



DRAFT TENDER PAPERS

**Name of Work :- Const. Of Multi Purpose Center Hall at Village Devadthal
Ta.Bavla Dist. Ahmedabad Package No. AHD/ADIMJUTH/05 (2026-2027)**

D.T.P. Cost. Rs. 2936237.92

Sr. No.	Name of Work	No.
1	Const. Of Multi Purpose Center Hall at Village Devadthal Ta.Bavla Dist. Ahmedabad Package No. AHD/ADIMJUTH/05 (2026-2027)	1

**GOVERNMENT OF GUJARAT
ROADS & BUILDING DEPARTMENT
SACHIVALAY, GANDHINAGAR**

ANNEXURE – II Notice Inviting On-Line Tender

Details about Tender :-Tender Notice No. 03 2026-2027

(Including as per Corrigendum)

Department Name	:-	(R&B) Dept. Gandhinagar
Circle	:-	Superintending Engineer Ahmedabad Panchayat (R & B) Circle L.D. Engineering Collage Compound, Navrangpura Ahmedabad
Division	:-	Executive Engineer, R & B Panchayat Division Laldarwaja, Bhadra Ahmedabad-380001
IFB No.	:-	Tender Notice No. 03 of 2026-2027
Name of Project	:-	Building
Name of Work	:-	Const. Of Multi Purpose Center Hall at Village Devadthal Ta.Bavla Dist. Ahmedabad Package No. AHD/ADIMJUTH/05 (2026-2027)
Estimated Contract Value (INR)	:-	Rs. 2936237.92
Period of Completion (in Months)	:-	9 (Nine) Months
Bidding Type	:-	Single bid system
Bid Call (Nos)	:-	1
Tender Currency Type	:-	Single
Tender Currency Settings	:-	Indian Rupee (INR)
Joint Venture	:-	Not Applicable
Rebate	:-	Applicable

Amount Details

Bid Document Fee	:-	Rs. 1500/-
Bid Document Fee Payable To	:-	Executive Engineer, R & B Panchayat Division Ahmedabad
Bid Security / EMD (INR)	:-	Rs. 29400/-
Bid Security / EMD in favour of	:-	Executive Engineer, R & B Panchayat Division Ahmedabad

Tender Dates

Bid Document Downloading Start Date	:-	29/5/2026 hrs 12.00
Bid Document Downloading End Date	:-	30/6/2026 hrs 18.00
Price Bid Opening Date	:-	01/07/2026 hrs 18.00
Bid Validity Period	:-	120days from the last date of online Submission of Tender
Submission of certain documents etc. in person in the office of the E.E. (R&B) Division, Ahmedabad		Submission of EMD. Tender fee and other Documents during office hours: Up to date 01/7/2026 to 10/07/2025 in the office of the Executive Engineer, (R&B) Panchayat Division, Laldarwaja Ahmedabad
Remarks	:-	Demand Draft for EMD & Tender fee shall be submitted in Electronic Format Only thorough Online(By Scanning) While Uploading the bid. This submission shall mean that EMD & tender fee are received Accordingly offer of those shall be opened whose EMD & tender fee is received electronically.

		<p>However for the purpose of realization of D.D. bidder shall send the D.D in original through RPAD so as to reach to Executive Engineer, R & B Panchayat Division, Jilla Panchayat Bhavan, Laldarwaja , Ahmedabad-380001 Within 7 days from the last date of uploading. Penaltative action for not submitting D.D. in original to E.E. by bidder shall be initiated. D.D. for Exemption Certificate is not necessary. However Exemption Certificate shall have to be submitted electronically through online.</p> <p>All the documents in supporting of bid and prequalification documents shall be submitted in electronic format only through online (by scanning) & hard copy will not be accepted and considered.</p>
Price Bid Opening Date	:-	<p>Dt 08/06/2025 12.00 Hrs.</p> <p>Office of the Executive Engineer, R & B Panchayat Division Ahmedabad</p>

Other Details

Officer Inviting Bids	:-	Executive Engineer, R & B Panchayat Division Ahmedabad
Bid Opening Authority	:-	Executive Engineer, R & B Panchayat Division Ahmedabad
Address	:-	Office of the Executive Engineer, R & B Panchayat Division Ahmedabad Ph. No. (079-25511608)

General Terms and Conditions

- (1) Bidders can download the tender document free of cost from the website.
- (2) Bidders have to submit Technical bid as well as Price bid in Electronic for only on nprocure website till the Last Date & time for submission.
- (3) Offers in physical form will not be accepted in any case.
- (4) Free vendor training camp will be organized every Saturday between 4.00 to 5.00 P.M. at (n)code solutions-A Division of GNFC Ltd., Bidders are requested to take benefit of the same.

Bidders who wish to participate in online tenders will have to procure / should have a legally valid Digital Certificate as per Information Technology Act-2000 using which they can sign their electronic bids. Bidders can procure the same from any of license certifying Authority of India or can contract (n)code solutions-A division GNFC Ltd, who are licensed Certifying Authority by Govt. of India.

All bids should be digitally signed, for details regarding digital signature certificate related training involved the below mentioned address should be contacted:

(n) Code Solutions

A division of GNFC

301, GNFC Infotower, Bodakdev,

Ahmedabad – 380 054 (India)

Tel: +91 26857316 / 17 / 18

Fax: +91 79 26857321

E-mail: nprocure@gnvfc.net

Web-site: www.rnb.nprocure.com

Toll Free: 1800-233-1010(Ext. 321)

**Name of Work :- Const. Of Multi Purpose Center Hall at Village Devadthal
Ta.Bavla Dist. Ahmedabad Package No. AHD/ADIMJUTH/05 (2026-2027)**

SCHEDULE – B

Memorandum Showing items of Works to be Carried out

Sr. No.	Item of Work	Quantities estimated but may be more or less	Unit	Tender Rates In Figures Rs.P.S.	Total Amount According to Estimated Quantities
1	3	2	6	4	7
1	Item No. 1 Excavation for foundation upto 1.5 m. depth incl. sorting out stacking of seful materials and disposing off the excavated stuff upto 50mt lead.(A) Loose or soft soil	119.520	Cmt	203.83	24361.76
2	Item No. 2 Filling in plinth with sand under floors incl. watering ramming consolidating and dressing etc.comp.	149.680	Cmt	460.19	68881.24
3	Item No. 3 Providing and laying Cement concrete 1:4:8 (1 cement:4 coarse sand:8 Graded Stone Agg. 40 mm nominal Size) & Quaring etc. complete. Excluding cost of form work in (A)Foundation & Plinth	57.450	Cmt	2849.16	163684.24
5	Item No- 4 Brick work using common burnt clay building bricks having crushing strength not less than 35 kg/ sq. C.M. In foundation and plinth in cement mortar 1:6 (1cement : 6 fine sand)	43.890	Cmt	4021.02	176482.57
6	Item no- 5 Providing and laying cement concrete 1:3:6 (1 cement : 3 coarse sand : 6 crushed stone aggregates 20 mm nominal size) and curing complete including cost of form work in (A) Wall caps/copings.	4.130	Cmt	4046.21	16710.85
7	Item No- 6 Brick work using common burnt clay building bricks having crushing strength not less than 35 kg/ sq. C.M. In foundation and plinth in cement mortar 1:6 (1cement : 6 fine sand) in super structure	65.740	Cmt	4061.21	266983.95
8	Item no- 7 Providing and laying ordinary Cement concrete 1:1.5:3 (1 Cement 1.5 coarse sand 3 graded stone agg. 20 mm nominal size) for RCC lintel including finishing smooth with curing etc. complete including the cost of formwork but excluding the cost of reinforcement.	3.180	Cmt	9146.35	29085.39
9	Item no. 8 Providing and laying ordinary cement concrete 1:1.5:3 (1 Cement : 1.5 coarse sand : 3 graded stone aggregates 20mm nominal size) and curing complete Including cost of form work in (i) Beam Having cross-sectional area 0.08 to 0.12 sq. m.	14.080	Cmt	8091.15	113923.39

10	Item No- 9 Provdg & laying cement concrete 1:1.5:3 (1cement : 1.5 coarse sand 3 graded stone aggregate 20 mm nominal size) for reinforced concrete chhajjas not exceeding 10 cm. Thickness upto floor two level including finishing the exposed surfaces with cement mortar 1:3 (1 cement : 3 fine sand) to give a smooth and even surface centering and form work and curing complete excluding cost of reinforcement.	1.890	Cmt	6977.49	13187.46
11	Item No- 10 Provdg & laying Ordinary cement concrete 1:1.5:3 (1cement : 1.5 coarse sand 3 graded stone aggregate 20 mm nominal size) and finishing the smooth with curing etc. complete including the cost of formwok but excluding the cost of reinforcement for RCC work in (II) slabs having more than 10 cm and upto 13 cm thickness.	32.210	Cmt	7313.70	235574.28
12	Item No- 11 Construction brick masonry chamber for underground C.I. Inspection chamber and beds with bricks having crushing strength not less 35 Kg.Sq/Cm.2 in C.M.1:5 C.I. cover with frame (Light duty) 455 x 610 mm mm internal diamensions Total Wt. of cover with frame to be not less than 38 Kg. (Wt.of cover 23 Kg. and wt. fof rame 15 Kg.s RCC top slab with 1:2:4 mix foundation concrete 1:5:10 inside plaster plaster 15 mm th. with C.M.1:3 finished smooth with a floating coat of neat cement on walls and bed concrete (i) Inside Dimension 455mm X 610mm and 450mm deep for single pipe line (upto 10 tone)	2.000	Cmt	2932.93	5865.86
13	Item No- 12 Provdg & laying Ordinary cement concrete 1:1.5:3 (1cement : 1.5 coarse sand 3 graded stone aggregate 20 mm nominal size) and finishing the smooth with curing etc. complete including the cost of formwok but excluding the cost of reinforcement for RCC work in (II) COLUMNS (i) Having cross sectional area 0.05 to 0.08 Sq.M.	14.020	Cmt	11024.53	154563.91
14	Item no- 13 Provi. Providing thermo Mechanically treated bars (TMT bars) confirming to IS 1786 / FC 415 for R.C.C. works including, bending, bindign and placing in position complete upto floor 2 level.	6677.830	Kg.	76.21	508917.42
15	Item no- 14 Half brick masonry in common burnt clay building bricks having crushingstrength not less than 35kg/Sq.Cm in cement mortar 1:4 (1 cement ::4 coarse sand) in foundation and plinth (B) Conventional	16.000	Smt	599.84	9597.44

16	Item No. 15 Providing 15 mm thick cement plaster in single coat on brick/ concrete walls for interior plastering up to floor two level finished even & smooth in (II) cement mortar (1 cement : 3 sand) Including finishing with a floating coat of neat cement slurry .	257.830	Smt	224.79	57957.61
17	Item no. 16 Provdg. 10 mm th. Cement plaster in single coat on brick/concrete walls for interior plastering up to floor two level & finished even & smooth in (1) cement mortar 1:3 (1 cement : 3 sand)	246.440	Smt	128.86	31756.26
18	Item No. 17 20 mm thick sand faced cement plaster on walls upto height 10 meters above ground level consisting of 12 mm thick backing coat of C.M.1:3 (1 Cement : 3 sand) and 8 mm thick finishing coat of C.M.1:1 (1 Cement 1 Sand) Watering curing etc. comple.	313.320	Smt	300.66	94202.79
19	Item No. 18 Item no. 12 Providing and laying 24" x 24" Vitrified 8 mm thick Tile flooring over 20 mm (Avg) base of C.M. 1:6 on new surface or fixing on Extg. Flooring by adhesive material incl. Dismantling of extg. Flooring & jointed with colour cement slurry finished with flush pointing & cleaning the surface etc. complete for light shade.	235.640	Smt	1189.88	280383.32
20	Item No- 19 Providing and laying Vitrified tiles 8 to 10 mm thick in skirting risers of steps and dado on 10 mm thick cement plaster 1:3 (1 Cement 3 coarse sand) and jointed with white cement slurry	8.890	Smt	1141.45	10147.49
22	Item No. 20 : Providing & laying broken china mosaic flooring for terrace using 12 mm to 20 mm broken pieces of glazed tiles to be laid over cement mortar 1:3 in plain or slope and to be tempered to bring mortar cr�me out up to surface using white cement including rounding off junction and extending them up to 15 cm along the well cleaning with water and oxalic acid as directed.	228.360	Smt	747.29	170651.14
23	Item No- 21 Provdg. & laying white glazed tiles 6 mm th. In flooring, treads of steps & landings laid on a bed of 12 mm th. Cement mortar 1:3 (1 cement : 3 coarse sand finished with flush pointing in white cement.	33.400	Smt	917.25	30636.15
24	Item No- 22 Provdg. & laying white glazed tiles 6 mm th. In flooring, treads of steps & landings laid on a bed of 10 mm th. Cement mortar 1:3 (1 cement : 3 coarse sand finished with flush pointing in white cement.	45.620	Smt	1054.67	48114.05

26	Item No- 23 Providingg and fixing extruded aluminium windows having extruded aluminium colour anodized section frame main outer size 95 mm x 24 mm x 1.17 mm (of jindal section No. 2459 @ Wt. 0.738 Kg/ mt) horizontal four trak member size 92 mm x 31.75 mm x 1.30 mm (of jindal section No. 8688@ Wt. 1.07Kg/ mt) vertical member of size 92 mm x 31.75 mm x 1.50 mm (of jindal section No. 8933 @ Wt.1.06 Kg/ mt) with sliding shutters of horizontal member size 40 mm x 18 mm x 1.29 mm (of Jindal Section no. 8947 @ wt. of 0.456 Kg/ mt) Vertical member of size 40 mm x 18 mm x 1.29 mm (of Jindal section No. 8949 @ Wt. of 0.456 Kg/ mt) with 5 mm thick transparent bronze colour tinted float glass with powder coated aluminium silicon sealant glass fixing to frame as per details etc. complete.	19.260	Smt	1583.95	30506.88
27	Item No- 24 Providing and fixing single shutter flush door with standard alluminium colour anodized hollow section frame approved shade & colours & rectengluar tube shape main frame of jindal section No. 4656 of the size 101.60 mm x 44.75 mm x 1.63 mm having weight 1.089 kg per metre filled with country wood 35 mm thick flush door laminated both side with 0.8 mm thick lamination of the make sunmica / Decolam formica or equivalent lamination, using U type alluminium beading around door, three nos of stainless steel hinges for shutter of required size fixtures fastenings & all other hardware fixtures and fastenings like handles, stopper, aldrap tadi, shall be of stainless steel of approved quality & size directed by Engineer in charge etc. complete.	17.640	Smt	4027.88	71051.80
28	Item No. 25 Providing & fixing urinal of approved quality including connecting the urinal with waste pipe trap etc.	6.000	No.	1036.27	6217.62
29	Item No. 26 Applying two coats of Birla or Asian acrylic lapy (putty) & two coats of primer of approved brand and manufacture on new wall surface to give an even shade including thoroughly brushing the surface free from mortar dropping and otheer foreeign matter and sand papered smooth.	449.770	Smt	40.59	18256.16

30	Item No. 27 Wall painting (Three coats) with plastic emulsion paint of approved brand and manufacture on undercoated wall surfaces to give an even shade incl. thoroughly brushing the surface free from mortar droppings and other foreign matter and sand papered smooth.	449.770	Smt	79.22	35630.78
31	Item No. 28 Finishing wall with weather proof exterior emulsion paint on wall surface (Two coats) to give an required shape even shade after thoroughly brushing the surface to remove all dirt and remains of loose powdered materials etc. complete.	313.320	Smt	114.53	35884.54
32	Item No. 29 Provdg. & fixing water closet squatting pna (Indian type W.C. Pan) size 580 mm (Earthwork, bed concrete, foot rests and trap to be measured and paid for separately). (A) Vitreous China :(I) In white colour	4.000	No.	935.36	3741.44
33	Item No. 30 Provdg. & fixing 100 mm size P or S trap for water closet squatting pan incl. Jointing the trap with the pan & soil pipe in cement mortar 1:1 (1 cement : 1 fine sand) (A) Vitreous China.	4.000	No.	314.97	1259.88
34	Item No :- 31 Procdg. & fixing wash basin with single hole for pillar tap with C.I. or M.S. brackets painted white incl. Cutting holes and making good the same but excluding fittings. (A) Vitreous China : (II) Flat back washbasin 550 mm x 400 mm size (I) In white colour including C.P. Brass west , West pipe, Stop tap	6.000	Rmt	1836.79	11020.74
35	Item No. 32 Providing laying and jointing in true line and level UPVC pipe (SCH-40) of following dia. Including fittings of standard make as approved by Engineer in charge pipe shall be fixed on the wall with the help of clamp at every 2000 mm center to center or shall be concealed as directed including necessary fittings etc. including testing of pipe and joints and fixing the same with adhesive solvent, including cost of all materials (A) 15 mm	100.000	Mtr.	72.65	7265.00
36	Item No. 33 Providing laying and jointing in true line and level UPVC pipe (SCH-40) of following dia. Including fittings of standard make as approved by Engineer in charge pipe shall be fixed on the wall with the help of clamp at every 2000 mm center to center or shall be concealed as directed including necessary fittings etc. including testing of pipe and joints and fixing the same with adhesive solvent, including cost of all materials (C) 25 mm	110.000	Mtr.	91.84	10102.40

37	Item No - 34 Providing & fixing screw down bib taps of following size(A) Brass screw down bib tap polished bright (ii)20 mm dia	9.000	No.	214.81	1933.29
38	Item No- 35 Providing & fixing PVC SWR Nahni trap Is 14735 for drain 100 mm diameter with jali of the following nominal diameter of self cleansing design with CI screed down or hinged grating including the cost of cutting and making good the walls.	4.000	No.	571.08	2284.32
39	Item No. 36 Provdlg. & fixing S.W. Gully trap with C.I. grating brick masonry chamber & water tight C.I. cover with frame of 300 mm x 300 mm size (inside) with standard weight (A) 100 mm x 100 mm size P-type.	4.000	No.	1292.19	5168.76
40	Item no. 37 Provdlg. & fixing to wall ceiling and floor 10.0 kg.F/cm ² (UPVC) working pressure polythelene pipes of the following outside dia, low density, complete with special flange compression type fittings, wall clips etc. incl. Making good the wall ceiling and floor.(A) 110 mm	55.000	Rmt	277.43	15258.65
41	Item no. 38 Provdlg. & fixing to wall ceiling and floor 6.0 kg.F/cm ² (UPVC) working pressure polythelene pipes of the following outside dia, low density, complete with special flange compression type fittings, wall clips etc. incl. Making good the wall ceiling and floor.(A) 110 mm	55.000	Rmt	336.24	18493.20
42	Item No. 39 Construction underground sock well 1.50 m diameter & 3 mt in depth with Honey comb Brick masonry having crushing stg. Not less than 35 Kg/ sqmt in C.M. 1:5, 0.35 m thick at bottom 1.50 mt & 0.23 mt thick 1.00 m of honey comb masonry and 0.23 m thick 0.50 m Ht at top level RCC 1:2:4 slab 0.10 m thick of top including inspection gap 0.60 m x 0.45 m and cover Ready made F.R.c. cover whole work as per instruction of Engineer in charge etc. complete	1.000	No.	22595.97	22595.97
43	Item No- 40 Providing cement vata (10x10 cm.size quarter round in C.M.1:1 including neat cement finishing watering etc, complete.	60.480	Rmt	23.68	1432.17
44	Item No. 41 Providing & fixing double coated Syntex or equivalent PVC (ISI) water tank or required capacity each with all necessary fittings and connection etc. complete on terrace.	2000.000	Ltr.	3.95	7900.00

