywood upholstered with fabric and moulded Polyurethane foam. Seat size shall be 550cm x 49cm. The back shall be injection moulded in Glass filled polyamide which shall be upholstered with Mesh fabric. The back consist of adjustable lumbar support shall be made of injection moulded polypropylene having an adjustment of 6cm. Back size shall be 50cm x 68cm. The Polyurethane foam for seat shall be of density 55 kg per meter cube. The three way adjustable armrests is made of glass filled polyamide arm structure with PU armtop and height adjustment of 7cm. The armtop has swivel and to and fro motion. The inner tube of armrest is chrome plated. The powder coated welded tubular frame is made of dia. 2.8cm x 0.2cm thick MS round tube. The frame is fitted with Plastic caps made of injection moulded glass filled Polypropylene. The overall dimensions of the frame shall be 63.5cm x 59.5cm x 97.5cm. The seat height shall be 42.5cm.**	**4.00**	**Nos**	
2.052	**SUB HEAD :- FURNITURE ITEMS** **Providing Woodan Proffessor Table Size- (1525x900x750 mm), Table top made of 25mm thick ISI Marked Pre Laminated MDF Board IS-14587-1998, Teak wood half round 50mm wide, Lipping supported from inside by Jungle wood 25mm x 25mm, DRAWER BOX CUBOARD :- CR sheet 0.80mm thick Confirming to IS-513, DRAWER SIZE :- 500(L)X100mm(D) Minimum, FRAME & STRUCTRUE :- ERW Square pipe25x25x1.25mm in size 1100 (L) x 600(W)x732(H) mm, CUPBOARD SHUTTER :- BOX TYPE made of 0.80mm CR sheet Confirming to IS-513. FOOT REST :-ERW square pipe 25x25x1.25mm in full length and gap between two pipes approx. 85.mm. as per approved design & shade, all complete as per direction of SBSC/ Consultant.**	**4.00**	**Nos**	
2.053	**SUB HEAD :- FURNITURE ITEMS** **Supplying and Placing in place of 3 seater sofa. The overall dimensions of the sofa shall be 2060W x 905D x 855H. The seat should be made of PU foam with Density 28 ± 2 kg/cu.mtr having an additional top layer of supersoft PU foam with Density 32 ± 2 kg/cu. Seat should be upholstered with fabric or leatherite. 2) BACK FOAM: The back should be made of PU foam with Density 28 ± 2 kg/cu. mtr with two additional top layer of supersoft foam of density 32±2 kg/cu. mtr, upholstered with fabric or leatherette.**	**1.00**	**Nos**	