45	Item No. 42 provdg & fixing M.S. grills of required pattern to wooden frames of window etc. with M.S. flats at required spacings and frame around, square or round bars with round headed bolts and nuts or by screws (A) plain grill	481.500	Kg.	101.17	48713.36
47	Item No. 43 Provdg. & fixing gun metal check or nonreturn full way wheel valve. (C) 25 mm dia.	6.000	No.	420.63	2523.78
49	Item no- 44 Point wiring for Light / Bell with 2-1.5 sq.mm & earthwire of 1.5 sq.mm (Green) both are of ISI marked 1.1 KV grade FRLS PVC insulated multistrand copper wires, in following type of pipe to be erected concealed in/ on surface on wall/ceiling complete with 6A Modular type switch / bell push & accessories and earth continuity of following type, erected on PVC / Metallic box, single mounting base frame covered with textured/metallic front plate modules erected on / in wall / ceiling as per pipe erected, with necessary Lamp holder/ceiling rose / H.D.Connector as directed. CAT- III	20.000	Point	467.63	9352.60
50	Item No- 45 Point wiring for looped PLUG with tissino type single pole ISI marked 6 A. switch and 6 A socket erected with necessary connections erected on polished wooden block / Metal / PVC box covered with 3 mm. thick laminated sheet for open / concealed wiring.	20.000	Point	167.66	3353.20
51	Item no. 46 Pipe type earthing having 150 cms long and 2.5 cms dia galvanised iron pipe with coupling and buch burried inspecially prepared earth pit complete with necessary 8 SWG earth wire.	1.000	Each	434.30	434.30
52	Item No- 47 For using salt and charcoat / coke as required for pipe type earthing.	1.000	Each	202.00	202.00
53	Item no- 48 Approved make ceiling fan with condenser A.C. 230 V50 Cys.1200 mm. sweep complete canopy and 30 Cms. down rod resistance type regulator erected on existing hook or clamp with 24/0.2 flat 3 core flexiblewire with earthing fan approved by Engineer in charge	12.000	Each	1717.00	20604.00
54	Item No- 49 Approved make C.F.L lamp retrofit 9/11 watt erected if required cat-II	12.000	Each	65.65	787.80
55	Item no- 50 Plastic encloser fitted with din rail suitable for incorporating one / two nos. MCB	6.000	Each	60.60	363.60
56	Item No.- 51 UGVC Ltd. meter connection charges	1.000	Each	5670.14	5670.14
57	Item No.- 52 Poswer connection charges from UGVCL/ GEB incl. in all Estimate charge & meter connection given by UGVCL/GEB	1.000	Each	5050.00	5050.00

58	Item No.- 53 Providing & fixing Approved make Sumercible Horizontal Pump 1.0 HP with Necessary Switches wiring board etc. completed.	1.000	No.	15331.80	15331.80
59	Item No.- 54 Providing & fixing Florcat tube light fuze , chawk, Statar of Philips / Bajaj as approved by Engineer in charge.	14.000	No.	441.37	6179.18
	-			Total	2936237.92

Rs. Twenty Nine Lacs Thirty Six Thousand Two Hundred Thirty Seven & Paisa Ninety Two Only

I/We am / are willing to carry out the work at % above/ below percent (Should be written in figures and words) of the estimated rate mentioned above. Amount of my/ our tender works out as under.

*Estimated Amount

*Estimated Amount

Put to tender Rs. Put to tender Rs.

Add.....% above Rs. Deduct% below Rs.

Total Rs. Net. Rs.

In Words In Words

(* Please strike out whichever is not applicable.)

Notes 1 - All work shall be carried out as per Public Works Department Handbook and other specifications of Division or as directed.

નોંધ -૧ :- બધું જ કામ બાંધકામ વિભાગની પુસ્તિકા અને ડિવિઝનની બીજી ખાસ વિગત મુજબ અથવા સૂચના પ્રમાણે કરી આપવાનું રહેશે.

Notes 2 - All the columns in Schedule should be filled in ink and the total of the entries in the last column should be struck by the contractor under his signature.

નોંધ -૨ :- અનુસૂચિમાં બધા ખાનાની વિગતો સહીથી ભરવી અને છેલ્લા ખાનાની નોંધોનો સરવાળો કરી કોન્ટ્રાક્ટરે પોતાની સહી કરવી

Deputy Executive Engineer
R & B Panchayat Sub Division
Dholka

Executive Engineer
R & B Panchayat Divisions
Ahmedabad

Specification

**Name of Work :- Const. Of Multi Purpose Center Hall at Village Devadthal
Ta.Bavla Dist. Ahmedabad Package No. AHD/ADIMJUTH/05 (2026-2027)**

TENDER OF ITEM SPECIFICATION

Sr. No.	Name of road	Item No.	Page No.
1	Item No. 1 Excavation for foundation upto 1.5 m. depth incl. sorting out stacking of seful materials and disposing off the excavated stuff upto 50mt lead.(A) Loose or soft soil		
2	Item No. 2 Filling in plinth with sand under floors incl. watering ramming consolidating and dressing etc.comp.		
3	Item No. 3 Providing and laying Cement concrete 1:4:8 (1 cement:4 coarse sand:8 Graded Stone Agg. 40 mm nominal Size) & Quaring etc. complete. Excluding cost of form work in (A)Foundation & Plinth		
4	Item No- 4 Brick work using common burnt clay building bricks having crushing strength not less than 35 kg/ sq. C.M. In foundation and plinth in cement mortar 1:6 (1cement : 6 fine sand)		
5	Item no- 5 Providing and laying cement concrete 1:3:6 (1 cement : 3 coarse sand : 6 crushed stone aggregates 20 mm nominal size) and curing complete including cost of form work in (A) Wall caps/copings.		
6	Item No- 6 Brick work using common burnt clay building bricks having crushing strength not less than 35 kg/ sq. C.M. In foundation and plinth in cement mortar 1:6 (1cement : 6 fine sand) in super structure		
7	Item no- 7 Providing and laying ordinary Cement concrete 1:1.5:3 (1 Cement 1.5 coarse sand 3 graded stone agg. 20 mm nominal size) for RCC lintel including finishing smooth with curing etc. complete includiong the cost of formwork but excluding the cost of reinforcement.		
8	Item no. 8 Providing and laying ordinary cement concreate 1:1.5:3 (1 Cement : 1.5 coarse sand : 3 graded stone aggregates 20mm nominal size) and curing complete Including cost of form work in (i) Beam Having cross-sectional area 0.08 to 0.12 sq. m.		
9	Item No- 9 Provdg & laying cement concrete 1:1.5:3 (1cement : 1.5 coarse sand 3 graded stone aggregate 20 mm nominal size) for reinforced concrete chhajjas not exceeding 10 cm. Thickness upto floor two level including finishing the exposed surfaces with cement mortar 1:3 (1 cement : 3 fine sand) to give a smooth and even surface centering and form work and curing complete excluding cost of reinforcement.		
10	Item No- 10 Provdg & laying Ordinary cement concrete 1:1.5:3 (1cement : 1.5 coarse sand 3 graded stone aggregate 20 mm nominal size) and finishing the smooth with curing etc. complete including the cost of formwok but excluding the cost of reinforcement for RCC work in (II) slabs having more than 10 cm and upto 13 cm thickness.		
11	Item No- 11 Construction brick masonry chamber for underground C.I. Inspection chamber and beds with bricks having crushing strength not less 35 Kg.Sq/Cm.2 in C.M.1:5 C.I. cover wth frame (Light duty) 455 x 610 mm mm internal dimensions Total Wt. of cover with frame to be not less than 38 Kg. (Wt.of cover 23 Kg. and wt. fof rame 15 Kg.s RCC top slab with 1:2:4 mix		

	foundation concrete 1:5:10 inside plaster plaster 15 mm th. with C.M.1:3 finished smooth with a floating coat of neat cement on walls and bed concrete (i) Inside Dimension 455mm X 610mm and 450mm deep for single pipe line (upto 10 tone)		
12	Item No- 12 Provdg & laying Ordinary cement concrete 1:1.5:3 (1cement : 1.5 coarse sand 3 graded stone aggregate 20 mm nominal size) and finishing the smooth with curing etc. complete including the cost of formwok but excluding the cost of reinforcement for RCC work in (II) COLUMNS (i) Having cross sectional area 0.05 to 0.08 Sq.M.		
13	Item no- 13 Provi. Providing thermo Mechanically treated bars (TMT bars) confirming to IS 1786 / FC 415 for R.C.C. works including, bending, binding and placing in position complete upto floor 2 level.		
14	Item no- 14 Half brick masonry in common burnt clay building bricks having crushing strength not less than 35kg/Sq.Cm in cement mortar 1:4 (1 cement : 4 coarse sand) in foundation and plinth (B) Conventional		
15	Item No. 15 Providing 15 mm thick cement plaster in single coat on brick/concrete walls for interior plastering up to floor two level finished even & smooth in (II) cement mortar (1 cement : 3 sand) Including finishing with a floating coat of neat cement slurry .		
16	Item no. 16 Provdg. 10 mm th. Cement plaster in single coat on brick/concrete walls for interior plastering up to floor two level & finished even & smooth in (1) cement mortar 1:3 (1 cement : 3 sand)		
17	Item No. 17 20 mm thick sand faced cement plaster on walls upto height 10 meters above ground level consisting of 12 mm thick backing coat of C.M.1:3 (1 Cement : 3 sand) and 8 mm thick finishing coat of C.M.1:1 (1 Cement 1 Sand) Watering curing etc. comple.		
18	Item No. 18 Item no. 12 Providing and laying 24" x 24" Vitrified 8 mm thick Tile flooring over 20 mm (Avg) base of C.M. 1:6 on new surface or fixing on Extg. Flooring by adhesive material incl. Dismantling of extg. Flooring & jointed with colour cement slurry finished with flush pointing & cleaning the surface etc. complete for light shade.		
19	Item No- 19 Providing and laying Vitrified tiles 8 to 10 mm thick in skirting risers of steps and dedo on 10 mm thick cement plaster 1:3 (1 Cement 3 coarse sand) and jointed with white cement slurry		
20	Item No. 20 : Providing & laying broken china mosaic flooring for terrace using 12 mm to 20 mm broken pieces of glazed tiles to be laid over cement mortar 1:3 in plain or slope and to be tempered to bring mortar crême out up to surface using white cement including rounding off junction and extending them up to 15 cm along the well cleaning with water and oxalic acid as directed.		
21	Item No- 21 Provdg. & laying white glazed tiles 6 mm th. In flooring, treads of steps & landings laid on a bed of 12 mm th. Cement mortar 1:3 (1cement : 3 coarsesand finished with flush pointing in white cement.		
22	Item No- 22 Provdg. & laying white glazed tiles 6 mm th. In flooring, treads of steps & landings laid on a bed of 10 mm th. Cement mortar 1:3 (1cement : 3 coarsesand finished with flush pointing in white cement.		
23	Item No- 23 Providing and fixing single shutter flush door with standard aluminium colour anodized hollow section frame approved shade & colours & rectangular tube shape main frame of jindal section No. 4656 of the size 101.60 mm x 44.75 mm x 1.63 mm having weight 1.089 kg per metre filled		

	with country wood 35 mm thick flush door laminated both side with 0.8 mm thick lamination of the make sunmica / Decolam formica or equivalent lamination, using U type alluminium beading around door, three nos of stainless steel hinges for shutter of required size fixtures fastenings & all other hardware fixtures and fastenings like handles, stopper, aldrap tadi, shall be of stainless steel of approved quality & size directed by Engineer in charge etc. complete.		
24	Item No- 24 Providing and fixing single shutter flush door with standard alluminium colour anodized hollow section frame approved shade & colours & rectengluar tube shape main frame of jindal section No. 4656 of the size 101.60 mm x 44.75 mm x 1.63 mm having weight 1.089 kg per metre filled with country wood 35 mm thick flush door laminated both side with 0.8 mm thick lamination of the make sunmica / Decolam formica or equivalent lamination, using U type alluminium beading around door, three nos of stainless steel hinges for shutter of required size fixtures fastenings & all other hardware fixtures and fastenings like handles, stopper, aldrap tadi, shall be of stainless steel of approved quality & size directed by Engineer in charge etc. complete.		
25	Item No. 25 Providing & fixing urinal of approved quality including connecting the urinal with waste pipe trap etc.		
26	Item No. 26 Applying two coats of Birla or Asian acrylic lapy (putty) & two coats of primer of approved brand and manufacture on new wall surface to give an even shade including thoroughly brushing the surface free from mortar dropping and otheer foreeign matter and sand papered smooth.		
27	Item No. 27 Wall painting (Three coats) with plastic emulsion paint of approved brand and manufacture on undercoraed wall surfaces to give an even shade incl. thoroughly brushing the surface free from mortar droplings and other foreign matter and sand papered smooth.		
28	Item No. 28 Finishing wall with weather proof exterior emulsion paint on wall surface (Two coats) to give an required shape even shade after thoroughly brushing the surface to reemove all dirt and remains of loose powdered materials etc. complete.		
29	Item No. 29 Provdg. & fixing water closet squatting pna (Indian type W.C. Pan) size 580 mm (Earthwork, bed concrete, foot rests and trap to be measured and paid for separately). (A) Vitreous China :(I) In white colour		
30	Item No. 30 Provdg. & fixing 100 mm size P or S trap for water closet squatting pan incl. Jointing the trap with the pan & soil pipe in cement mortar 1:1 (1 cement : 1 fine sand) (A) Vitreous China.		
31	Item No :- 31 Procdg. & fixing wash basin with single hole for pillar tap with C.I. or M.S. brackets painted white incl. Cutting holes and making good the same but excluding fittings. (A) Vitreous China : (II) Flat back washbasin 550 mm x 400 mm size (I) In white colour including C.P. Brass west , West pipe, Stop tap		
32	Item No. 32 Providing laying and jointing in true line and level UPVC pipe (SCH-40) of following dia. Including fittings of standard make as approved by Engineer in charge pipe shall be fixed on the wall with the help of clamp at every 2000 mm center to center or shall be concealed as directed including necessary fittings etc. cincluding testing of pipe and joints and fixing the same with adhesive solvent, including cost of all materials (A) 15 mm		

33	Item No. 33 Providing laying and jointing in true line and level UPVC pipe (SCH-40) of following dia. Including fittings of standard make as approved by Engineer in charge pipe shall be fixed on the wall with the help of clamp at every 2000 mm center to center or shall be concealed as directed including necessary fittings etc. including testing of pipe and joints and fixing the same with adhesive solvent, including cost of all materials (C) 25 mm		
34	Item No - 34 Providing & fixing screw down bib taps of following size(A) Brass screw down bib tap polished bright (ii)20 mm dia		
35	Item No- 35 Providing & fixing PVC SWR Nahni trap Is 14735 for drain 100 mm diameter with jali of the following nominal diameter of self cleansing design with CI screed down or hinged grating including the cost of cutting and making good the walls.		
36	Item No. 36 Provdg. & fixing S.W. Gully trap with C.I. grating brick masonry chamber & water tight C.I. cover with frame of 300 mm x 300 mm size (inside) with standard weight (A) 100 mm x 100 mm size P-type.		
37	Item no. 37 Provdg. & fixing to wall ceiling and floor 10.0 kg.F/cm ² (UPVC) working pressure polythelene pipes of the following outside dia, low density, complete with special flange compression type fittings, wall clips etc. incl. Making good the wall ceiling and floor.(A) 110 mm		
38	Item no. 38 Provdg. & fixing to wall ceiling and floor 6.0 kg.F/cm ² (UPVC) working pressure polythelene pipes of the following outside dia, low density, complete with special flange compression type fittings, wall clips etc. incl. Making good the wall ceiling and floor.(A) 110 mm		
39	Item No. 39 Construction underground sock well 1.50 m diameter & 3 mt in depth with Honey comb Brick masonry having crushing stg. Not less than 35 Kg/ sqmt in C.M. 1:5, 0.35 m thick at bottom 1.50 mt & 0.23 mt thick 1.00 m of honey comb masonry and 0.23 m thick 0.50 m Ht at top level RCC 1:2:4 slab 0.10 m thick of top including inspection gap 0.60 m x 0.45 m and cover Ready made F.R.c. cover whole work as per instruction of Engineer in charge etc. complete		
40	Item No- 40 Providing cement vata (10x10 cm.size quarter round in C.M.1:1 including neat cement finishing watering etc, complete.		
41	Item No. 41 Providing & fixing double coated Syntex or equivalent PVC (ISI) water tank or required capacity each with all necessary fittings and connection etc. complete on terrace.		
42	Item No. 42 provdg & fixing M.S. grills of required pattern to wooden frames of window etc. with M.S. flats at required spacings and frame around, square or round bars with round headed bolts and nuts or by screws (A) plain grill		
43	Item No. 43 Provdg. & fixing gun metal check or nonreturn full way wheel valve. (C) 25 mm dia.		
44	Item no- 44 Point wiring for Light / Bell with 2-1.5 sq.mm & earthwire of 1.5 sq.mm (Green) both are of ISI marked 1.1 KV grade FRLS PVC insulated multistrand copper wires, in following type of pipe to be erected concealed in/ on surface on wall/ceiling complete with 6A Modular type switch / bell push & accessories and earth continuity of following type, erected on PVC / Metallic box, single mounting base frame covered with textured/metallic front plate modules erected on / in wall / ceiling as per pipe erected, with necessary Lamp holder/ceiling rose / H.D.Connector as directed. CAT- III		

45	Item No- 45 Point wiring for looped PLUG with tissino type single pole ISI marked 6 A. switch and 6 A socket erected with necessary connections erected on polished wooden block / Metal / PVC box covered with 3 mm. thick laminated sheet for open / concealed wiring.		
46	Item no. 46 Pipe type earthing having 150 cms long and 2.5 cms dia galvanised iron pipe with coupling and buch burried inspecially prepared earth pit complete with necessary 8 SWG earth wire.		
47	Item No- 47 For using salt and charcoat / coke as required for pipe type earthing.		
48	Item no- 48 Approved make ceiling fan with condenser A.C. 230 V50 Cys.1200 mm. sweep complete canopy and 30 Cms. down rod resistance type regulator erected on existing hook or clamp with 24/0.2 flat 3 core flexiblewire with earthing fan approved by Engineer in charge		
49	Item No- 49 Approved make C.F.L lamp retrofit 9/11 watt erected if required cat-II		
50	Item no- 50 Plastic encloser fitted with din rail suitable for incorporating one / two nos. MCB		
51	Item No.- 51 UGVC Ltd. meter connection charges		
52	Item No.- 52 Poswer connection charges from UGVCL/ GEB incl. in all Estimate charge & meter connection given by UGVCL/GEB		
53	Item No.- 53 Providing &fixing Approved make Sumercible Horizontal Pump 1.0 HP with Necessary Switches wiring board etc. completed.		
54	Item No.- 54 Providing & fixing Florcat tube light fuze , chawk, Statar of Philips / Bajaj as approved by Engineer in charge.		

Deputy Executive Engineer
R & B Panchayat Sub Division
Dholka

Executive Engineer
R & B Panchayat Division
Ahmedabad

Item No. 1 Excavation for foundation upto 1.5 m. depth incl. sorting out stacking of useful materials and disposing off the excavated stuff upto 50mt lead.(A) Loose or soft soil

4.0.0 (a) Excavation for foundation upto 1.5 M depth including sorting out and stacking useful materials disposing of the excavated stuff upto 50 metre lead-in loose or soft soil.

1.0. General: 1.1. Any soil which generally yields to the application of pickaxes and shovels, phawaras, rakes or any such ordinary excavating implement or organic soil, gravel, silt, sand turfloam, clay, peat etc., fall under this category.

2.0 Clearing the site : 2.1 The site on which the structure is to be built shall be cleared and all obstructions, loose stone, materials and rubbish of all kind, bush, wood and trees shall be removed as directed: The materials so obtained shall be property of the Government and be conveyed and stacked as directed within 50 M. lead. The roots of the trees coming in the sides shall be cut and coated with a hot asphalt.

2.2 The rate of site clearance is deemed to be included in the rate of earth work for which no extra will be paid.

3.0 Setting out: After clearing the site, the center lines will be given by the Engineer-in-charge. The contractor shall assume full responsibility for alignment, elevation and dimension of each and all parts of the tractor shall assume full responsibility for alignment elevation and dimension of each and all parts of the work. Contractor shall supply labourers, materials, etc.required for setting out the reference marks and bench marks and shall maintain them as long as required and directed.

4.0 Excavation : The excavation in foundation shall be carried out in true line and level and shall have the width and depth as shown in the drawings or as directed. The contractor shall do the necessary shoring and shutting or providing necessary slopes to a safe angle, at his own cost. The payment for such precautionary measures shall be paid separately if not specified. The bottom of the excavated area shall be levelled both longitudinally and transversely as directed by removing and watering as required. No earth filling will be allowed for bringing it to level, if by mistake or any other reason excavation is made 22 deeper or wider than shown on the plan or directed. The extra depth or width shall be made up with concrete of same proportion as specified for the foundation concrete at the cost of the contractor. The excavation upto 1.5 m. depth shall be measured under this item.

5.0. Disposal of the excavated stuff : 5.1. The excavated stuff of the selected type shall be used in filling the trenches and plinth or levelling the ground in layers including ramming and watering etc.5.2. The balance of the excavated quantity shall be removed by the contractor from the site of work to a place as directed with lead upto 50 M. and all lift.

6.0. Mode of measurement and payment:

6.1. The measurement of excavation in trenches for foundation shall be made according to the sections of trenches shown on the drawing or as per sections given by the Engineer-in-charge. No payment shall be made for surplus excavation made in excess of above requirements or due to slopping and sloping back as found necessary on account of conditions of soil and requirements of safety.

6.2. The rate shall be for a unit of one cubic metre.

Item No. 2 Filling in plinth with sand under floors incl. watering ramming consolidating and dressing etc.comp.

4.24. Filling in plinth with sand under floors including watering, ramming consolidating and dressing etc. complete.1.0. Materials: 1.1. Sand shall conform to M. 6.

2.0. Workmanship : 2.1. The relevant specifications of item No. 4.12 shall be followed except that sand shall be filled inundo, floors, including watering, ramming, consolidating and dressing etc. complete.

3.0. Mode of measurement and payment:

3.1. The relevant specifications of item No. 4.12 shall be followed.

3.2. The rate includes cost of collecting carting sand with all lead and labour for filling the same in plinth under floors.

3.3. The rate shall be for a unit of one cubic metre

Item No. 3 Providing and laying Cement concrete 1:4:8 (1 cement:4 coarse sand:8 Graded Stone Agg. 40 mm nominal Size) & Quaring etc. complete. Excluding cost of form work in (A)Foundation & Plinth

1.0. Materials : Water shall conform to M-I. Cement shall conform to M-3. Sand shall conform to M-6. Grit shall conform to M-8. Graded stone aggregate 20 mm. nominal size shall conform to M-12.

2.0. General:

2.1. The concrete mix is not required to be designed by preliminary tests. The proportion of the concrete mix shall be 1 : 2 :

4 (1 cement: 4 coarse sand ; 8 graded stone aggregate 40 mm. nominal size) by volume.

Concrete work shall have exposed concrete surface or as specified in the item.

2.2. The designation ordinary M-100, M-150, M-200, M-250 specified as per. I.S.

Corresponding approximately to 1 : 3 : 6,

1 : 2 : 4, 1 : 1 1/2 : 3 and 1:1:2 nominal mix of ordinary concrete by volume respectively.

2.3. The ingredients required for ordinary concrete containing one beg of cement of 50 Kg. by weight (0.0342 Cu. M.) for different proportions of mix shall be as under:

Grade of

concrete

Total quantity of dry aggregate by volume

per 50 Kgs. of cement to be taken as the

sum of individual volume of fine and

coarse aggregates, maximum

Proportion of fine aggregate to

coarse aggregate

Quantity of

water per 50 Kgs.

of cement

maximum.

1 2 3 4

M-100 (1 : 3: 6) 300 Liters Generally 1 : 2 for fine aggregate 34 Liters

M-150 (1 : 2 : 4) 2.20 “ to coarse aggregate by volume 32 “

M-200 (1 : 1 1/2 : 3) 160 “ but subject to and upper limit 30 “

M-250 (1:1:2) 100 “ of 1 : 1 1/2 and lower limit 1 : 3 27 “

2.4. The water cewment ratios shall not more than those specified in the above table. The cement content of the mix specified

in the Table shall be increased if the quantity of water in a mix has to be increased to overcome the difficulties of placement

and compaction so that the water-cement-ratio specified in the Table is not exceeded.

2.5. Workability of the concrete shall be controlled by maintaining a water-cement-ratio that is bound to give a concrete mix which is just sufficiently wet to be placed and compacted without difficulty with the means available.

2.6. The maximum size of coarse aggregate shall be as large as possible within the limits specified but in no case greater than one fourth of the minimum thickness of the member, provided that the concrete can be placed without difficulty so as to surround all reinforcement thoroughly and to fill the corners of the form.

2.7. For reinforced concrete work, coarse aggregates having a nominal size of 20 mm. are generally considered satisfactory.

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

33

2.9. Where the reinforcement is widely spaced as in solid slabs, limitations of size of the aggregate may not be important and the nominal maximum size may sometimes be as great as or greater than the minimum cover.

2.10. Admixture may be used in concrete only with approval of Engineer-in-charge based upon the evidence that with the passage of time, neither the compressive strength of concrete is reduced nor are other requisite qualities of concrete and steel impaired by the use of such admixtures.

3.0. Workmanship:

3.1. Proportioning : Proportioning shall be done by volume, except cement which shall be measured in terms of bags of 50

Kg. weight. The volume of one such bag being taken as 0.0342 Cu. metre. Boxes of suitable sizes shall be used for measuring sand aggregate. The size of the boxes (internal) shall be 35 cms. x 25 cms. and 40 Cms. deep. While measuring the aggregate and sand, the box shall be filled without shaking ramming or hammering. The proportioning of sand shall be on the basis of its dry volume and in case of damp sand, allowances for bulkage shall be made.

3.2 Mixing:

3.2.1. For all work, concrete shall "be mixed in a mechanical mixer which alongwith other accessories shall be kept in first class working condition and so maintained throughout the construction. Measured quantity of aggregate, sand, cement required for each batch shall be poured into the drum of the mechanical mixer while it is continuously running. After about half a minute of dry mixing, measured quantity of water required for each batch of concrete mix shall be added gradually and mixing continued for another one and a half minute. Mixing shall be. continued till materials are uniformly distributed and uniform colour of the entire mass is obtained and each individual particle of the coarse aggregate shows complete coating of

mortar containing its proportionate amount of cement. In no case shall the mixing be done for less than 2 minutes after all ingredients have been put into the mixer.

3.2.2. When hand mixing is permitted by the Engineer-in-charge for small jobs or for certain other reasons, it shall be done on the smooth watertight platform large enough to allow efficient turning over the ingredients of concrete before and after adding water. Mixing platform shall be so arranged that no foreign material gets mixed with concrete nor does the mixing water flow out. Cement in required number of bags shall be placed in a uniform layer on top of the measured quantity of fine and coarse aggregate, which shall also be spread in a layer of uniform thickness on the mixing platform. Dry coarse and fine aggregate and cement shall then be mixed thoroughly by turning over to get a mixture to uniform colour. Specified quantity of water shall then be added gradually through a rose-can and the mass turned over till a mix of required consistency is obtained. In hand mixing, quantity of cement shall be increased by 10 percent above that specified.

3.2.3. Mixers which have been out of use for more than 30 minutes shall be thoroughly cleaned before putting in a new batch. Unless otherwise agreed to by the Engineer-in-charge the first batch of concrete from the mixture shall contain only two thirds of normal quantity of coarse aggregate. Mixing plant shall be thoroughly cleaned before changing from one type of cement to another. .

3.3. Consistency: 3.3.1. The degree of consistency which shall depend upon the nature of the work and methods of vibration of concrete, shall be determined by regular slump tests in accordance with I.S. 1199-1959. The slump of 10 mm. to 25 mm. shall be adopted when vibrators are used and 80 mm. when vibrators are not used.

4.4. Inspection:

3.4.1. Contractor shall give the Engineer-in-charge due notice before placing any concrete in the forms to permit him to inspect and accept the false work and forms as to their strength, alignment, and general fitness but such inspection shall not relieve the contractor of his responsibility for the safety of men, machinery, materials and for results obtained. Immediately before concreting, all forms shall be thoroughly cleaned.

3.4.2. Centering design and its erection shall be got approved from the Engineer-in-charge. One carpenter with helper shall invariably be kept present throughout the period of concreting. Movement of labour and other persons shall be totally prohibited for reinforcement laid in position. For access to different parts, suitable mobile platforms shall be provided so that steel reinforcement in position is not disturbed. For ensuring proper cover, mortar blocks of suitable size shim be cast and tied to the reinforcement. Timber, kapachi or metal pieces shall not be used for this purpose.

3.5. Transporting and laying:

3.5.1. The method of transporting and placing concrete shall be as approved. Concrete shall be so transported and placed that no contamination segregation or loss of its constituent material takes place. All form work shall be cleaned and made free from standing water, dust, snow or ice immediately before placing of concrete.

34

No concrete shall be placed in any part of the structure until the approval of the Engineer-in-charge has been obtained.

3.5.2. Concreting shall proceed continuously over the area between construction joints.

Fresh concrete shall not be placed

against concrete which has been in position for more than 30 minutes unless a proper construction joint is formed. Concrete

shall be compacted in its final position within 30 minutes of its discharge from the mixer.

Except where otherwise agreed to

by the Engineer-in-charge concrete shall be deposited in horizontal layers to a compacted depth of not more than 0.45 metre

when internal vibrators are used and not exceeding 0.30 metre in all other cases.

3.5.3. Unless otherwise agreed to by the Engineer-in-charge, concrete shall not be dropped into place from a height exceeding

2 metres. When trucking or chutes are used they shall be kept close and used in such a way as to avoid segregation. When

concreting has to be resumed on a surface which has hardened, it shall be roughened, swept clean, thoroughly wetted and

covered with a 13 mm. thick layer of mortar composed of cement and sand in the same ratio as in the concrete mix itself. This

13 mm. layer of mortar shall be freshly mixed and placed immediately before placing of new concrete. Where concrete has

not fully hardened, all laitance shall be removed by scrubbing the wet surface with wire or bristle brushes, care being taken

to avoid dislodgement of any particles of coarse aggregate. The surface shall then be thoroughly wetted, all free water

removed and then coated with neat cement grout. The first layer of concrete to be placed on this surface shall not exceed 150

mm. in thickness and shall be well rammed against old work, particular attention being given to corners and close spots.

3.5.4. All concrete shall be compacted to produce a dense homogeneous mass with the assistance of vibrators unless,

otherwise permitted by the Engineer-in-charge for exceptional cases, such as concreting under water, where vibrators cannot

be used. Sufficient vibrators in serviceable condition shall be kept at site so that spare equipment is always available in the

event of breakdowns.

Concrete shall be judged to be compacted when the mortar fills the spaces between the coarse aggregate and begins to cream

up to form an even surface. Compaction shall be completed before the initial setting starts i.e. within 30 minutes of addition

of water to dry mixture. During compaction, it shall be observed that needle vibrators are not applied on reinforcement which

is likely to destroy the bond between concrete and reinforcement.

3.6. Curing: Immediately after compaction, concrete shall be protected from weather, including rain, running water, shocks, vibration, traffic, rapid temperature changes, frost and drying out process. It shall be covered with wet sacking, hassain or other similar absorbant material approved, soon after the initial set and shall be kept continuously wet for a period of not less than 14 days from the date of placement. Masonary work over foundation concrete may be started after 48 hours of its laying but curing of concrete shall be continued for a minimum period of 14 days.

3.7. Sampling and Testing of concrete :

3.7.1. Samples from fresh concrete shall be taken as per I.S. 1199-1959 and cubes shall be made, cured and tested at 7 days or 28 days as per requirements in accordance with I.S. 516-1959. A random sampling procedure shall be adopted to ensure that each concrete batch shall have a resonable chance of being tested i.e. the sampling should be spread over the entire period of concreting and cover all mixing units. The minimum frequency of sampling of concrete of each grade shall be in accordance with following :

Quantity of concrete in the work	No. of samples	Quantity of concrete in the works	No. of samples
----------------------------------	----------------	-----------------------------------	----------------

1-5Cmt.	1	16-30Cmt.	3
---------	---	-----------	---

6-15Cmt.	2	31-50	4
----------	---	-------	---

51 and above 4 + one additional for each additional 50 M. or part thereof.

NOTE : At least one sample shall be taken from each shift. Ten test specimens shall be made from each sample, five for testing at 7 days and the remaining five at 28 days. The samples of concrete shall be taken on each day of the concreting as per above frequency. The number of specimens may be suitably increased as deemed necessary by the Engineer-in-charge when procedure of tests given above reveals a poor quality of concrete and in other special cases.

3.7.2. Tire average strength of the group of cubes cast for each day shall not be less than the specified cube strength of 150

Kg/Cm at 28 days. 20% of the cubes cast for each day may have value less than the specified strength provided the lowest value is not less than 85% of the specified strength. If the concrete made in accordance with the proportions given for a particular grade docs not yield the specified strength, such concrete shall be classified as belonging to the appropriate lower, grade concrete made in accordance with the proportions given for a particular grade shall not, however, be placed in a higher grade on the ground that the test strength are higher than the minimum specified.

3.8. Stripping:

35

3.8.1. The Engineer-in charge shall be informed in advance by the contractor of his intention lo strike the form work. While fixing the time for removal of form work, due consideration shall be given to local conditions, character of the structure, the

weather and other condition that influence the setting of concrete and of the materials used in the mix. In normal circumstances (generally where temperatures are above 20 ° C) and where ordinary concrete is used, forms may be struck after expiry of periods specified in item No. 9.1 (A) for respective item of form work.

3.8.2. All form work shall be removed without causing any shock or vibration as would damage the concrete. Before the soffit and struts are removed, the concrete surface shall be exposed, where necessary in order to ascertain that the concrete has sufficiently hardened. Centring shall be gradually and uniformly lowered in such manner as to permit the concrete to take stresses due to its own weight uniformly and gradually. Where internal metal ties are permitted, they or their removable parts shall be extracted without causing any damage to the concrete and remaining holes filled with mortar. No permanently embedded metal part shall have less than 25 mm. cover to the finished concrete surface. Where it is intended to re-use the form work, it shall be cleaned and made good to the satisfaction of the Engineer-in-charge. After removal of form work and shuttering, the Executive Engineer shall inspect the work and satisfy by random checks that concrete produced is of good quality.

3.8.3. Immediately after the removal of forms, all exposed bolts etc., passing through the cement concrete member and used for shuttering or any other purpose shall be cut inside the cement concrete member to a depth of at least 25 mm. below the surface of the concrete and the resulting holes be filled by cement mortar. All fine caused by form joints, all cavities produced by the removal of form ties and all other holes and depressions honeycomb spots, broken edges or corners and other defects shall be thoroughly cleaned, saturated with water and carefully pointed and rendered true with mortar of cement and fine aggregate mixed in the proportions used in the grade of concrete that is-being finished and of as dry consistency as is possible to use. Considerable pressure shall be applied in filling and pointing to ensure thorough filling in all voids. Surfaces which are pointed shall be kept moist for a period of 24 hours. If rock pockets/honeycombs in the opinion of the Engineer in-charge are of such an extent or character to effect the strength of the structure materially or to endanger the life of the steel reinforcement, he may declare the concrete defective and require the removal and replacement of the portions of the structure affected.

4.0. Mode of measurement and payment:

4.1. The consolidated cubical contents of concrete work as specified in item shall be measured. The concrete laid in excess of section shown on drawings or as directed shall not be measured. No deduction shall be made for

(a) Ends of dissimilar materials such as joists, beams, posts, girders, rafters, purline trusses, corbels and steps etc upto 500 Sq. Cm. in section.

(b) Opening upto 0.1 Sq. M.

4.2. The rate includes cost of all materials, labour, tools and plant required for mixing, placing, position, vibrating and compacting, finishing, as directed, curing and all other incidental expenses for producing concrete lied strength The rate excludes the cost of form work.

4.3. The rate shall be for a unit of one cubic metre.

tem No- 4 Brick work using common burnt clay building bricks having crushing strength not less than 35 kg/ sq. C.M. In foundation and plinth in cement mortar 1:6 (1 cement : 6 fine sand)

1.0. Materials

Bricks shall conform to M-15. Cement mortar shall conform to M-11.