SD/-

	Understructure should be made up of 1.2±0.1 cm. thick hot pressed plywood (which also shall be resistance and termite proof as per IS:303.) and pinewood of cross section deviod of major knots and surface defects 6 nos. per seat and 3.8mm dia. zigzag spring assembly is mounted over understrucrure for cushioning effect. It should be a welded assembly made in Stainless steel (grade SS 202) tube & plate with plastic endcap.			
2.054	**SUB HEAD :- FURNITURE ITEMS** **Supplying and Placing in place of 2 seater sofa. The overall dimensions of the sofa shall be 1460W x 905D x 855H. The seat should be made of PU foam with Density 28 ± 2 kg/cu.mtr having an additional top layer of supersoft PU foam with Density 32 ± 2 kg/cu. Seat should be upholstered with fabric or leatherette. 2) BACK FOAM: The back should be made of PU foam with Density 28 ± 2 kg/cu. mtr with two additional top layer of supersoft foam of density 32±2 kg/cu. mtr, upholstered with fabric or leatherette. Understructure should be made up of 1.2±0.1 cm. thick hot pressed plywood (which also shall be resistance and termite proof as per IS:303.) and pinewood of cross section deviod of major knots and surface defects 6 nos. per seat and 3.8mm dia. zigzag spring assembly is mounted over understrucrure for cushioning effect. It should be a welded assembly made in Stainless steel (grade SS 202) tube & plate with plastic endcap.**	**1.00**	**Nos**	
2.055	**SUB HEAD :- FURNITURE ITEMS** **Supplying and placing centre table whose Glass shall be 10+/-0.3mm thick black tinted toughened glass UV glued with bushes made in SS 202 grade for fixing with understructure. It shall be a welded assembly made in SS202 grade having dia. 12+/-0.04 as per IS:1762. overall dimensions of table shall be Width of table= 112.0 cm, Depth=60.0 cm, height=35.1 cm.**	**1.00**	**Nos**	
2.056	**SUB HEAD :- FURNITURE ITEMS** **Supplying and placing side table whose glass shall be 10+/-0.3mm thick black tinted toughened glass UV glued with bushes made in SS 202 grade for fixing with understructure. It shall be a welded assembly made in SS202 grade having dia. 12+/-0.04 as per IS:1762. overall dimensions of table shall be Width of table= 60.0 cm, Depth=60.0 cm, height=35.1 cm.**	**2.00**	**Nos**	
2.057	**SUB HEAD :- FURNITURE ITEMS** **Back Cabinet (Laminate top)** **Providing & Placing in position 3'0" high & deep box type File cabinets made out 1 mm BWR Board with WHITE 1.5 mm thick High gloss Laminate on top & lipping (outside edge) The same will be provided with 2 shutters made of 19 mm thick board with 1 mm th. High gloss laminate with all others exposed internal / surfaces provided with Duco paint with melamine coating complete with side hinged shutters complete with handles ,**	**5.00**	**Square Metre**	

SD/-

	locks etc. The same will be provided with a single shelf in middle . (for the purpose of contractor's payment only front elevation) area will be measured .			
2.058	**SUB HEAD :- FURNITURE ITEMS** **Storage (Laminate top)** **Providing and fixing wooden storage 450 mm wide having sides, partitions shelves and shutter made of 19 mm th. Board with 1 mm th. High gloss laminate with all other exposed internal / external surface provided with Duco paint with melamine coating complete with side hinged sutter complete with handles , locks etc. (for the purpose of contractor's payment only front elevation area of a cabinate will be measured .**	**12.00**	**Square Metre**	
2.059	**SUB HEAD :- FURNITURE ITEMS** **Providing & fixing of Roller Blinds- The Blind system consist of a coated aluminium tube of 38 mm diameter with provision of fabric clamping. The Fabric is rolled up and down through a chain drive system with built in drive gear and an over run brake system. The side brackets are universal type suitable both for wall and ceiling mounting. The bottom end of the fabric is rolled over an oval shape aluminium tube with provision to lock the fabric, all complete as per direction of SBSC/ Consultant.**	**25.00**	**Square Metre**	
2.060	**SUB HEAD :- ELECTRICAL WORKS** **Wiring for light point/ fan point/ exhaust fan point/ call bell point with 1.5 sq.mm FR PVC insulated copper conductor single core cable in surface / recessed medium class PVC conduit, with modular switch, modular plate, suitable GI box and earthing the point with 1.5 sq.mm. FR PVC insulated copper conductor single core cable etc as required.** **group C**	**25.00**	**Point**	
2.061	**SUB HEAD :- ELECTRICAL WORKS** **Wiring for circuit/ submain wiring alongwith earth wire with the following sizes of FR PVC insulated copper conductor, single core cable in surface/ recessed medium class PVC conduit as required** **2 X 2.5 sq. mm + 1 X 2.5 sq. mm earth wire**	**150.00**	**Metre**	
2.062	**SUB HEAD :- ELECTRICAL WORKS** **Wiring for circuit/ submain wiring alongwith earth wire with the following sizes of FR PVC insulated copper conductor, single core cable in surface/ recessed medium class PVC conduit as required** **2 X 4 sq. mm + 1 X 4 sq. mm earth wire**	**150.00**	**Metre**	
2.063	**SUB HEAD :- ELECTRICAL WORKS** **Supplying and fixing suitable size GI box with modular plate and cover in front on surface or in recess, including providing and fixing 3 pin 5/6 amps modular socket outlet and 5/6 amps modular switch, connection etc. as required. (For light plugs to be used in**	**6.00**	**Each**	