2.0. Workmanship

2.1. Proportion:

2.1.1. The proportion of the cement mortar shall be 1:6 (1 cement: 6 fine sand) by volume.

2.2. Wetting of bricks:

2.2.1. The bricks required for masonry shall be thoroughly wetted with clean water for about two hours before use or as directed. The cessation of bubbles, when the bricks are wetted with water is as indication of through wetting of bricks.

2.3. Laying:

2.3.1. Bricks shall be laid in English bond unless directed otherwise. Half or cut bricks shall not be used except when necessary to complete to bond; closures in such case shall be cut to required size and used near the ends of walls.

2.3.2. A layer of mortar shall be spread on full width for suitable length of the lower course. Each brick shall first be property bedded and set home by gently tapping with handle of trowel or wooden mallet. Its inside face shall be flushed with mortar before the next brick is laid and pressed against it. On completion of course, the vertical joints shall be fully filled from the top with mortar.

2.3.3. The walls shall be taken up truly in plumb. All courses shall be laid truly horizontal and all vertical joint shall be truly vertical. Vertical joints in alternate course shall generally be directly one over the other. The thickness of brick course shall be kept uniform.

2.3.4. The brick shall be laid with frog up wards. A set of tools comprising of wooden straight edges, mason's spirit level, square half meter rub, and pins, string and plumb shall be kept on the site of work for frequent checking during the progress of work.

2.3.5. Both the faces of walls of thickness greater than 23 cms. shall be kept in proper place. All the connected brick work shall be kept not more than one meter over the rest of the work. Where this is not possible, the work shall be raked back according to bond (and not left toothed) at an angle not steeper than 45 degrees.

2.3.6. All futures, pipes, outlets of water, hold fasts of doors and windows etc. which are required to be built in wall shall be embedded in cement mortar.

2.4. Joints:

2.4.1. Bricks shall be so laid that all joints are quite flush with mortar. Thickness of joints shall not exposed 12 mm. The face joints shall be raked out as directed by raking tools daily during the progress of work, when the mortar is still green so as to provide key for plaster or pointing to done.

2.4.2. The face of brick shall be cleaned the very day on which the work is laid and all mortar dropping removed.

2.5. Curing:

2.5.1. Green work shall be protected from rain suitably. Masonry work shall be kept moist on all the faces for a period of seven days. The top of masonry work shall be kept well wetted at the close of the day.

2.6. Preparation of foundation bed:

2.6.1. If the foundation is to be laid directly on the excavated bed, it shall be leveled, cleared of all loose materials, cleaned and wetted before stating masonry, If masonry is to be laid on concrete footing, the top of concrete shall be cleaned and moistened. The contractor shall obtain the engineer's approval for the foundation bed before foundation masonry is started. When pucca flooring is to be provided flush with the top to plinth, the inside plinth offset shall be kept lower than the outside plinth top by the thickness of the flooring.

2.7. The frames of doors, windows, cupboards etc. shall be housed into the brick work at the correct location and level as directed. The heavy steel doors, window frames etc. shall be built in with work, but for ordinary steel doors and windows required opening for frames, hold-fasts, etc., shall be in the wall and frame embedded later on in order to avoid damage to the frames.

- 2.8.** Necessary scaffolding shall be provided. The supports of the scaffolding shall be sound and strong tied, together with horizontal pieces over which the scaffolding plunks shall be fixed. Simple scaffolding shall be allowed normally. In this case scaffolding hole shall rest in hole header horizontal coarse only. Minimum number of holes be left in brick work for supporting horizontal scaffolding poles. The contractor is responsible for providing and maintaining sufficiently strong scaffolding so as to withstand all loads likely to come upon it.
- 2.9.** For the face of brick work, where plastering is to be done, joints shall be racked out to a depth not less than thickness of joints. The face of brick work shall be cleaned and mortar dropping removed on very same day that brick work is laid.
- 3.0. Mode of measurements & payment**
- 3.1.** The masonry work of G.F. & First floor shall be measured and paid under this item rate includes cost of all materials & labour.
- 3.2.** Brick work in parapet shall be included in the corresponding masonry item of floor immediately below the floor above which the parapet is built.
- 3.3.** No deduction shall be made from quantity of brick work nor any extra payment made for embedding in masonry of marking holes in respect of following item.
- (1) Ends of joints, beams, posts, girders, rafters, purlins trusses corbel, steps, etc. where cross sectional area does not exceed 500 sq.cm.
 - (2) Opening not exceed in 1000 sq.cm.
 - (3) Wall plate sand bed plates bearing of slab, chhajjas, and like whose thickness does not exceed 10 cms. and the bearing does not extend the full thickness of wall.
 - (4) Drainage holes and recesses for cement concrete blocks to embed hold fasts for doors, window etc.
 - (5) Iron fixtures, pipes up to 300 mm. dia. hold fasts of doors, and window built into masonry and pipes etc. for concealed wiring.
 - (6) Forming charges of section not exceeding 350 sq.cm. in masonry.
 - (7) Apparatuses for fire places shall not be deducted nor shall extra labour required to make splaying of jumps, throating and making trenches over the aperture be paid for separately.
- 3.4.** The rate shall be for a unit of one cubic meter.

Item no- 5 Providing and laying cement concrete 1:3:6 (1 cement : 3 coarse sand : 6 crushed stone aggregates 20 mm nominal size) and curing complete including cost of form work in (A) Wall caps/copings.

1.0. Materials

1.1. Water shall conform to M-1. Cement shall conform to M-3 Sand shall conform to M-6.

Stones aggregate 40

mm. nominal size shall conform to M-12.

2.0. Workmanship

2.1. General

2.1.1. Before stating concrete the bed of foundation trenches shall be cleared of all loose materials, leveled, watered and rammed as directed

2.2. Proportion of Mix:

2.2.1. The proportion of cement, sand and coarse aggregate shall be one part of cement. 3 parts of sand and 6

parts of stone aggregates and shall be measured by volume.

2.3. Mixing:

2.3.1. The concrete shall be mixed in a mechanical mixer at the site of work. Hand mixing may however be allowed

for smaller quantity of work if approved by the Engineer-in-charge. When hand mixing is permitted by the Engineer-incharge

in case "of break-down of machineries and in the interest of the work, it shall be carried out on a water tight

platform and care shall be taken to ensure that mixing is continued until the mass is uniform in colour and

consistency, However in such case 10% more cement than otherwise period 1 1/2 to 2 minutes.

The quantity of

water shall be just sufficient to produce a dense concrete of required workability for the purpose.

2.4. Transporting & Placing the Concrete:

2.4.1. The concrete shall be handed from the place, of mixing to the final position in not more than 15 minutes by

the method as directed and shall be placed into its final-position, compacted and finished within 30 minutes of mixing

with water i.e. before the setting commences.

2.4.2. The concrete shall be laid in layers of 15 cms. to 20 cms.

2.5.1. The concrete shall be rammed with heavy iron rammers and rapidly to get the required compaction and to

allow all the interstices to be filled with mortar.

2.6. Curing:

2.6.1. After the final set, the concrete-shall be kept continuously wet if required by pounding for a period of not less

then 7 days from the date of placement.

2.7. Mode of Measurement & Payment:

2.7.1. The concrete shall be measured for its length, breadth and depth, limiting dimensions to those specified on

plan or as directed.

2.7.2. The rate shall be for a unit of one cubic meter.

Item No- 6 Brick work using common burnt clay building bricks having crushing strength not less than 35 kg/ sq. C.M. In foundation and plinth in cement mortar 1:6 (1 cement : 6 fine sand) in super structure

Materials

- 1.1. Water shall conform to M-1. Cement shall conform to M-3. Sand shall conform to M-6. Grit shall conform to M-8. Graded stone aggregate 20 mm nominal size shall conform to M-12.
- (a) The bars shall be kept in position by the following methods :
 - (i) In case of beam and slab construction, sufficient number of precast cover blocks in cement mortar 1:2 (1 cement : 2 coarse sand) about 4 cms. x 4 cms. section and of thickness equal to the specified cover shall be placed between the bars and shattering as to secure and maintain the requisite cover of concrete over the reinforcement. In case of cantilevered or doubly reinforce beams or slabs, the main reinforcing bars shall be held in position by introducing chain spacers or supports bars at 1.0 to 1.2 meter centers.
- 1.2. All bars projecting form pillars, columns, beams, slabs etc, to which other bars and concrete are to be attached of bounded to later on, shall be protected with a coat of thin neat cement grout, if the bars are not likely to be incorporated with succeeding mass of concrete within the following 10 days. This coat of thin neat cement shall be removed before concreting.
- 1.3. The shuttering to be provided shall be of ordinary timber plank and shall conform to M-26.
- 1.4. The dimensions of scantlings and battens shall conform to the design. The strength of the wood shall not be less than that assumed in the design.

2.0. General

- 2.1. The concrete mix is not required to be designed by preliminary testes. The proportion of the concrete mix shall be 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm. nominal size) by volume concrete work shall have exposed concrete surface or as specified in the item.
- 2.2. The designation ordinary M-100, M-150m M-200, M-250 specified as per I.S. corresponds approximately to 1:3:6, 1:2:4, 1:1:1/2:3 and 1:1:2 nominal mix of ordinary concrete by volume respectively.
- 2.3. The ingredients required for ordinary concrete containing one beg of cement of 50 kg. by weight (0.0342 Cu.M.) for different proportions of mix shall be as under:

TABLE

Grade of concrete	Mix by volume	Total quantity of dry aggregates by volume per 50 kg. cement to be taken as sum aggregate of the individual volumes of fine & coarse aggregates, maximum	Proportion of fine aggregate to coarse aggregate	Quantity of water per 50 kg. of cement max.
(1 cubic metre : 1000 Liters)				
1	2	3	4	5
Ordinary	Liters			Liters
M-100	1:3:6	300	Generally 1:2 for fine aggregate to Coarse aggregate by volume but subject to a upper limit of 1:1.1/1 & a lower limit of 1:3.	34
M-150	1:2:4	220		32
M-200	1:1.1/2:3	160		30
M-250	1:1:2	100		27

- 2.4. The water cement ratios shall not be more than specified in the above table. The cement content of the mix specified in the table shall be increased if the quantity of water in mix has to be met eased to

overcome the difficulties of placements and compaction so that the water-cement ratio specified in the table is not exceeded.

- 2.5. Workability of the concrete shall be controlled by maintaining a water -cement-ratio that is found to give a concrete mix which is just sufficient wet to be placed and compacted without difficulty with the means available.
- 2.6. The maximum size of coarse aggregate shall be as large as possible within the limits specified but in no case greater than one forth of the minimum thickness of the member provided that the concrete can be placed without difficulty so as to surround all reinforcement thoroughly and to fill the corners of the form.
- 2.7. For reinforced concrete work; coarse aggregates having a nominal size of 20 mm. are generally considered satisfactory.
- 2.8. For heavily reinforced concrete members as in the case of ribs of main beams, the nominal maximum size of coarse aggregate should usually be restricted to 5 mm. less than the minimum clear distance between the main bar or 5 mm. less than the minimum cover to the reinforcement whichever is smaller.
- 2.9. Where the reinforcement is widely spaced as in solid slabs, limitations of size of the aggregate may not be so important, and the nominal maximum size may some times be as great as or greater than the minimum cover.
- 2.10. Admixture maybe used in concrete only with approval of Engineer-in-charge based upon the evidence that with the passage of time neither the compressive strength of concrete is reduced not are other requisite qualities of concrete and steel impaired by the use of such admixtures.

3.0. Workmanship

- 3.1. **Proportioning :** Proportioning shall be done by volume, except which shall be measured in terms of bags of 50 kg. weight, the volume of one such bag being taken as 0.0342 cu. meter Boxes of suitable size shall be used for measuring sand aggregate. The size of boxes (internal) shall be 35 x 25 cms. and 40 cms deep while measuring the aggregate and sand the boxes shall be filled without shaking ramming or hammering. The proportioning of sand shall be on the basis of its dry volume and in case of damp saner, allowances for bulk age shall be made.

3.2. Mixing :

- 3.2.1. For all work, concrete shall be mixed in a mechanical mixed which along with other accessories shall be kept in first class working condition and so maintained throughout the construction Measured quantity of aggregate, sand and cement required for each batch shall be poured into the claim of the mechanical mixer while it is continuously running. After half a minute of dry mixing measured quantity of water required for each batch of concrete mix shall be added gradually and mixing continued for another one and a half minute Mixing shall be continued till materials are uniformly distributed and uniform colour of the entire mass is obtained and each individual particle of the coarse aggregate shows complete coating of mortar containing its proportionate amount of cement. In no case shall the mixing he done for less than 2 minutes after-oil ingredients have been put into the mixer.
- 3.2.2. When hand mixing is permitted by the Engineer-in-charge for small jobs or for certain other reasons, it shall be done on the smooth watertight platform large enough to allow efficient tuning over the ingredients of concrete before and after adding water Mixing platform shall be so arranged that no foreign malarial gets mixed with concrete nor does the mixing water flow out. Cement in required number of bags shall be spread in n layer of uniform thickness on the mixing platform. Dry coarse and fine aggregate and cement shall then be mixed thoroughly be turning over to get a mixture to uniform colour. Specified quantity water shall then be added gradually through a rose can and the mass turned over till a mix of required consistency is obtained. In hand mixing quantity of cement shall be increased by 10 percent above that specified.
- 3.2.3. Mixers which haw been out of use for more than 30 minutes shall be thoroughly cleaned before putting in a new batch. Unless otherwise agreed to by the Engineer in-charge the first batch of concrete from the mixture shall contain only two thirds of normal quantity of coarse aggregate Mixing plant shall be thoroughly cleaned before changing from one type of cement to another.
- 3.2.4. The form work shall conform to the shape lines and dimensions as shown on the plans and be constructed as to remain sufficiently rigid during the placing and compacting of the concrete. Adequate arrangements shall be made by the contractor toe safe-guard against any settlement of the form-work during the course of concreting and after concreting. The form work of shuttering, centering, scaffolding, bracing etc. shall be as per design.

3.3. Clearing and Treatment of forms:

- 3.3.1** All rubbish, particularly chipping shaving and saw dust shall be removed from the interior of the form before the concrete work is placed and the form in contact with concrete shall be cleaned and thoroughly wetted or treated. The surface shall be then coated with soap solution applied before concreting is done. Soap solution for the purpose shall be prepared by dissolving yellow soap in water to get consistency of paint. Alternatively a coat of raw linseed oil shall be applied after thoroughly cleaning the surface. Care shall be taken that the coating does not get on construction joint surface and reinforced bars.
- 4.0 Stripping time:**
- 4.1.** In normal circumstances and where ordinary cement is used forms may be struck after expiry of following periods.
- (a) Sides of walls columns and vertical faces of beams.....24 to 48 hours.
 - (b) Beam soffits, (props, left under).....7 days.
 - (c) Removal of props slabs:
 - (i) Slabs spanning up to 4.5 m.....7 days.
 - (ii) Spanning over 4.5 m.....14 days.
 - (d) Removal of props to beams and Arches:
 - (i) Spanning up to 6 m.....14 days.
 - (ii) Spanning over 6 m.....21 days.
- 5.0 Procedure when removing the form work :**
- 5.1.** All form work shall be removed without such shock or vibrations as would damage the reinforced concrete surface. Before the soffits form work and struts are removed, the soffits and the concrete surface shall be exposed where necessary in order to ascertain that the concrete has sufficiently hardened.
- 6.0 Centering:**
- 6.1.** The centering to be provided shall be got approved. It shall be sufficiently strong to ensure absolute safety of the form work and concrete work before, during and after pouring concrete. Watch should be kept to see that behavior or centering and form work is satisfactory during concreting. Erection should also be such that it would allow removal of forms in proper sequence without damaging either the concrete or the forms to be removed.
- 6.2.** The props of centering shall be provided on firm foundation or base of sufficient strength to carry the loads without any settlement.
- 6.3.** The centering and form work shall, be inspected and approved by the Engineer-in-charge before concreting. But this will not relieve the contractor of his responsibility for strength, adequacy and safety of form work and centering. If there is a failure of form work or centering, contractor shall be responsible for the damages to property.
- 7.0 Scaffolding:**
- 7.1.** All scaffolding, hoisting arrangements and ladders etc. required for the facilitating of concreting shall be provided and removed on completion of work by contractor at his own expense. The scaffolding, hoisting arrangements and ladders etc. shall be strong enough to withstand all live, dead and impact loads expected to act and shall be subject to the approval of the Engineer-in-charge. However contractor shall be solely responsible for the safety of the scaffolding, hoisting arrangement, ladders, work and workman etc.
- 7.2.** The scaffolding, hoisting arrangements and ladder shall allow easy approach to the work spot and afford easy inspection.
- 7.3.** The rate is applicable to all condition of working and height up to 4 mts. The rate shall include the cost of materials and labour for various operations involved such as :
- (a) Splayed edges, notching, allowance for overlaps and passing at angles, battens centering, shuttering propping, bolting, wedging easing, striking and removal.
 - (b) Filleting to form stop chamfered edges or splayed external angles not exceeding 20 mm: width to beams, columns and the like.
 - (c) Temporary openings in the forms for pouring concrete, if required removing rubbish etc.
 - (d) Dressing with oil to prevent adhesion of concrete with shuttering and.
 - (e) Raking or circular cutting.
- 8.0 Re-Use:**
- 8.1.** Before re-use, all form shall be inspected by Engineer-in-charge and their suitability ascertained. The forms shall be scarred, cleaned and joints are gone over, repaired where required. Inside surface shall be retreated to prevent adhesion of concrete.
- 9.0 Consistency:**

9.1. The degree of consistency which shall depend upon the nature of the work and methods of vibration of concrete shall be determined by regular slump tests in accordance with I.S. 1199-193. The slump of 10 mm. to 25 mm shall be adopted when vibrators are used and 80 mm. when vibrators are not used.

9.2. Inspection:

9.2.1. Contractor shall give the Engineer-in-charge due notice before placing any concrete in the forms to permit him to inspect and accept the false work and forms as to their strength, alignment and general fitness but such inspection shall not relieve the contractor of his responsibility for the safety of men machinery materials and for results obtained immediately before concreting all forms shall be thoroughly cleaned.

9.2.2. Centering design and its erection shall be got approved from the engineer-in-charge. One carpenter with helper shall invariably be kept present throughout the period of concreting. Movement of labour and other persons shall be totally prohibited for reinforcement laid in position. For access to different parts suitable mobile platforms shall be provided so that steel reinforcement in position is not disturbed. For ensuring proper cover, mortar blocks of suitable size shall be cast and tied to the reinforcement. Timber kapachi or metal pieces shall not be used for this purpose.

9.3. Transporting and laying:

9.3.1. The method of transporting and placing concrete shall be as approved. Concrete shall be so transported and placed that no contamination, segregation or loss of its constituent material takes place. All from work shall be cleaned and made free from standing water dust, snow or ice immediately before placing of concrete. No concrete shall be placed in any part of the structure until the approval of the engineer-in-charge has been obtained.