SD/-

	non residential buildings).			
2.064	**SUB HEAD :- ELECTRICAL WORKS** **Supplying and fixing suitable size GI box with modular plate and cover in front on surface or in recess, including providing and fixing 6 pin 5/6 & 15/16 amps modular socket outlet and 15/16 amps modular switch, connection etc. as required.**	**6.00**	**Each**	
2.065	**SUB HEAD :- ELECTRICAL WORKS** **Supplying and fixing following modular switch/ socket on the existing modular plate & switch box including connections but excluding modular plate etc. as required** **2 way 5/6 A Switch**	**6.00**	**Each**	
2.066	**SUB HEAD :- ELECTRICAL WORKS** **Supplying and fixing following modular switch/ socket on the existing modular plate & switch box including connections but excluding modular plate etc. as required** **15/16 A Switch**	**6.00**	**Each**	
2.067	**SUB HEAD :- ELECTRICAL WORKS** **Supplying and fixing following modular switch/ socket on the existing modular plate & switch box including connections but excluding modular plate etc. as required** **3 Pin 5/6 Socket Outlet**	**6.00**	**Each**	
2.068	**SUB HEAD :- ELECTRICAL WORKS** **Supplying and fixing following modular switch/ socket on the existing modular plate & switch box including connections but excluding modular plate etc. as required** **3 Pin 15/16 Socket Outlet**	**6.00**	**Each**	
2.069	**SUB HEAD :- ELECTRICAL WORKS** **Supplying and fixing of following sizes of medium class PVC conduit along with accessories in surface/recess including cutting the wall and making good the same in case of recessed conduit as required.** **20mm dia PVC conduit**	**50.00**	**Metre**	
2.070	**SUB HEAD :- ELECTRICAL WORKS** **Supplying and fixing of following sizes of medium class PVC conduit along with accessories in surface/recess including cutting the wall and making good the same in case of recessed conduit as required.** **25mm dia PVC conduit**	**50.00**	**Metre**	
2.071	**SUB HEAD :- FANS & LIGHT FIXTURES** **Supply of Recess mounted LED 2'x2' luminaire delivering an initial system lumen of 3300 lumens & the luminaire shall be with system efficacy ≥ 100 lm / W. Housing: CRCA, Rim: Engneering plastic / CRCA. Optics: polycarbonate / PMMA/ Polysterene, IP20 Protection.**	**9.00**	**Each**	

SD/-

	The operating CCT shall be 5700K with CRI of ≥80. The luminaire shall be with BIS Registered electronic driver with input voltage range of 150 to 270V , THD ≤ 10% & PF ≥ 0.95, 50,000 Hrs LED Life with L70 Criteria. The LED Driver shall be easily avaiable in India for repair and service. The LED shall be SMD type. Luminaire shall have minimum surge protection of 2KV.The luminaire shall be with following certifications: LM79 & LM80 issued by LED manufacture along with Photo Biological Safety Standard. All complete as per direction ofSBSC/ Consultant.			
2.072	**SUB HEAD :- FANS & LIGHT FIXTURES** **Supply of Surface Mount Round Led Downlighter consuming a system wattage of 15W (±10%) & the luminaire shall be with system efficacy ≥ 100 lm / W. Housing: CRCA Powder Coated. IP20 , Optics: PMMA/Polysterene Diffuser. The operating CCT shall be 5700K with CRI of ≥80. The luminaire shall be with BIS Registered electronic driver with input voltage range of 150 to 270V , THD ≤ 10% & PF ≥ 0.9, 50,000 Hrs LED Life with L70 Criteria. The LED Driver shall be easily avaiable in India for repair and service. The LED shall be SMD type. Luminaire shall have minimum surge protection of 2KV.The luminaire shall be with following certifications: LM79 with NABL Own LAB & LM80 issued by LED manufacture along with Photo Biological Safety Standard. All complete as per direction of SBSC/ Consultant.**	**24.00**	**Each**	
2.073	**SUB HEAD :- FANS & LIGHT FIXTURES** **Supply of 2ft Linear LED luminaire delivering an initial system lumen of 903 lumens & the luminaire shall be with system efficacy ≥ 90 lm / W. The luminaire Housing shall be made of PC & the diffuser shall be of polycarbonate/PMMA. The operating CCT shall be 6500K with CRI of ≥80. The luminaire shall be with BIS Registered electronic driver with input voltage range of 150 to 270V , THD ≤ 20% & PF ≥ 0.95 , 50,000 Hrs LED Life with L70 Criteria, IP20. The LED Driver shall be easily avaiable in India for repair and service. The LED shall be SMD type. Luminaire shall have minimum surge protection of 2KV.The luminaire shall be with following certifications: LM79 with NABL Own LAB & LM80 issued by LED manufacture along with Photo Biological Safety Standard. All complete as per direction of SBSC/ Consultant.**	**3.00**	**Each**	
2.074	**SUB HEAD :- FANS & LIGHT FIXTURES** **Supplying, installation, Testing & Commissioning of 225 mm dia heavey duty Exhust fan, Power- 220-240 VAC,50/60 Hz, Speed- 1400 RPM,Power Source- Corded Electric, High Velocity including supply and fixing of all necessary supports. All complete with labour and materials as per drawings, specifications and directions of SBSC/ Consultant.**	**5.00**	**Each**	
2.075	**SUB HEAD :- FANS & LIGHT FIXTURES** **Supply, installation, testing and commissioning of 400mm Wall Mounted 3 speed Fans**	**6.00**	**Each**	

SD/-

	with oscillation and tilt mechanisam, Aerodynamically designed and balanced blades including supply and fixing of the electronic regulators with all necessary supports. All complete with labour and materials as per drawings, specifications and directions of SBSC/ Consultant.			
2.076	**SUB HEAD :- FANS & LIGHT FIXTURES** **U.P.S. POINTS & CIRCUITS :-** **P & F ups points in 2 mm thick PVC conduit with 2 X 2.5 sq. mm insulated copper wire along with 1 X 1.5 sq. mm PVC insulated wire for earthing including bends, nipples, junction, M.S. switch boxes each to have 3 nos. 6 A 5 pin modular socket 1 X 6 A indicator controlled by 1 X 16 A modular type switch compl fine finish incl. making necessary connection & start of equipment as per details. Complete in all respects as per direction of Engineer/ Architect. Make as specified above)** **DIRECT POINT**	**4.00**	**Each**	
2.077	**SUB HEAD :- FANS & LIGHT FIXTURES** **AC point Wiring :-** **Point wiring for power plug point with 4 sq.mm stranded PVC insulated copper wire including earthing the third pin with 2.5 sq. mm copper insulated earthing wire complete with supply and fixing of recessed mounted industrial type 3 pin 32 A metal clad socket and plug, 20A MCB (Motor duty) housed in a 16 gauge M.S. Box**	**2.00**	**Each**	
2.078	**SUB HEAD :- AIR CONDITIONING WORK** **Supply, installation , testing and commissioning of 1.5 TR 5 Star Invertor cassette type air conditioners including remote, mounting brackets for outdoor and indoor units with rotary compressor, copper condenser and first charge refrigerant R410A/R22/Other, including connection of copper pipe and material supplied with complete unit etc. as required (Excluding cost of copper pipe) within Refinery / Petrochemical Complex/ Refinery Township as per direction of Engineer-in-charge.**	**2.00**	**Each**	
2.079	**SUB HEAD :- AIR CONDITIONING WORK** **Supply & fixing of additional length of copper tube for split A/C commissioning including all accessories.**	**25.00**	**Metre**	
2.080	**SUB HEAD :- AIR CONDITIONING WORK** **Supply, Installation, Testing and Commissioning of Hard u-PVC condensate drain piping complete with fittings, support as per specification with 6mm thick closed cell elastomeric nitrile rubber tubular insulation (Supreme / Superflon) up to the nearest drain point .** **25 mm**	**20.00**	**Metre**	