9.3.2. Concreting shall proceed continuously over the area between construction joints. Fresh concrete proper contraction joint is formed. Concrete shall be compacted in its final position within 30 minutes of its discharge from the mixer. Except where otherwise agreed to by the engineer-in-charge, concrete shall be deposited in horizontal layers to a compacted depth of not more than 0.45 meter when internal vibrators are used and not exceeding 0.30 meter in all other cases.

9.3.3. Unless otherwise agreed to by the Engineer-in-charge concrete shall be dropped in to place from a height exceeding 2 meters. When trucking or chutes are used they shall be kept close and used in such a way as to avoid segregation. When concreting has to be resumed on a surface which has hardened, it shall be roughened, swept clean, thoroughly wetted and covered with a 13 mm. thick layer of mortar composed of cement and sand in the same ratio as in the concrete mix itself. This 13 mm. layer of mortar shall be freshly mixed and placed immediately before placing of new concrete. Where concrete has not fully hardened, all laitance shall be removed by scrubbing the wet surface with wire or bristle brushes, care being taken to avoid dislodgement of any particles of coarse aggregate. The surface shall then be thoroughly wetted, all free water removed and then coated with neat cement grout. The first layer of concrete to be placed on this surface shall not exceed 150 mm. in thickness and shall be well rammed against old work, particular attention being given to corners and close spots.

9.3.4. All concrete shall be compacted to produce a dense homogeneous mass with the assistance of vibrators, unless otherwise permitted by the Engineer-in-charge for exceptional cases, such as concreting under water, where vibrators cannot be used. Sufficient vibrators in serviceable condition shall be kept at site so that spare equipment is always available in the event of breakdowns. Concrete shall be judged to be compacted when the mortar fills the spaces between the coarse aggregate and begins to cream up to form an even surface. Compaction shall be completed before the initial setting starts i.e. within 30 minutes of addition of water to dry mixture. During compaction, it shall be observed that needle vibrators are not applied on reinforcement which is likely to destroy the bond between concrete and reinforcement.

9.4. Curing:

Immediately after compaction, concrete shall be protected including rain, running water, shocks, vibration, traffic, rapid temperature changes, frost and drying out process. It shall be covered with wet sacking or similar absorbent material approved, soon after the initial set, and shall be kept continuously wet for a period of not less than 14 days from the date of placement. Masonry work over foundation

concrete may be started after 48 hours of its laying but curing of concrete shall be continued for a minimum period of 14 days.

9.5. Sampling and testing of concrete:

- 9.5.1.** Samples from fresh concrete shall be taken as per I.S. 1199-1959 and cubes shall be made, cured and tested at 7 days and 28 days as per requirements in accordance with I.S. 526-1959. A random sampling procedure shall be adopted to ensure that each concrete batch shall have a reasonable chance of being tested i.e. the sampling should be spread over the entire period of concreting and cover all mixing units. The minimum frequency of sampling of concrete of each grade shall be in accordance with following :

Quantity of concrete in the work	No of samples	Quantity of concrete in the works	No of samples
1 - 5 Cmt.	1	16-30 Cmt.	3
6 - 15 Cmt.	2	31-50 Cmt.	4
51 and above	4± one additional for each additional 50 mm. or part thereof.		

Note : At least one sample shall be taken from each shift, Ten test specimens shall be made from each sample, five for testing at 7 days and the remaining five at 28 days. The samples of concrete shall be taken on each day of concreting as per above frequency. The number of specimens may be suitably increased as deemed necessary by the Engineer-in-charge when procedure of tests given above reveals a poor quality of concrete and in other special cases.

- 9.5.2.** The average of the group of cubes cast for each day shall not be less than the specified cube strength of 150 K/g Cm² at 28 days. 20% of the cubes cast for each day may have value less than the specified strength provided the lowest value is not less than 85% of the specified strength. If the concrete made in accordance with the proportions given for a particular grade does not yield the specified strength, such concrete shall be classified as belonging to the appropriate lower grade. Concrete made in accordance with the Proportions given for a particular grade shall not, however be placed in a higher grade on the ground that the test strength are higher than the minimum specified.

9.6. Stripping :

- 9.6.1.** The Engineer-in-charge shall be informed in advance by the contractor of his intention to strike the form work. While fixing the time of removal of form work, due consideration shall be given to local conditions, character of the structure, the weather and other conditions that influence the setting of concrete and of the materials used in the mix. In normal circumstances (generally where temperatures are above 20°C) and where ordinary concrete is used, forms may be struck after periods specified in item No.9.1 (A) for respective item of form work.
- 9.6.2.** All form work shall be removed without causing any shock or vibration as would damage the concrete. Before the soles and struts are removed, the concrete surface shall be gradually exposed, where necessary in order to ascertain that concrete has sufficiently hardened. Centering shall be gradually and uniformly lowered in such a manner as to permit the concrete to take stresses due to its own weight uniformly and gradually. Where internal metal ties are permitted, they or their removable parts shall be extracted without causing any damage to the concrete and remaining holes filled with mortar. No permanently embedded metal part shall have less than 25 mm. cover to the finished concrete surface. Where it is intended to re-use the form work, it shall be cleaned and made good to the satisfaction of the Engineer-in-charge. After removal of form work and shuttering, the Executive Engineer shall inspect the work and satisfy by random checks that concrete produced is of good quality.
- 9.6.3.** Immediately after the removal of forms, all exposed bolts etc. passing through the cement concrete member and used for shuttering or any other purpose shall be cut inside the cement concrete member to a depth of at least 25 mm. below the surface of the concrete and the resulting holes be filled by cement mortar, all fins, caused by form joints, all cavities produced by the removal of form ties and all other holes and depressions, honeycomb spots, broken edges or corners and other defects, shall be thoroughly cleaned, saturated with water and carefully pointed and rendered true with mortar of cement and fine aggregate mixed in proportions used in the grade of concrete that is being furnished and of as dry consistency as is possible to use. Considerable pressure shall be applied in filling and pointing to ensure thorough filling in all voids. Surface which are pointed shall be kept moist for a period of 24 hours.

If rock pockets/honeycombs in the opinion of the Engineer-in-charge are of such an extent or character as to effect the strength of the structure materially or to endanger the life of the steel reinforcement, he may declare the concrete defective and require the removal and replacement of the portions of structure affected.

10.0. Mode of Measurement & Payment

- 10.1. The consolidated cubical contents of concrete work as specified in item shall be measured. No deduction shall be made for
 - (a) Ends of dissimilar materials such as joints, beams, posts, girders, falters, purling trusses, corbels and steps etc. up to 500 Sq, Cm. in section.
- 10.2. Form work shall be measured as the area in square meters to shuttering in contract with concrete except in the case of inclined member and portion of curved profile and upper side in which case on area of underside shall be measured for payment.
- 10.3. Form work to secondary beams shall be measured up to the sides of main beams but no deduction shall be made form the form work of the main beam at the inter section point. No deduction shall be made form the form work of a column at inter section of beams.
- 10.4. The rate includes cost of all materials labour, tools and plant required for mixing, placing in position, vibrating and compacting, finishing, as directed, curing and all other incidental expenses for producing centre of specified strength. The rate includes the cost of form work.
- 10.5. the size of the stone aggregate shall be 10 mm nominal size and the concrete work shall be carried out in 25 mm. thick damp proof course
- 10.6. The rate shall be for a unit of **oneSq. meter.**

Item no- 7 Providing and laying ordinary Cement concrete 1:1.5:3 (1 Cement 1.5 coarse sand 3 graded stone agg. 20 mm nominal size) for RCC lintel including finishing smooth with curing etc. complete including the cost of formwork but excluding the cost of reinforcement.

1.0. Materials

- 1.1. Water shall conform to M-1. Cement shall conform to M-3. Sand shall conform to M-6. Grit shall conform to M-8. Coarse aggregate shall conform M-12.
- 1.2. The shuttering to be provided shall be of ordinary timber plank and shall conform to M-26.
- 1.3. The dimensions of scantlings and battens shall conform to the design. The strength of the wood shall not be less than that assumed in the design.

2.0. General

- 2.1. The concrete mix shall be designed from preliminary tests. The proportion of the concrete mix shall be 1:1.5:3 (1 cement : 1.5 coarse sand : 3 graded stone aggregate 20 mm. nominal size) by volume concrete work shall have exposed concrete surface or as specified in the item.
- 2.2. The proportioning of cement and aggregates shall be done by weight and necessary precautions shall be taken in the production to ensure that the required work cube strength is attained and maintained. The controlled concrete shall be in grades of M-100, M-150, M-200, M-250, M-300, M-350 & M-400 with prefix controlled added to it. The letter M refers to mix and the numbers specify 28 days works cube compressive strength of 150 mm. cubes of the mix expressed in Kg./cm.
- 2.3. The proportion of cement, sand and coarse aggregate shall be determined of weight. The weight batch machine shall be used for maintaining proper control over the proportion of aggregates as per mix design. The strength requirements of different grades of concrete shall be as under:

Grade of Concrete	Compressive strength of 15 cms. cubes in kg/cmt. at 28 days, conducted in accordance with I.S. 516-1959.
--------------------------	---

	Preliminary test Min.	Work Test Min.
M 150	200	150
M 200	260	200
M 250	320	250
M 300	380	300
M 350	440	350
M 400	500	400

In all cases, the 28 days compressive strength specified in above be the criteria for acceptance or rejection of the concrete. Where the strength of a concrete mix as indicated by tests, lies in between the strength of any two grades specified in the above table, such concrete shall be classified in for purpose as concrete belonging to the lower of the grades between which its strength lies.

3.0. Workmanship

3.1. The proportions for ingredients chosen shall be such that concrete has adequate workability for conditions prevailing on the work question and can be properly compacted with means available except where it can be shown to the satisfaction of the Engineer-in-charge, that supply of properly graded aggregate of uniform quality can be maintained till the completion of work, grading of aggregate shall be controlled by obtaining the coarse aggregates in different sizes and bending them in the right proportions as required. Aggregates of different sizes shall be stocked in separate stock piles. The required quantity of material shall be stock piled several hours, preferably a day before use. The grading of coarse and fine aggregate shall be checked as frequently as possible, the frequency for a given job being determined by Engineer-in-charge to ensure that the suppliers are maintaining the uniform grading as approved for samples used in the preliminary tests.

3.2. In proportioning concrete, the quantity of both cement and aggregate shall be determined by weight. Where the weight of cement is determined by accepting the maker's weight per bag, a reasonable number of bags shall be weighted separately to check the net weight. Where cement is weighted from bulk stocks at site and not by bags, it shall be weighed separately from the aggregate. Water, shall either be measured by volume in calibrated tanks or weighed. All measuring equipment shall be maintained in clean and serviceable condition. Their accuracy shall be periodically checked.

3.3. It is most important to keep the specified water cement ratio constant and at its correct value. To this end, moisture content in both fine and coarse aggregates shall be determined by the Engineer-in-charge according to the weather conditions. The amount of mixing water shall then be adjusted to compensate for variations in the moisture content. For the determination of moisture content in the aggregates I.S. 2386 (Part-III) shall be referred to. Suitable adjustments shall also be made in the weights of aggregates due to variation in their moisture content. Minimum quantity of cement to be used in controlled concrete shall not be less than 220 kg./m³ in plain concrete and not less than 250 kg/m³ in reinforced concrete.

3.4 The form work shall conform to the shape lines and dimensions as shown on the plans and be constructed as to remain sufficiently rigid during the placing and compacting of the concrete. Adequate arrangements shall be made by the contractor to safe-guard against any settlement of the form-work during the course of concreting and after concreting. The form work of shuttering, centering, scaffolding, bracing etc. shall be as per design.

4.0. Clearing and Treatment of forms:

4.1. All rubbish, particularly chipping shaving and saw dust shall be removed from the interior of the form before the concrete work is placed and the-form in contact with concrete shall be cleaned and thoroughly wetted or treated. The surface shall be then coated with soap solution applied before concreting is done. Soap solution for the purpose shall be prepared by dissolving yellow soap in water to get consistency of paint. Alternatively a coat of raw linseed oil shall be

applied after thoroughly cleaning the surface. Care shall be taken that the coating does not get on construction joint surface and reinforced bars..

5.0 Stripping time:

5.1. In normal circumstances and where ordinary cement is used forms may be struck after expire of following periods.

- (a) Sides of walls columns and vertical faces of beams.....24 to 48 hours.
- (b) Beam soffits, (props, left under).....7 days.
- (c) Removal of props slabs:
 - (i) Slabs spanning up to 4.5. m.....7 days.
 - (ii) Spanning over 4.5 mm.....14 days.
- (d) Removal of props t beams and Arches:
 - (i) Spanning up to 6 mm.....14 days.
 - (ii) Spanning over 6 m.....21 days.

6.0 Procedure when removing the form work :

6.1. All form work shall be removed without such shock or vibrations as would damage the reinforced concrete surface. Before the soffits form work and struts are removed, the soffits and the concrete surface shall be exposed where necessary in order to ascertain that the concrete has sufficiently hardened.

7.0 Centering:

7.1. The centering to be provided shall be got approved. It shall be sufficiently strong to ensure absolute safety of the form work and concrete work before, during and after pouring concrete. Watch should be kept to see that behavior or centering and form work is satisfactory during concreting. Erection should also be such that it would allow removal of forms in proper sequence without damaging either the concrete or the forms to be removed.

7.2. The props of centering shall be provided on firm foundation or base of sufficient strength to carry the loads without any settlement.

7.3. The centering and form work shall, be inspected and approved by the Engineer-in-charge before concreting. But this will not relieve the contractor of his responsibility for strength, adequacy and safety of form work and centering. If there is a failure of form work or centering, contractor shall be responsible for the damages to property.

8.0 Scaffolding:

8.1. All scaffolding, hoisting arrangements and ladders etc. required for the facilitating of conceding shall be provided and removed on completion of work by contractor at his own expense. The scaffolding, hoisting arrangements and ladders etc. shall be strong enough to with stand all live, dead and impact loads expected to act and shall be subject to the approval of the Engineer-in-charge. However contractor shall be solely responsible for the safety of the scaffolding, hoisting arrangement, ladders, work and workman etc.

8.2. The scaffolding, hoisting arrangements and ladder shall allow easy approach to the work spot and afford easy inspection.

8.3. The rate is applicable to all condition of working and height up to 4 mts. The rate shall include the cost of materials and labour for various operations involved such as :

- (a) Splayed edges, notching, allowance for overlaps and passing at angles, battens centering, shuttering propping, bolting, wedging easing, striking and removal.
- (b) Filleting to form stop chamfered edges or splayed external angles not exceeding 20 mm: width to beams, columns and the like.
- (c) Temporary openings in the forms for pouring concrete, if required removing rubbish etc.
- (d) Dressing with oil to prevent adhesion of concrete with shuttering and.
- (e) Raking or circular cutting.

9.0 Re-Use:

9.1. Before re-use, all form shall be inspected by Engineer-in-charge and their suitability ascertained. The forms shall be scarred, cleaned and joints are gone over, repaired where required. Inside surface shall be retreated to prevent adhesion of concrete.

10.0. Mode of measurement & payment

- 10.1. The consolidated cubical contents of concrete work as specified in item shall be measured. No deduction shall be made for
 - (a) Ends of dissimilar materials such as joints, beams, posts, girders, falters, purling trusses, corbels and steps etc. up to 500 Sq, Cm. in section.
- 10.2. Form work shall be measured as the area in square meters to shuttering in contract with concrete except in the case of inclined member and portion of curved profile and upper side in which case on area of underside shall be measured for payment.
- 10.3. Form work to secondary beams shall be measured up to the sides of main beams but no deduction shall be made form the form work of the main beam at the inter section point. No deduction shall be made form the form work of a column at inter section of beams.
- 10.4. The rate includes cost of all materials labour, tools and plant required for mixing, placing in position, vibrating and compacting, finishing, as directed, curing and all other incidental expenses for producing concrete of specified strength. The rate includes the cost of form work.
- 10.5. The rate shall be for a unit of **one cubic meter**.

Item no. 8 Providing and laying ordinary cement concreete 1:1.5:3 (1 Cement : 1.5 coarse sand : 3 graded stone aggregates 20mm nominal size) and curing complete Including cost of form work in (i) Beam Having cross-sectional area 0.08 to 0.12 sq. m.

1.0. Materials : Water shall conform to M-1. Cement shall conform to M-3. Sand shall conform to M-6. Grit shall conform to

M-8. Graded stone aggregate 20 mm. nominal size shall conform to M-12.

2.0. General:

2.1. The concrete mix is not required to be designed by preliminary tests. The proportion of the concrete mix shall be 1 : 2 :

4 (1 cement: 2 coarse sand ; 4 graded stone aggregate 10 mm. nominal size) by volume.

Concrete work shall have exposed

concrete surface or as specified in the item.

2.2. The designation ordinary M-100, M-150, M-200, M-250 specified as per. I.S.

Corresponding approximately to 1 : 3 : 6,

1 : 2 : 4, 1 : 1 1/2 : 3 and 1:1:2 nominal mix of ordinary concrete by volume respectively.

2.3. The ingredients required for ordinary concrete containing one beg of cement of 50 Kg. by weight (0.0342 Cu. M.) for

different proportions of mix shall be as under:

Grade of

concrete

Total quantity of dry aggregate by volume

per 50 Kgs. of cement to be taken as the

sum of individual volume of fine and

coarse aggregates, maximum

Proportion of fine aggregate to

coarse aggregate

Quantity of

water per 50 Kgs.

of cement

maximum.

1 2 3 4

M-100 (1 : 3: 6) 300 Liters Generally 1 : 2 for fine aggregate 34 Liters

M-150 (1 : 2 : 4) 2.20 " to coarse aggregate by volume 32 "

M-200 (1 : 1 1/2 : 3) 160 “ but subject to and upper limit 30 “

M-250 (1:1:2) 100 “ of 1 : 1 1/2 and lower limit 1 : 3 27 “

2.4. The water cement ratios shall not more than those specified in the above table. The cement content of the mix specified

in the Table shall be increased if the quantity of water in a mix has to be increased to overcome the difficulties of placement

and compaction so that the water-cement-ratio specified in the Table is not exceeded.

2.5. Workability of the concrete shall be controlled by maintaining a water-cement-ratio that is bound to give a concrete mix

which is just sufficiently wet to be placed and compacted without difficulty with the means available.

2.6. The maximum size of coarse aggregate shall be as large as possible within the limits specified but in no case greater than

one fourth of the minimum thickness of the member, provided that the concrete can be placed without difficulty so as to

surround all reinforcement thoroughly and to fill the comers of the form.

2.7. For reinforced concrete work, coarse aggregates having a nominal size of 20 mm. are generally considered satisfactory.