SD/-

2.081	**SUB HEAD :- AIR CONDITIONING WORK** **Supply, Installation, Testing and Commissioning of 2 core x 1.5 sq.mm copper conductor shielded communication cable as per requirement at site complete with supports etc. for control between indoor and outdoor unit in suitable PVC Conduit or communication between Indoor Unit & Remote Controllers in suitable PVC Conduit.** **2 C * 1.5 sq.mm Cable**	**30.00**	**Metre**	
2.082	**SUB HEAD :- AIR CONDITIONING WORK** **Wall Chiselling for Copper Piping / Drain Piping . Filling shall be in the Client Scope**	**20.00**	**Metre**	
2.083	**SUB HEAD :- AIR CONDITIONING WORK** **Supplying, fixing & painting of Heavy duty GI steel wall bracket stand Load carrying capacity up to 160 Kgs Powder Coating for Rust Prevention with fastner for Air conditioner outdoor unit.**	**2.00**	**Each**	
2.084	**SUB HEAD :- PLUMBING WORK** **Providing and fixing water closet squatting pan (Indian type W.C. pan) with 100 mm sand cast Iron P or S trap, 10 litre low level white P.V.C. flushing cistern, including flush pipe, with manually controlled device (handle lever) conforming to IS : 7231, with all fittings and fixtures complete, including cutting and making good the walls and floors wherever required:** **White Vitreous china Orissa pattern W.C. pan of size 580x440 mm with integral type foot rests**	**2.00**	**Each**	
2.085	**SUB HEAD :- PLUMBING WORK** **Providing and fixing White vitreous wash basin Size -375x475x130 with C.I. brackets, 15 mm C.P. brass pillar taps, 32 mm C.P. brass waste of standard pattern, including painting of fittings and brackets, cutting and making good the walls wherever require, all complete as per direction of SBSC/ Consultant.**	**4.00**	**Each**	
2.086	**SUB HEAD :- PLUMBING WORK** **Providing and fixing CP Brass 32mm size Bottle Trap of approved quality & make, all complete as per direction of SBSC/ Consultant.**	**8.00**	**Each**	
2.087	**SUB HEAD :- PLUMBING WORK** **Providing & fixing Sensotronic Sensor Faucet for wash basin deck mounted, all complete as per direction of SBSC/ Consultant.**	**4.00**	**Each**	
2.088	**SUB HEAD :- PLUMBING WORK** **Providing and fixing Braided Hoses with Two 15mm CP Brass Nuts & Rubber Washers Without Nipple (Suitable for Geysers and basins). , all complete as per direction of SBSC/ Consultant.** **45 cm length**	**7.00**	**Each**	

SD/-

	15 mm nominal bore			
2.089	**SUB HEAD :- PLUMBING WORK** **Providing & fixing of Wall Mounted Paper towel dispensers towels with C/Z folds capacity: 400-600 C/Z towels made of AISI 304 Stainless Steel with Satin finished. The towel tray opening has bound edges to minimise tearing of paper towels. Door fixed to the body with two rivets, allowing it to be swung open for replenishment.Slot for viewing content level on the front, all complete as per direction of SBSC/ Consultant.**	**4.00**	**Each**	
2.090	**SUB HEAD :- PLUMBING WORK** **Providing and Fixing of Health Faucet Kit (Flexible Chrome Hose, Handset & Bracket) allcomplete including CP flange etc., all complete as per direction of SBSC/ Consultant.**	**4.00**	**Each**	
2.091	**SUB HEAD :- PLUMBING WORK** **Providing & fixingTowel Ring Square with C.P. brass wall brackets & C.P brass screws complete as required, all complete as per direction of SBSC/ Consultant.** **Size 600 x 20 mm size**	**4.00**	**Each**	
2.092	**SUB HEAD :- PLUMBING WORK** **Providing and fixing C.P. brass angle valve for basin mixer and geyser points of approved quality conforming to IS:8931 a) 15 mm nominal bore, all complete as per direction of SBSC/ Consultant.**	**4.00**	**Each**	
2.093	**SUB HEAD :- PLUMBING WORK** **Providing and fixing of Sensor Operated Optimum Hand Dryers - Weld-free cover fixed to the base with 4 Allen bolts. Base in ABS thermoplastic UL 94-V0. Thermoplastic fan wheel PA6 UL 94-V0. Class F induction motor incorporating a safety thermal cut-off. PP UL 94-V0 aluminium centrifugal single inlet fan wheel. Heating element incorporating a safety thermal cut-off. Electronic infrared detection sensor. Adjustable detection adjustable (15-25 cm)., all complete as per direction of SBSC/ Consultant.**	**2.00**	**Each**	
2.094	**SUB HEAD :- PLUMBING WORK** **Providing & Fixing Automatic soap dispensor Capacity-0.8 L. made by aluminium / ABS with Chrome finished , all complete as per direction of SBSC/ Consultant.**	**2.00**	**Each**	
2.095	**SUB HEAD :- PLUMBING WORK** **Providing and fixing white vitreous china extended wall mounting water closet of size 780x370x690 mm of approved shape including providing & fixing white vitreous china cistern with dual flush fitting, of flushing capacity 3 litre/6 litre (adjustable to 4 litre/8 litres), including seat cover, and cistern fittings, nuts, bolts and gasket etc, all complete as per direction of SBSC/ Consultant.**	**2.00**	**Each**	

SD/-

2.096	**SUB HEAD :- PLUMBING WORK** **Providing and fixing C.P. brass extension nipple (size 15mm x 50mm) of approved make and quality, all complete as per direction of SBSC/ Consultant.**	**13.00**	**Each**	
2.097	**SUB HEAD :- PLUMBING WORK** **Providing and fixing Stainless Steel A ISI 304 (18/8) kitchen sink as per IS:13983 with C.I. brackets and stainless steel plug 40 mm, including painting of fittings and brackets, cutting and making good the walls wherever required :** **Kitchen sink without drain board** **470x420 mm bowl depth 178 mm**	**1.00**	**Each**	
2.098	**SUB HEAD :- PLUMBING WORK** **Providing and fixing white vitreous china battery based infrared sensor operated urinal of approx. size 610 x 390 x 370 mm having pre & post flushing with water (250 ml & 500 ml consumption), having water inlet from back side, including fixing to wall with suitable brackets all as per manufacturers specification and direction of Engineer-in-charge.**	**4.00**	**Each**	
2.099	**SUB HEAD :- PLUMBING WORK** **Providing & fixing Curved shapechrome finished urinal partition with 10mm thick frosted glass size-(900mm x 450mm), all complete as per the direction of Engineer-in-charge/ Consultant.**	**4.00**	**Each**	
2.100	**SUB HEAD :- PLUMBING WORK** **Providing and fixing horzontal/vertical Hot water geyser made of MS body with copper jacket inside with necessary inlet, outlet, drain, overflow, vent and all safety accessories etc. complete including cutting and making good the walls, wherever required, all complete as per direction of SBSC/ Consultant.** **15 LITRE**	**2.00**	**Each**	
2.101	**SUB HEAD :- PLUMBING WORK** **Providing and fixing 600 x 450 mm beveled edge mirror of superior glass (of approved quality) complete with 6 mm thick hard board ground fixed to wooden cleats with C.P. brass screws and washers , all complete as per direction of SBSC/ Consultant.**	**2.00**	**Each**	
2.102	**SUB HEAD :- PLUMBING WORK** **Providing and laying water proofing treatment in sunken portion of WCs, bathroom etc., by applying cement slurry mixed with water proofing cement compound consisting of applying :** **(a) First layer of slurry of cement @ 0.488 kg/sqm mixed with water proofing cement compound @ 0.253 kg/ sqm. This layer will be allowed to air cure for 4 hours.** **(b) Second layer of slurry of cement @ 0.242 kg/sqm mixed with water proofing cement compound @ 0.126 kg/sqm. This layer will be allowed to air cure for 4 hours followed**	**20.00**	**Square Metre**	