2.8. For heavily reinforced concrete members as in the case of ribs of main beams, the nominal maximum size of coarse

aggregate should usually be restricted to 5 mm. less than the minimum, clear distance between the main bars, or 5 mm. less

than the minimum cover to the reinforcement whichever is smaller.

33

2.9. Where the reinforcement is widely spaced as in solid slabs, limitations of size of the aggregate may not be important and

the nominal maximum size may sometimes be as great as OF greater than the minimum cover.

2.10. Admixture may be used in concrete only with approval of Engineer-in-charge based upon the evidence that with the

passage of time, neither the compressive strength of concrete is reduced nor are other requisite qualities of concrete and steel

impaired by the use of such admixtures.

3.0. Workmanship:

3.1. Proportioning : Proportioning shall be done by volume, except cement which shall be measured in terms of bags of 50

Kg. weight. The volume of one such bag being taken as 0.0342 Cu. metre. Boxes of suitable sizes shall be used for measuring

sand aggregate. The size of the boxes (internal) shall be 35 cms. x 25 cms. and 40 Cms. deep. While measuring the aggregate

and sand, the box shall be filled without shaking ramming or hammering. The proportioning of sand shall be on the basis of

its dry volume and in case of damp sand, allowances for bulkage shall be made.

3.2 Mixing:

3.2.1. For all work, concrete shall “be mixed in a mechanical mixer which alongwith other accessories shall be kept in first

class working condition and so maintained throughout the construction. Measured quantity of aggregate, sand, cement

required for each batch shall be poured into the drum of the mechanical mixer while it is continuously running. After about

half a minute of dry mixing, measured quantity of water required for each batch of concrete mix shall be added gradually and mixing continued for another one and a half minute. Mixing shall be continued till materials are uniformly distributed and uniform colour of the entire mass is obtained and each individual particle of the coarse aggregate shows complete coating of mortar containing its proportionate amount of cement. In no case shall the mixing be done for less than 2 minutes after all ingredients have been put into the mixer.

3.2.2. When hand mixing is permitted by the Engineer-in-charge for small jobs or for certain other reasons, it shall be done on the smooth watertight platform large enough to allow efficient turning over the ingredients of concrete before and after adding water. Mixing platform shall be so arranged that no foreign material gets mixed with concrete nor does the mixing water flow out. Cement in required number of bags shall be placed in a uniform layer on top of the measured quantity of fine and coarse aggregate, which shall also be spread in a layer of uniform thickness on the mixing platform. Dry coarse and fine aggregate and cement shall then be mixed thoroughly by turning over to get a mixture to uniform colour. Specified quantity of water shall then be added gradually through a rose-can and the mass turned over till a mix of required consistency is obtained. In hand mixing, quantity of cement shall be increased by 10 percent above that specified.

3.2.3. Mixers which have been out of use for more than 30 minutes shall be thoroughly cleaned before putting in a new batch. Unless otherwise agreed to by the Engineer-in-charge the first batch of concrete from the mixture shall contain only two thirds of normal quantity of coarse aggregate. Mixing plant shall be thoroughly cleaned before changing from one type of cement to another. .

3.3. Consistency: 3.3.1. The degree of consistency which shall depend upon the nature of the work and methods of vibration of concrete, shall be determined by regular slump tests in accordance with I.S. 1199-1959. The slump of 10 mm. to 25 mm. shall be adopted when vibrators are used and 80 mm. when vibrators are not used.

4.4. Inspection:

3.4.1. Contractor shall give the Engineer-in-charge due notice before placing any concrete in the forms to permit him to inspect and accept the false work and forms as to their strength, alignment, and general fitness but such inspection shall not relieve the contractor of his responsibility for the safety of men, machinery, materials and for results obtained. Immediately before concreting, all forms shall be thoroughly cleaned.

3.4.2. Centering design and its erection shall be got approved from the Engineer-in-charge. One carpenter with helper shall invariably be kept present throughout the period of concreting. Movement of labour and other persons shall be totally

prohibited for reinforcement laid in position. For access to different parts, suitable mobile platforms shall be provided so that steel reinforcement in position is not disturbed. For ensuring proper cover, mortar blocks of suitable size shall be cast and tied to the reinforcement. Timber, kapachi or metal pieces shall not be used for this purpose.

3.5. Transporting and laying:

3.5.1. The method of transporting and placing concrete shall be as approved. Concrete shall be so transported and placed that no contamination, segregation or loss of its constituent material takes place.

All form work shall be cleaned and made free from standing water, dust, snow or ice immediately before placing of concrete.

No concrete shall be placed in any part of the structure until the approval of the Engineer-in-charge has been obtained.

3.5.2. Concreting shall proceed continuously over the area between construction joints.

Fresh concrete shall not be placed

against concrete which has been in position for more than 30 minutes unless a proper construction joint is formed. Concrete

shall be compacted in its final position within 30 minutes of its discharge from the mixer.

Except where otherwise agreed to

by the Engineer-in-charge concrete shall be deposited in horizontal layers to a compacted depth of not more than 0.45 metre

when internal vibrators are used and not exceeding 0.30 metre in all other cases.

3.5.3. Unless otherwise agreed to by the Engineer-in-charge, concrete shall not be dropped into place from a height exceeding

2 metres. When trucks or chutes are used they shall be kept close and used in such a way as to avoid segregation. When

concreting has to be resumed on a surface which has hardened, it shall be roughened, swept clean, thoroughly wetted and

covered with a 13 mm. thick layer of mortar composed of cement and sand in the same ratio as in the concrete mix itself. This

13 mm. layer of mortar shall be freshly mixed and placed immediately before placing of new concrete. Where concrete has

not fully hardened, all laitance shall be removed by scrubbing the wet surface with wire or bristle brushes, care being taken

to avoid dislodgement of any particles of coarse aggregate. The surface shall then be thoroughly wetted, all free water

removed and then coated with neat cement grout. The first layer of concrete to be placed on this surface shall not exceed 150

mm. in thickness and shall be well rammed against old work, particular attention being given to corners and close spots.

3.5.4. All concrete shall be compacted to produce a dense homogeneous mass with the assistance of vibrators unless, otherwise permitted by the Engineer-in-charge for exceptional cases, such as concreting under water, where vibrators cannot

be used. Sufficient vibrators in serviceable condition shall be kept at site so that spare equipment is always available in the event of breakdowns.

Concrete shall be judged to be compacted when the mortar fills the spaces between the coarse aggregate and begins to cream

up to form an even surface. Compaction shall be completed before the initial setting starts i.e. within 30 minutes of addition of water to dry mixture. During compaction, it shall be observed that needle vibrators are not applied on reinforcement which is likely to destroy the bond between concrete and reinforcement.

3.6. Curing: Immediately after compaction, concrete shall be protected from weather, including rain, running water, shocks, vibration, traffic, rapid temperature changes, frost and drying out process. It shall be covered with wet sacking, hassain or other similar absorbant material approved, soon after the initial set and shall be kept continuously wet for a period of not less than 14 days from the date of placement. Masonary work over foundation concrete may be started after 48 hours of its laying but curing of concrete shall be continued for a minimum period of 14 days.

3.7. Sampling and Testing of concrete :

3.7.1. Samples from fresh concrete shall be taken as per I.S. 1199-1959 and cubes shall be made, cured and tested at 7 days or 28 days as per requirements in accordance with I.S. 516-1959. A random sampling procedure shall be adopted to ensure that each concrete batch shall have a resonable chance of being tested i.e. the sampling should be spread over the entire period of concreting and cover all mixing units. The minimum frequency of sampling of concrete of each grade shall be in accordance with following :

Quantity of concrete in the work	No. of samples	Quantity of concrete in the works	No. of samples
----------------------------------	----------------	-----------------------------------	----------------

1-5Cmt.	1	16-30Cmt.	3
---------	---	-----------	---

6-15Cmt.	2	31-50	4
----------	---	-------	---

51 and above	4 + one additional for each additional 50 M. or part thereof.
--------------	---

NOTE : At least one sample shall be taken from each shift. Ten test specimens shall be made from each sample, five for testing at 7 days and the remaining five at 28 days. The samples of concrete shall be taken on each day of the concreting as per above frequency. The number of specimens may be suitably increased as deemed necessary by the Engineer-in-charge when procedure of tests given above reveals a poor quality of concrete and in other special cases.

3.7.2. Tire average strength of the group of cubes cast for each day shall not be less than the specified cube strength of 150

Kg/Cm at 28 days. 20% of the cubes cast for each day may have value less than the specified strength provided the lowest value is not less than 85% of the specified strength. If the concrete made in accordance with the proportions given for a particular grade docs not yield the specified strength, such concrete shall be classified as belonging to the appropriate lower, grade concrete made in accordance with the proportions given for a particular grade shall not, however, be placed in a higher grade on the ground that the test strength are higher than the minimum specified.

3.8. Stripping:

3.8.1. The Engineer-in charge shall be informed in advance by the contractor of his intention to strike the form work. While fixing the time for removal of form work, due consideration shall be given to local conditions, character of the structure, the weather and other condition that influence the setting of concrete and of the materials used in the mix. In normal circumstances (generally where temperatures are above 20 ° C) and where ordinary concrete is used, forms may be struck after expiry of periods specified in item No. 9.1 (A) for respective item of form work.

3.8.2. All form work shall be removed without causing any shock or vibration as would damage the concrete. Before the soffit and struts are removed, the concrete surface shall be exposed, where necessary in order to ascertain that the concrete has sufficiently hardened. Centring shall be gradually and uniformly lowered in such manner as to permit the concrete to take stresses due to its own weight uniformly and gradually. Where internal metal ties are permitted, they or their removable parts shall be extracted without causing any damage to the concrete and remaining holes filled with mortar. No permanently embedded metal part shall have less than 25 mm. cover to the finished concrete surface. Where it is intended to re-use the form work, it shall be cleaned and made good to the satisfaction of the Engineer-in- charge. After removal of form work and shuttering, the Executive Engineer shall inspect the work and satisfy by random checks that concrete produced is of good quality.

3.8.3. Immediately after the removal of forms, all exposed bolts etc., passing through the cement concrete member and used for shuttering or any other purpose shall be cut inside the cement concrete member to a depth of at least 25 mm. below the surface of the concrete and the resulting holes be filled by cement mortar. All fine caused by form joints, all cavities produced by the removal of form ties and all other holes and depressions honeycomb spots, broken edges or corners and other defects shall be thoroughly cleaned, saturated with water and carefully pointed and rendered true with mortar of cement and fine aggregate mixed in the proportions used in the grade of concrete that is-being finished and of as dry consistency as is possible to use. Considerable pressure shall be applied in filling and pointing to ensure thorough filling in all voids. Surfaces which are pointed shall be kept moist for a period of 24 hours. If rock pockets/honeycombs in the opinion of the Engineer in- charge are of such an extent or character to effect the strength of the structure materially or to endanger the, life of the steel reinforcement, he may declare the concrete defective and require the removal and replacement of the portions of the structure affected.

4.0. Mode of measurement and payment:

4.1. The consolidated cubical contents of concrete work as specified in item shall be measured. The concrete laid in excess

of section shown on drawings or as directed shall not be measured. No deduction shall be made for

(a) Ends of dis-similar materials such as joits, beams, posts, girders, rafters, purline trusses, corbels and steps etc upt 500 Sq.

Cm. in section.

(b) Opening upto 0.1 Sq. M.

4.2. The rate includes cost of all materials, labour, tools and plant required for mixing, placing, position, vibrating and compacting, finishing, as directed, curing and all other incidental expenses for producing concrete lied strength The rate excludes the cost of form work.

4.3. The rate shall be for a unit of one cubic metre.

Item No- 9 Provdg & laying cement concrete 1:1.5:3 (1cement : 1.5 coarse sand 3 graded stone aggregate 20 mm nominal size) for reinforced concrete chhajjas not exceeding 10 cm. Thickness upto floor two level including finishing the exposed surfaces with cement mortar 1:3 (1 cement : 3 fine sand) to give a smooth and even surface centering and form work and curing complete excluding cost of reinforcement.

1.0. Materials

1.1. Water shall conform to M-1. Cement shall conform to M-3. Sand shall conform to M-6. Grit shall conform to M-8. Coarse aggregate shall conform M-12.

1.2. The shuttering to be provided shall be of ordinary timber plank and shall conform to M-26.

1.3. The dimensions of scantlings and battens shall conform to the design. The strength of the wood shall not be less than that assumed in the design.

2.0. General

2.1. The concrete mix shall be designed from preliminary tests. The proportion of the concrete mix shall be 1:1.5:3 (1 cement : 1.5 coarse sand : 3 graded stone aggregate 20 mm. nominal size) by volume concrete work shall have exposed concrete surface or as specified in the item.

2.2. The proportioning of cement and aggregates shall be done by weight and necessary precautions shall be taken in the production to ensure that the required work cube strength is attained and maintained. The controlled concrete shall be in grades of M-100, M-150, M-200, M-250, M-300, M-350 & M-400 with prefix controlled added to it. The letter M refers to mix and the numbers specify 28 days works cube compressive strength of 150 mm. cubes of the mix expressed in Kg./cm.

2.3. The proportion of cement, sand and coarse aggregate shall be determined of weight. The weight batch machine shall be used for maintaining proper control over the proportion of aggregates as per mix design. The strength requirements of different grades of concrete shall be as under:

Grade of Concrete	Compressive strength of 15 cms. cubes in kg/cmt. at 28 days, conducted in accordance with I.S. 516-1959.	
	Preliminary test Min.	Work Test Min.
M 150	200	150
M 200	260	200
M 250	320	250
M 300	380	300
M 350	440	350

In all cases, the 28 days compressive strength specified in above be the criteria for acceptance or rejection of the concrete. Where the strength of a concrete mix as indicated by tests, lies in between the strength of any two grades specified in the above table, such concrete shall be classified in for purpose as concrete belonging to the lower of the grades between which its strength lies.

3.0. Workmanship

3.1. The proportions for ingredients chosen shall be such that concrete has adequate workability for conditions prevailing on the work question and can be properly compacted with means available except where it can be shown to the satisfaction of the Engineer-in-charge, that supply of properly graded aggregate of uniform quality can be maintained till the completion of work, grading of aggregate shall be controlled by obtaining the coarse aggregates in different sizes and bending them in the right proportions as required. Aggregates of different sizes shall be stocked in separate stock piles. The required quantity of material shall be stock piled several hours, preferably a day before use. The grading of coarse and fine aggregate shall be checked as frequently as possible, the frequency for a given job being determined by Engineer-in-charge to ensure that the suppliers are maintaining the uniform grading as approved for samples used in the preliminary tests.

3.2. In proportioning concrete, the quantity of both cement and aggregate shall be determined by weight. Where the weight of cement is determined by accepting the maker's weight per bag, a reasonable number of bags shall be weighted separately to check the net weight. Where cement is weighted from bulk stocks at site and not by bags, it shall be weighed separately from the aggregate. Water, shall either be measured by volume in calibrated tanks or weighed. All measuring equipment shall be maintained in clean and serviceable condition. Their accuracy shall be periodically checked.

3.3. It is most important to keep the specified water cement ratio constant and at its correct value. To this end, moisture content in both fine and coarse aggregates shall be determined by the Engineer-in-charge according to the weather conditions. The amount of mixing water shall then be adjusted to compensate for variations in the moisture content. For the determination of moisture content in the aggregates I.S. 2386 (Part-III) shall be referred to. Suitable adjustments shall also be made in the weights of aggregates due to variation in their moisture content. Minimum quantity of cement to be used in controlled concrete shall not be less than 220 kg./m³ in plain concrete and not less than 250 kg/m³ in reinforced concrete.

3.4 The form work shall conform to the shape lines and dimensions as shown on the plans and be constructed as to remain sufficiently rigid during the placing and compacting of the concrete. Adequate arrangements shall be made by the contractor to safe-guard against any settlement of the form-work during the course of concreting and after concreting. The form work of shuttering, centering, scaffolding, bracing etc. shall be as per design.

4.0. Clearing and Treatment of forms:

4.1. All rubbish, particularly chipping shaving and saw dust shall be removed from the interior of the form before the concrete work is placed and the form in contact with concrete shall be cleaned and thoroughly wetted or treated. The surface shall be then coated with soap solution applied before concreting is done. Soap solution for the purpose shall be prepared by dissolving yellow soap in water to get consistency of paint. Alternatively a coat of raw linseed oil shall be applied after thoroughly cleaning the surface. Care shall be taken that the coating does not get on construction joint surface and reinforced bars..

5.0 Stripping time:

5.1. In normal circumstances and where ordinary cement is used forms may be struck after expire of following periods.

- (a) Sides of walls columns and vertical faces of beams.....24 to 48 hours.
- (b) Beam soffits, (props, left under).....7 days.
- (c) Removal of props slabs:
 - (i) Slabs spanning up to 4.5. m.....7 days.
 - (ii) Spanning over 4.5 mm.....14 days.
- (d) Removal of props t beams and Arches:
 - (i) Spanning up to 6 mm.....14 days.
 - (ii) Spanning over 6 m.....21 days.

6.0 Procedure when removing the form work :

6.1. All form work shall be removed without such shock or vibrations as would damage the reinforced concrete surface. Before the soffits form work and struts are removed, the soffits and the concrete surface shall be exposed where necessary in order to ascertain that the concrete has sufficiently hardened.

7.0 Centering:

7.1. The centering to be provided shall be got approved. It shall be sufficiently strong to ensure absolute safety of the form work and concrete work before, during and after pouring concrete. Watch should be kept to see that behavior or centering and form work is satisfactory during concreting. Erection should also be such that it would allow removal of forms in proper sequence without damaging either the concrete or the forms to be removed.

7.2. The props of centering shall be provided on firm foundation or base of sufficient strength to carry the loads without any settlement.

7.3. The centering and form work shall, be inspected and approved by the Engineer-in-charge before concreting. But this will not relieve the contractor of his responsibility for strength, adequacy and safety of form work and centering. If there is a failure of form work or centering, contractor shall be responsible for the damages to property.

8.0 Scaffolding:

8.1. All scaffolding, hoisting arrangements and ladders etc. required for the facilitating of conceding shall be provided and removed on completion of work by contractor at his own expense. The scaffolding, hoisting arrangements and ladders etc. shall be strong enough to with stand all live, dead and impact loads expected to act and shall be subject to the approval of the Engineer-in-charge. However contractor shall be solely responsible for the safety of the scaffolding, hoisting arrangement, ladders, work and workman etc.

8.2. The scaffolding, hoisting arrangements and ladder shall allow easy approach to the work spot and afford easy inspection.

8.3. The rate is applicable to all condition of working and height up to 4 mts. The rate shall include the cost of materials and labour for various operations involved such as :

- (a) Splayed edges, notching, allowance for overlaps and passing at angles, battens centering, shuttering propping, bolting, wedging easing, striking and removal.
- (b) Filleting to form stop chamfered edges or splayed external angles not exceeding 20 mm: width to beams, columns and the like.
- (c) Temporary openings in the forms for pouring concrete, if required removing rubbish etc.
- (d) Dressing with oil to prevent adhesion of concrete with shuttering and.
- (e) Raking or circular cutting.

9.0 Re-Use:

9.1. Before re-use, all from shall be inspected by Engineer-in-charge and their suitability ascertained. The forms shall be scarred, cleaned and joints are gone over, repaired where required. Inside surface shall be retreated to prevent adhesion of concrete.

10.0 Mode of measurement & payment

10.1. The consolidated cubical contents of concrete work as specified in item shall be measured. No deduction shall be made for

- (a) Ends of dissimilar materials such as joints, beams, posts, girders, falters, purling trusses, corbels and steps etc. up to 500 Sq. Cm. in section.
- 10.2.** Form work shall be measured as the area in square meters to shuttering in contract with concrete except in the case of inclined member and portion of curved profile and upper side in which case on area of underside shall be measured for payment.
- 10.3.** Form work to secondary beams shall be measured up to the sides of main beams but no deduction shall be made form the form work of the main beam at the inter section point. No deduction shall be made form the form work of a column at inter section of beams.
- 10.4.** The rate includes cost of all materials labour, tools and plant required for mixing, placing in position, vibrating and compacting, finishing, as directed, curing and all other incidental expenses for producing concrete of specified strength. The rate includes the cost of form work.
- 10.5.** The rate shall be for a unit of **one cubic meter**.

Item No- 10 Provdg & laying Ordinary cement concrete 1:1.5:3 (1cement : 1.5 coarse sand 3 graded stone aggragate 20 mm nominal size) and finishing the smooth with curing etc. complete including the cost of formwok but excluding the cost of reinforcement for RCC work in (II) slabs having more than 10 cm and upto 13 cm thickness.

1.0. Materials : Water shall conform to M-1. Cement shall conform to M-3. Sand shall conform to M-6. Grit shall conform to M-8. Graded stone aggregate 20 mm. nominal size shall conform to M-12.

2.0. General:

2.1. The concrete mix is not required to be designed by preliminary tests. The proportion of the concrete mix shall be 1 : 2 :

4 (1 cement: 2 coarse sand ; 4 graded stone aggregate 10 mm. nominal size) by volume.

Concrete work shall have exposed concrete surface or as specified in the item.

2.2. The designation ordinary M-100, M-150, M-200, M-250 specified as per. I.S.

Corresponding approximately to 1 : 3 : 6,

1 : 2 : 4, 1 : 1 1/2 : 3 and 1:1:2 nominal mix of ordinary concrete by volume respectively.

2.3. The ingredients required for ordinary concrete containing one beg of cement of 50 Kg. by weight (0.0342 Cu. M.) for

different proportions of mix shall be as under:

Grade of

concrete

Total quantity of dry aggregate by volume

per 50 Kgs. of cement to be taken as the

sum of individual volume of fine and

coarse aggregates, maximum

Proportion of fine aggregate to

coarse aggregate

Quantity of

water per 50 Kgs.

of cement

maximum.

1 2 3 4

M-100 (1 : 3: 6) 300 Liters Generally 1 : 2 for fine aggregate 34 Liters

M-150 (1 : 2 : 4) 2.20 " to coarse aggregate by volume 32 "

M-200 (1 : 1 1/2 : 3) 160 “ but subject to and upper limit 30 “

M-250 (1:1:2) 100 “ of 1 : 1 1/2 and lower limit 1 : 3 27 “

2.4. The water cement ratios shall not more than those specified in the above table. The cement content of the mix specified

in the Table shall be increased if the quantity of water in a mix has to be increased to overcome the difficulties of placement

and compaction so that the water-cement-ratio specified in the Table is not exceeded.

2.5. Workability of the concrete shall be controlled by maintaining a water-cement-ratio that is bound to give a concrete mix

which is just sufficiently wet to be placed and compacted without difficulty with the means available.

2.6. The maximum size of coarse aggregate shall be as large as possible within the limits specified but in no case greater than

one fourth of the minimum thickness of the member, provided that the concrete can be placed without difficulty so as to

surround all reinforcement thoroughly and to fill the comers of the form.

2.7. For reinforced concrete work, coarse aggregates having a nominal size of 20 mm. are generally considered satisfactory.

2.8. For heavily reinforced concrete members as in the case of ribs of main beams, the nominal maximum size of coarse

aggregate should usually be restricted to 5 mm. less than the minimum, clear distance between the main bars, or 5 mm. less

than the minimum cover to the reinforcement whichever is smaller.

33

2.9. Where the reinforcement is widely spaced as in solid slabs, limitations of size of the aggregate may not be important and

the nominal maximum size may sometimes be as great as OF greater than the minimum cover.

2.10. Admixture may be used in concrete only with approval of Engineer-in-charge based upon the evidence that with the

passage of time, neither the compressive strength of concrete is reduced nor are other requisite qualities of concrete and steel

impaired by the use of such admixtures.

3.0. Workmanship:

3.1. Proportioning : Proportioning shall be done by volume, except cement which shall be measured in terms of bags of 50

Kg. weight. The volume of one such bag being taken as 0.0342 Cu. metre. Boxes of suitable sizes shall be used for measuring

sand aggregate. The size of the boxes (internal) shall be 35 cms. x 25 cms. and 40 Cms. deep. While measuring the aggregate

and sand, the box shall be filled without shaking ramming or hammering. The proportioning of sand shall be on the basis of

its dry volume and in case of damp sand, allowances for bulkage shall be made.

3.2 Mixing:

3.2.1. For all work, concrete shall “be mixed in a mechanical mixer which alongwith other accessories shall be kept in first

class working condition and so maintained throughout the construction. Measured quantity of aggregate, sand, cement

required for each batch shall be poured into the drum of the mechanical mixer while it is continuously running. After about

half a minute of dry mixing, measured quantity of water required for each batch of concrete mix shall be added gradually and mixing continued for another one and a half minute. Mixing shall be continued till materials are uniformly distributed and uniform colour of the entire mass is obtained and each individual particle of the coarse aggregate shows complete coating of mortar containing its proportionate amount of cement. In no case shall the mixing be done for less than 2 minutes after all ingredients have been put into the mixer.

3.2.2. When hand mixing is permitted by the Engineer-in-charge for small jobs or for certain other reasons, it shall be done on the smooth watertight platform large enough to allow efficient turning over the ingredients of concrete before and after adding water. Mixing platform shall be so arranged that no foreign material gets mixed with concrete nor does the mixing water flow out. Cement in required number of bags shall be placed in a uniform layer on top of the measured quantity of fine and coarse aggregate, which shall also be spread in a layer of uniform thickness on the mixing platform. Dry coarse and fine aggregate and cement shall then be mixed thoroughly by turning over to get a mixture to uniform colour. Specified quantity of water shall then be added gradually through a rose-can and the mass turned over till a mix of required consistency is obtained. In hand mixing, quantity of cement shall be increased by 10 percent above that specified.

3.2.3. Mixers which have been out of use for more than 30 minutes shall be thoroughly cleaned before putting in a new batch. Unless otherwise agreed to by the Engineer-in-charge the first batch of concrete from the mixture shall contain only two thirds of normal quantity of coarse aggregate. Mixing plant shall be thoroughly cleaned before changing from one type of cement to another. .

3.3. Consistency: 3.3.1. The degree of consistency which shall depend upon the nature of the work and methods of vibration of concrete, shall be determined by regular slump tests in accordance with I.S. 1199-1959. The slump of 10 mm. to 25 mm. shall be adopted when vibrators are used and 80 mm. when vibrators are not used.

4.4. Inspection:

3.4.1. Contractor shall give the Engineer-in-charge due notice before placing any concrete in the forms to permit him to inspect and accept the false work and forms as to their strength, alignment, and general fitness but such inspection shall not relieve the contractor of his responsibility for the safety of men, machinery, materials and for results obtained. Immediately before concreting, all forms shall be thoroughly cleaned.

3.4.2. Centering design and its erection shall be got approved from the Engineer-in-charge. One carpenter with helper shall invariably be kept present throughout the period of concreting. Movement of labour and other persons shall be totally

prohibited for reinforcement laid in position. For access to different parts, suitable mobile platforms shall be provided so that steel reinforcement in position is not disturbed. For ensuring proper cover, mortar blocks of suitable size shall be cast and tied to the reinforcement. Timber, kapachi or metal pieces shall not be used for this purpose.

3.5. Transporting and laying:

3.5.1. The method of transporting and placing concrete shall be as approved. Concrete shall be so transported and placed that no contamination segregation or loss of its constituent material takes place. All form work shall be cleaned and made free from standing water, dust, snow or ice immediately before placing of concrete.

34

No concrete shall be placed in any part of the structure until the approval of the Engineer-in-charge has been obtained.

3.5.2. Concreting shall proceed continuously over the area between construction joints.

Fresh concrete shall not be placed against concrete which has been in position for more than 30 minutes unless a proper construction joint is formed. Concrete shall be compacted in its final position within 30 minutes of its discharge from the mixer.

Except where otherwise agreed to by the Engineer-in-charge concrete shall be deposited in horizontal layers to a compacted depth of not more than 0.45 metre when internal vibrators are used and not exceeding 0.30 metre in all other cases.

3.5.3. Unless otherwise agreed to by the Engineer-in-charge, concrete shall not be dropped into place from a height exceeding 2 metres. When trucks or chutes are used they shall be kept close and used in such a way as to avoid segregation. When

concreting has to be resumed on a surface which has hardened, it shall be roughened, swept clean, thoroughly wetted and covered with a 13 mm. thick layer of mortar composed of cement and sand in the same ratio as in the concrete mix itself. This

13 mm. layer of mortar shall be freshly mixed and placed immediately before placing of new concrete. Where concrete has

not fully hardened, all laitance shall be removed by scrubbing the wet surface with wire or bristle brushes, care being taken

to avoid dislodgement of any particles of coarse aggregate. The surface shall then be thoroughly wetted, all free water

removed and then coated with neat cement grout. The first layer of concrete to be placed on this surface shall not exceed 150

mm. in thickness and shall be well rammed against old work, particular attention being given to corners and close spots.

3.5.4. All concrete shall be compacted to produce a dense homogeneous mass with the assistance of vibrators unless, otherwise permitted by the Engineer-in-charge for exceptional cases, such as concreting under water, where vibrators cannot be used. Sufficient vibrators in serviceable condition shall be kept at site so that spare equipment is always available in the event of breakdowns.

Concrete shall be judged to be compacted when the mortar fills the spaces between the coarse aggregate and begins to cream

up to form an even surface. Compaction shall be completed before the initial setting starts i.e. within 30 minutes of addition of water to dry mixture. During compaction, it shall be observed that needle vibrators are not applied on reinforcement which is likely to destroy the bond between concrete and reinforcement.

3.6. Curing: Immediately after compaction, concrete shall be protected from weather, including rain, running water, shocks, vibration, traffic, rapid temperature changes, frost and drying out process. It shall be covered with wet sacking, hessian or other similar absorbent material approved, soon after the initial set and shall be kept continuously wet for a period of not less than 14 days from the date of placement. Masonary work over foundation concrete may be started after 48 hours of its laying but curing of concrete shall be continued for a minimum period of 14 days.

3.7. Sampling and Testing of concrete :

3.7.1. Samples from fresh concrete shall be taken as per I.S. 1199-1959 and cubes shall be made, cured and tested at 7 days or 28 days as per requirements in accordance with I.S. 516-1959. A random sampling procedure shall be adopted to ensure that each concrete batch shall have a reasonable chance of being tested i.e. the sampling should be spread over the entire period of concreting and cover all mixing units. The minimum frequency of sampling of concrete of each grade shall be in accordance with following :

Quantity of concrete in the work	No. of samples	Quantity of concrete in the works	No. of samples
----------------------------------	----------------	-----------------------------------	----------------

1-5Cmt.	1	16-30Cmt.	3
---------	---	-----------	---

6-15Cmt.	2	31-50	4
----------	---	-------	---

51 and above	4 + one additional for each additional 50 M. or part thereof.
--------------	---

NOTE : At least one sample shall be taken from each shift. Ten test specimens shall be made from each sample, five for testing at 7 days and the remaining five at 28 days. The samples of concrete shall be taken on each day of the concreting as per above frequency. The number of specimens may be suitably increased as deemed necessary by the Engineer-in-charge when procedure of tests given above reveals a poor quality of concrete and in other special cases.

3.7.2. Tire average strength of the group of cubes cast for each day shall not be less than the specified cube strength of 150

Kg/Cm at 28 days. 20% of the cubes cast for each day may have value less than the specified strength provided the lowest value is not less than 85% of the specified strength. If the concrete made in accordance with the proportions given for a particular grade does not yield the specified strength, such concrete shall be classified as belonging to the appropriate lower, grade concrete made in accordance with the proportions given for a particular grade shall not, however, be placed in a higher grade on the ground that the test strength are higher than the minimum specified.

3.8. Stripping:

3.8.1. The Engineer-in charge shall be informed in advance by the contractor of his intention to strike the form work. While fixing the time for removal of form work, due consideration shall be given to local conditions, character of the structure, the weather and other condition that influence the setting of concrete and of the materials used in the mix. In normal circumstances (generally where temperatures are above 20 ° C) and where ordinary concrete is used, forms may be struck after expiry of periods specified in item No. 9.1 (A) for respective item of form work.

3.8.2. All form work shall be removed without causing any shock or vibration as would damage the concrete. Before the soffit and struts are removed, the concrete surface shall be exposed, where necessary in order to ascertain that the concrete has sufficiently hardened. Centring shall be gradually and uniformly lowered in such manner as to permit the concrete to take stresses due to its own weight uniformly and gradually. Where internal metal ties are permitted, they or their removable parts shall be extracted without causing any damage to the concrete and remaining holes filled with mortar. No permanently embedded metal part shall have less than 25 mm. cover to the finished concrete surface. Where it is intended to re-use the form work, it shall be cleaned and made good to the satisfaction of the Engineer-in- charge. After removal of form work and shuttering, the Executive Engineer shall inspect the work and satisfy by random checks that concrete produced is of good quality.

3.8.3. Immediately after the removal of forms, all exposed bolts etc., passing through the cement concrete member and used for shuttering or any other purpose shall be cut inside the cement concrete member to a depth of at least 25 mm. below the surface of the concrete and the resulting holes be filled by cement mortar. All fine caused by form joints, all cavities produced by the removal of form ties and all other holes and depressions honeycomb spots, broken edges or corners and other defects shall be thoroughly cleaned, saturated with water and carefully pointed and rendered true with mortar of cement and fine aggregate mixed in the proportions used in the grade of concrete that is-being finished and of as dry consistency as is possible to use. Considerable pressure shall be applied in filling and pointing to ensure thorough filling in all voids. Surfaces which are pointed shall be kept moist for a period of 24 hours. If rock pockets/honeycombs in the opinion of the Engineer in- charge are of such an extent or character to effect the strength of the structure materially or to endanger the, life of the steel reinforcement, he may declare the concrete defective and require the removal and replacement of the portions of the structure affected.

4.0. Mode of measurement and payment:

4.1. The consolidated cubical contents of concrete work as specified in item shall be measured. The concrete laid in excess

of section shown on drawings or as directed shall not be measured. No deduction shall be made for

(a) Ends of dissimilar materials such as joists, beams, posts, girders, rafters, purline trusses, corbels and steps etc up to 500 Sq.

Cm. in section.

(b) Opening up to 0.1 Sq. M.

4.2. The rate includes cost of all materials, labour, tools and plant required for mixing, placing, positioning, vibrating and compacting, finishing, as directed, curing and all other incidental expenses for producing concrete of required strength. The rate excludes the cost of form work.

4.3. The rate shall be for a unit of one cubic metre.

Item No- 11 Construction brick masonry chamber for underground C.I. Inspection chamber and beds with bricks having crushing strength not less than 35 Kg./Sq.Cm. in C.M.1:5 C.I. cover with frame (Light duty) 455 x 610 mm internal dimensions. Total Wt. of cover with frame to be not less than 38 Kg. (Wt. of cover 23 Kg. and wt. of frame 15 Kg.) RCC top slab with 1:2:4 mix foundation concrete 1:5:10 inside plaster 15 mm th. with C.M.1:3 finished smooth with a floating coat of neat cement on walls and bed concrete (i) Inside Dimension 455mm X 610mm and 450mm deep for single pipe line (up to 10 tone)

1.0 Materials: Water shall conform to M-1. Cement shall conform to M-3. Coarse sand shall conform to M-5. Brick shall conform to M-15. Stone aggregate shall conform to M-12. Brick bat shaft shall conform to M-14. M.S. bar shall conform to M-18.

2.0. Workmanship:

2.1. C.I. inspection chamber with provision of C.I. bends of specified size with bolts, nuts and left washers for underground drain shall be enclosed in masonry chamber which shall be constructed as under:

2.2. The excavation shall be done true to dimensions and levels shown on the plans or as directed.

2.3. Bed concrete shall be of 15 cms. thick C.C. 1:5:10 (1 cement: 5 coarse sand : 10 graded brick bat aggregates). The projection of bed concrete beyond the masonry walls shall be 7.5 cms.

2.4. Masonry walls and plaster work shall be carried out as per relevant specifications of item 24-40.

2.5. The cover slab shall be constructed as per relevant specifications of 24.27(1).

3.0. Mode of measurements & payment:

3.1. The earth work in excavation providing and laying C.I. inspection chamber and bends shall be measured and paid for separately.

3.2. The rate shall be for a unit of one number.

Item No- 12 Providing & laying Ordinary cement concrete 1:1.5:3 (1 cement : 1.5 coarse sand 3 graded stone aggregate 20 mm nominal size) and finishing the smooth with curing etc. complete including the cost of formwork but excluding the cost of

reinforcement for RCC work in (II) COLUMNS (i) Having cross sectional area 0.05 to 0.08 Sq.M.

1.0. Materials

1.1. Water shall conform to M-1. Cement shall conform to M-3. Sand shall conform to M-6. Grit shall conform to M-8. Coarse aggregate shall conform M-12.

1.2. The shuttering to be provided shall be of ordinary timber plank and shall conform to M-26.

1.3. The dimensions of scantlings and battens shall conform to the design. The strength of the wood shall not be less than that assumed in the design.

2.0. General

2.1. The concrete mix shall be designed from preliminary tests. The proportion of the concrete mix shall be 1:1.5:3 (1 cement : 1.5 coarse sand : 3 graded stone aggregate 20 mm. nominal size) by volume concrete work shall have exposed concrete surface or as specified in the item.