SD/-

	with water curing for 48 hours. **The rate includes preparation of surface, treatment and sealing of all joints, corners, junctions of pipes and masonry with polymer mixed slurry.**			
2.103	**SUB HEAD :- PLUMBING WORK** **Providing and fixing Chlorinated Polyvinyl Chloride (CPVC) pipes, having thermal stability for hot & cold water supply including all CPVC plain & brass threaded fittings i/c fixing the pipe with clamps at 1.00 m spacing. This includes jointing of pipes & fittings with one step CPVC solvent cement and the cost of cutting chases and making good the same including testing of joints complete as per direction of Engineer in Charge (Cement shall be free issue material): Concealed work including cutting chases and making good the walls etc, all complete as per direction of SBSC/ Consultant.** **15 mm nominal outer dia Pipes**	**30.00**	**Running Metre**	
2.104	**SUB HEAD :- PLUMBING WORK** **Providing and fixing Chlorinated Polyvinyl Chloride (CPVC) pipes, having thermal stability for hot & cold water supply including all CPVC plain & brass threaded fittings i/c fixing the pipe with clamps at 1.00 m spacing. This includes jointing of pipes & fittings with one step CPVC solvent cement and the cost of cutting chases and making good the same including testing of joints complete as per direction of Engineer in Charge (Cement shall be free issue material): Concealed work including cutting chases and making good the walls etc, all complete as per direction of SBSC/ Consultant.** **20 mm nominal outer dia Pipes**	**25.00**	**Running Metre**	
2.105	**SUB HEAD :- PLUMBING WORK** **Providing and fixing Chlorinated Polyvinyl Chloride (CPVC) pipes, having thermal stability for hot & cold water supply including all CPVC plain & brass threaded fittings i/c fixing the pipe with clamps at 1.00 m spacing. This includes jointing of pipes & fittings with one step CPVC solvent cement and the cost of cutting chases and making good the same including testing of joints complete as per direction of Engineer in Charge (Cement shall be free issue material): Concealed work including cutting chases and making good the walls etc, all complete as per direction of SBSC/ Consultant.** **25 mm nominal outer dia Pipes**	**20.00**	**Running Metre**	
2.106	**SUB HEAD :- PLUMBING WORK** **Providing and fixing Chlorinated Polyvinyl Chloride (CPVC) pipes, having thermal stability for hot & cold water supply including all CPVC plain & brass threaded fittings i/c fixing the pipe with clamps at 1.00 m spacing. This includes jointing of pipes & fittings with one step CPVC solvent cement and the cost of cutting chases and making good the same including testing of joints complete as per direction of Engineer in Charge (Cement**	**20.00**	**Running Metre**	

SD/-

	shall be free issue material): Concealed work including cutting chases and making good the walls etc, all complete as per direction of SBSC/ Consultant. 32 mm nominal outer dia Pipes			
2.107	**SUB HEAD :- PLUMBING WORK Providing & fixing UPVC soil, waste, vent pipework comprising UPVC pipe conforming to IS :4985-1983 and of required class as specified below and fittings (moulded as well as fabricated) like elbows, bends, reducers, threaded tail pieces, caps and and other specials. jointing with cement solvent, chasing, cutting and making good the walls, complete in all respects including testing of complete installation, all complete as per direction of SBSC/ Consultant. 75 mm dia**	**40.00**	**Running Metre**	
2.108	**SUB HEAD :- PLUMBING WORK Providing & fixing UPVC soil, waste, vent pipework comprising UPVC pipe conforming to IS :4985-1983 and of required class as specified below and fittings (moulded as well as fabricated) like elbows, bends, reducers, threaded tail pieces, caps and and other specials. jointing with cement solvent, chasing, cutting and making good the walls, complete in all respects including testing of complete installation, all complete as per direction of SBSC/ Consultant. 100 mm dia**	**60.00**	**Running Metre**	

SD/-