2.2. The proportioning of cement and aggregates shall be done by weight and necessary precautions shall be taken in the production to ensure that the required work cube strength is attained and maintained. The controlled concrete shall be in grades of M-100, M-150, M-200, M-250, M-300, M-350 & M-400 with prefix controlled added to it. The letter M refers to mix and the numbers specify 28 days works cube compressive strength of 150 mm. cubes of the mix expressed in Kg./cm.

2.3. The proportion of cement, sand and coarse aggregate shall be determined of weight. The weight batch machine shall be used for maintaining proper control over the proportion of aggregates as per mix design. The strength requirements of different grades of concrete shall be as under:

Grade of Concrete	Compressive strength of 15 cms. cubes in kg/cmt. at 28 days, conducted in accordance with I.S. 516-1959.
--------------------------	---

	Preliminary test Min.	Work Test Min.
M 150	200	150
M 200	260	200
M 250	320	250
M 300	380	300
M 350	440	350
M 400	500	400

In all cases, the 28 days compressive strength specified in above be the criteria for acceptance or rejection of the concrete. Where the strength of a concrete mix as indicated by tests, lies in between the strength of any two grades specified in the above table, such concrete shall be classified in for purpose as concrete belonging to the lower of the grades between which its strength lies.

3.0. Workmanship

3.1. The proportions for ingredients chosen shall be such that concrete has adequate workability for conditions prevailing on the work question and can be property compacted with means available except where it can be shown to the satisfaction of the Engineer-in-charge, that supply of properly graded aggregate of uniform quality can be maintained till the completion of work, grading of aggregate shall be controlled by obtaining the coarse aggregates in different sizes and bending them in the right proportions as required. Aggregates of different sizes shall be stocked in separate stock piles. The required quantity of material shall be stock piled several hours, preferably a day before use. The grading of coarse and fine aggregate shall be checked as frequently as possible, the frequency for a given job being determined by Engineer-in-charge to ensure that the suppliers are maintaining the uniform grading as approved for samples used in the preliminary tests.

- 3.2.** In proportioning concrete, the quantity of both cement and aggregate shall be determined by weight. Where the weight of cement is determined by accepting the maker's weight per bag, a reasonable number of bags shall be weighted separately to check the net weight. Where cement is weighted from bulk stocks at site and not by bags, it shall be weighed separately from the aggregate. Water, shall either be measured by volume in calibrated tanks or weighed. All measuring equipment shall be maintained in clean and serviceable condition. Their accuracy shall be periodically checked.
- 3.3.** It is most important to keep the specified water cement ratio constant and at its correct value. To this end, moisture content in both fine and coarse aggregates shall be determined by the Engineer-in-charge according to the weather conditions. The amount of mixing water shall then be adjusted to compensate for variations in the moisture content. For the determination of moisture content in the aggregates I.S. 2386 (Part-III) shall be referred to. Suitable adjustments shall also be made in the weights of aggregates due to variation in their moisture content. Minimum quantity of cement to be used in controlled concrete shall not be less than 220 kg./m³ in plain concrete and not less than 250 kg/m³ in reinforced concrete.
- 3.4** The form work shall conform to the shape lines and dimensions as shown on the plans and be constructed as to remain sufficiently rigid during the placing and compacting of the concrete. Adequate arrangements shall be made by the contractor to safe-guard against any settlement of the form-work during the course of concreting and after concreting. The form work of shuttering, centering, scaffolding, bracing etc. shall be as per design.
- 4.0. Clearing and Treatment of forms:**
- 4.1.** All rubbish, particularly chipping shaving and saw dust shall be removed from the interior of the form before the concrete work is placed and the-form in contact with concrete shall be cleaned and thoroughly wetted or treated. The surface shall be then coated with soap solution applied before concreting is done. Soap solution for the purpose shall be prepared by dissolving yellow soap in water to get consistency of paint. Alternatively a coat of raw linseed oil shall be applied after thoroughly cleaning the surface. Care shall be taken that the coating does not get on construction joint surface and reinforced bars..
- 5.0 Stripping time:**
- 5.1.** In normal circumstances and where ordinary cement is used forms may be struck after expiry of following periods.
- | | |
|---|-----------------|
| (a) Sides of walls columns and vertical faces of beams..... | 24 to 48 hours. |
| (b) Beam soffits, (props, left under)..... | 7 days. |
| (c) Removal of props slabs: | |
| (i) Slabs spanning up to 4.5. m..... | 7 days. |
| (ii) Spanning over 4.5 mm..... | 14 days. |
| (d) Removal of props t beams and Arches: | |
| (i) Spanning up to 6 m..... | 14 days. |
| (ii) Spanning over 6 m..... | 21 days. |
- 6.0 Procedure when removing the form work :**
- 6.1.** All form work shall be removed without such shock or vibrations as would damage the reinforced concrete surface. Before the soffits form work and struts are removed, the soffits and the concrete surface shall be exposed where necessary in order to ascertain that the concrete has sufficiently hardened.
- 7.0 Centering:**
- 7.1.** The centering to be provided shall be got approved. It shall be sufficiently strong to ensure absolute safety of the form work and concrete work before, during and after pouring concrete. Watch should be kept to see that behavior or centering and form work is satisfactory during concreting. Erection should also be such that it would allow removal of forms in proper sequence without damaging either the concrete or the forms to be removed.
- 7.2.** The props of centering shall be provided on firm foundation or base of sufficient strength to carry the loads without any settlement.
- 7.3.** The centering and form work shall, be inspected and approved by the Engineer-in-charge before concreting. But this will not relieve the contractor of his responsibility for strength,

adequacy and safety of form work and centering. If there is a failure of form work or centering, contractor shall be responsible for the damages to property.

8.0 Scaffolding:

- 8.1.** All scaffolding, hoisting arrangements and ladders etc. required for the facilitating of conceding shall be provided and removed on completion of work by contractor at his own expense. The scaffolding, hoisting arrangements and ladders etc. shall be strong enough to with stand all live, dead and impact loads expected to act and shall be subject to the approval of the Engineer-in-charge. However contractor shall be solely responsible for the safety of the scaffolding, hoisting arrangement, ladders, work and workman etc.
- 8.2.** The scaffolding, hoisting arrangements and ladder shall allow easy approach to the work spot and afford easy inspection.
- 8.3.** The rate is applicable to all condition of working and height up to 4 mts. The rate shall include the cost of materials and labour for various operations involved such as :
- (a) Splayed edges, notching, allowance for overlaps and passing at angles, battens centering, shuttering propping, bolting, wedging easing, striking and removal.
 - (b) Filleting to form stop chamfered edges or splayed external angles not exceeding 20 mm: width to beams, columns and the like.
 - (c) Temporary openings in the forms for pouring concrete, if required removing rubbish etc.
 - (d) Dressing with oil to prevent adhesion of concrete with shuttering and.
 - (e) Raking or circular cutting.

9.0 Re-Use:

- 9.1.** Before re-use, all form shall be inspected by Engineer-in-charge and their suitability ascertained. The forms shall be scarred, cleaned and joints are gone over, repaired where required. Inside surface shall be retreated to prevent adhesion of concrete.

10.0. Mode of measurement & payment

- 10.1.** The consolidated cubical contents of concrete work as specified in item shall be measured. No deduction shall be made for
- (a) Ends of dissimilar materials such as joints, beams, posts, girders, falters, purling trusses, corbels and steps etc. up to 500 Sq. Cm. in section.
- 10.2.** Form work shall be measured as the area in square meters to shuttering in contract with concrete except in the case of inclined member and portion of curved profile and upper side in which case on area of underside shall be measured for payment.
- 10.3.** Form work to secondary beams shall be measured up to the sides of main beams but no deduction shall be made from the form work of the main beam at the inter section point. No deduction shall be made from the form work of a column at inter section of beams.
- 10.4.** The rate includes cost of all materials labour, tools and plant required for mixing, placing in position, vibrating and compacting, finishing, as directed, curing and all other incidental expenses for producing concrete of specified strength. The rate includes the cost of form work.
- 10.5.** The rate shall be for a unit of **one cubic meter**.

Item no- 13 Provi. Providing thermo Mechanically treated bars (TMT bars) confirming to IS 1786 / FC 415 for R.C.C. works including, bending, binding and placing in position complete upto floor 2 level.

Specification for this item shall conform to item no. 5.4.11,

P. 37 of General Technical Specifications for building work except that the thermo mechanically treated bars (TMT) shall be used instead of H.Y.S.D. bars for all floors.

TMT bar shall conform to IS 1786/FC 415 for R.C.C. work. It shall be purchased from approved manufacturer and necessary proof of purchase shall be submitted. Bars shall be tested in Govt. or Govt. approved laboratory before use. All necessary tests shall be carried out as per instruction of engineer in charge.

415 TMT bar shall conform to min 415 Mpa yield strength. Tensile strength of min 600 Mpa and elongation percentage min 22. The chemical composition of bars shall be as below.

	<i>% Max.</i>
<i>Carbon</i>	<i>0.25</i>
<i>Sulphur</i>	<i>0.05</i>
<i>Phosphorus</i>	<i>0.05</i>
<i>Sulphur and</i>	<i>0.01</i>
<i>Phosphorus</i>	

Rate shall be for a unit of one kg

2.0. Workmanship :

2.1. The work shall consist of furnishing and placing reinforcement to the shape and dimensions shown as on the drawings or as directed.

2.2. Steel shall be clean and free from rust and loose mill scale at the time of fixing in position and subsequent concreting.

2.3. Reinforcing steel shall conform accurately to the dimensions given in the bar bending schedules shown on relevant drawings. Bars shall be bent cold to specified shape and dimensions or as directed using a proper bar bender, operated by hand or power to attain proper radius of bends. Bars shall not be bent or straightened in a manner that will injure the material. Bars bent during transport or handling shall be straightened before being used on the work. They shall not be heated to facilitate bending. Unless otherwise specified, a 'U' type hook at the end of each bar shall invariably be provided to main reinforcement. The radius of the bend shall not be less than twice the diameter of the round bar and the length of straight part of the bar beyond the end of the curve shall be at least four times the diameter of the round bar. In case of bars which are not round and in case of deformed bars, the diameter shall be taken as the diameter of circle having an equivalent effective area. The hooks shall be suitably encased to prevent any splitting of the concrete.

2.4. All the reinforcement bars shall be accurately placed in exact position shown on the drawing and shall be securely held in position during placing of concrete by annealed binding wire not less than 1 mm. in size, and by using stay blocks or metal chair spacers, metal hangers, supporting wires or other approved devices at sufficiently-close intervals. Bars shall not be allowed to sag between supports nor displaced during concreting or any other operations of the work. All devices used for positioning shall be of non-corrodible material. Wooden and metal supports shall not extend to the surface of concrete, except where shown on drawings. Placing bars on layers of freshly laid concrete as the work progresses for adjusting bar spacing

shall not be allowed. Pieces of broken stone or brick and wooden blocks shall not be used. Layers of bars shall be separated by spacer bars, precast mortar blocks or other approved devices. Reinforcement after

being placed in position shall be maintained 37 in a clean condition until completely embedded in concrete. Special care shall be exercised to prevent any displacement of reinforcement in concrete already placed. To prevent reinforcement from corrosion, concrete cover shall be provided as indicated on drawing. All the bars protruding from concrete and to which other bars are to be spliced and which are likely to be exposed for a period exceeding 10 days shall be protected by a thick coat of neat cement grout. .

2.5. Bars crossing each other where required shall be secured by binding wires (annealed) of size not less than 1 mm. in such manner that they do not slip over each other at the time of fixing and concreting.

2.6. As far as possible, bars of full length shall be used. In case this is not possible, overlapping of bars shall be done as directed. When practicable, overlapping bars shall not touch each other, but be kept apart by 25 mm. or 1.25 times the maximum size of the coarse aggregate whichever is greater by concrete between them. Where not feasible, overlapping bars

shall be bound with annealed wires not less than 1 mm. thick twisted tight The overlaps shall be staggered for different bars and located at points along the span where neither shear nor bending movement is maximum.

2.7. Whenever indicated on the drawings or desired by the Engineer-in-charge, bars shall be joined by couplings which shall have a cross-section sufficient to transmit the full stresses of bars. The ends of the bars that are joined by coupling shall be upset for sufficient length so that the effective cross section at the base of threads is not less than normal cross-section of the

bar. Threads shall be standard threads. Steel for coupling shall conform to I.S. 226.

2.8. When permitted or specified on the drawings, joints of reinforcement bars shall be butt-welded so as to transmit their full stresses. Welded joints shall preferably be located at points where steel will not be subject to more than 75 per cent of the maximum permissible stresses and welds so staggered that at any one section not more than 20 percent of the rods are welded. Only electric arc welding using a process which excludes air from the molten metal and conforms to any or all other special provisions for the work shall be accepted. Suitable means shall be provided for holding bars securely in position during welding. It shall be ensured that no voids are left in welding and when welding is done in two or three stages, previous surface shall be cleaned properly. Ends of the bars shall be cleaned of all loose scale, rust, grease, paint and other foreign matter before welding. Only competent welders shall be employed on the work. The M.S. electrodes used for welding shall conform to I.S. 814. Welded pieces of reinforcement shall be tested. Specimen shall be taken from the actual site and their number and frequency of test shall be as directed.

3.0 Mode of measurement and payment

3.1 For the purpose of calculating consumption wastage shall not be permitted beyond 5 percent Excess consumption over 5 % will be charged at penal rate.\

3.2 Reinforcement shall be measured in length including overlaps separately for different diameters as actually used in the work. Where welding or comping is resorted to in place of lap joints such joints shall be measured for payment as equivalent length of overlap as per design requirement from the length so measured the weight of reinforcement shall be calculated in tonnes on the same basis as as per M 18 even though steel is supplied to the contractor by the department on actual weight Length shall include hooks at the end wastage and annealed steel wire for binding shall not be measured and the cost of these items shall be deemed to be included in the rate for reinforcement.

3.3 The rate for reinforcement included cost of steel binding wires its carting from department store to work site cutting binding placing, binding & fixing in position as shown on the drawing and as directed. It shall also include. All devices for keeping reinforcement in approved position Cost of joining as per approved method and all wastage and speller bars.

3.4 The rate shall be for a unit of 1.00 Kg

Item no- 14 Half brick masonry in common burnt clay building bricks having crushing strength not less than 35kg/Sq.Cm in cement mortar 1:4 (1 cement ::4 coarse sand) in foundation and plinth (B) Conventional

Materials

Bricks shall conform to M-15. Water shall conform to M-1. Cement shall conform to M-3. Sand shall conform to M-6. Cement mortar shall conform to M-11.

2.0. Workmanship

- 2.1. Relevant specifications of bricks, wetting and laying of bricks, joints, curing etc shall conform to **Item No. 7** except that the brick work of half brick shall be carried out.
- 2.2. Cement mortar used in masonry work shall be in proportion of 1 part of cement and 4 parts of coarse sand by volume.
- 2.3. All bricks shall be laid stretcher wise, breaking joints with those in the upper and lower courses. The wall shall be taken truly plumb. All courses shall be said truly horizontal and all vertical joints shall be truly vertical. The bricks shall be laid with frogs upwards. A set of masons tools shall be maintained on work as required for frequent checking. After every three course 2 nos. of 6mm mild steel round bars shall be embedded in cement mortar.

3.0. Mode of measurement and payment

- 3.1. The half brick masonry work in [superstructure](#) shall be measured under this item the limiting dimensions shall not exceed those shown in the plan or as directed. Any work done extra over the specified dimensions shall be ignored.
- 3.2. The relevant specifications of **Item No. 7** shall be followed. The length shall be measured nearest to one cm.
- 3.3. The rate includes the cost of providing 2 nos. of 7mm dia. mild steel round bars after every 4th course.
- 3.4. The rate shall be for a unit of one sq. meter.

Item No. 15 Providing 15 mm thick cement plaster in single coat on brick/ concrete walls for interior plastering up to floor two level finished even & smooth in (II) cement mortar (1 cement : 3 sand) Including finishing with a floating coat of neat cement slurry .

17.58.(I) 15 mm. thick cement plaster in single coat on fair side of brick concrete walls for interior plastering up to floor two level and finished even and smooth in (i) C.M. 1:3.

1.0. Materials: 1.1. Water M-1. The cement mortar of proportion 1 : 3 shall conform to M-13.

2.0. Workmanship:

2.1. Scaffolding : Wooden ballies, bamboos, planks, treaties and other scaffolding shall be sound. These shall be properly examined before erection and use. Stage scaffolding shall be provided for ceiling plaster which shall be independent of the walls.

2.2. Preparation of back-ground:

2.2.1. The surface shall be cleaned of all dust, loose mortar droppings, traces of algae, efflorescence and other foreign matter by water or by brushing. Smooth surface shall be roughened by wire brushing if it is not hard and by racking if it is hard. 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. Trimming of projections on brick/concrete surface where necessary shall be carried out to get an even surface.

2.2.2. Raking of joints in case of masonry where necessary shall be allowed to dry out for sufficient period before carrying out the plaster work.

2.2.3. The work shall not be soaked but only damped evenly before applying the plaster. If the surface becomes dry such area shall be moistened again.

2.2.4. For external plaster, the plastering operation shall be started from top floor and carried downwards. For internal plaster, the plastering operations may be started wherever the building frame and cladding work are ready and the temporary supporting ceiling resting on the wall of the floor have been removed. Ceiling plaster shall be completed before starting plaster to walls.

2.3. Applications of plaster :

2.3.1. The plaster about 15 x 15 cms. shall be first applied horizontally and vertically at not more than 2 metres intervals over the entire surface to serve as gauge. The surfaces of these gauges shall be truly in plane of the finished plastered surface. The mortar shall then be applied in uniform surface slightly more than the specified thickness, then brought to a true surface by working a wooden straight edge reaching across the gauges with small upward and sideways movement at a time. Finally, the surface shall be finished off true with a trowel or wooden float according as a smooth or a sandy granular texture is required. Excessive trowelling or overworking the float shall be avoided. All corners, arrises, angles and junctions be truly vertical or horizontal as the case may be and shall be carefully finished. Rounding or chamfering corners, arrises junctions etc. shall be carried out with proper templates to the size required. 105

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

2.3.3. In suspending the work at the end of the day, the plaster shall be left out clean to the line both horizontally and vertically. When recommencing the plaster, the edges of the old work shall be scraped clean and wetted with cement putty 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 the wall and nearer than 15 cm. to any corners or arrises. Horizontal joints in plaster work shall not also occur on parapet tops and copings as these invariably lead to leakage. No portion of the surface shall be left out initially to be packed up later on.

2.3.4. Each coat shall be kept damp continuously till the next coat is applied or for a minimum period of 7 days. Moistening shall commence as soon as plaster is hardened sufficiently. Soaking of walls shall be avoided and only as much water as can be readily absorbed shall be used, excessive evaporation on the sunny or windward side of building in hot air or dry weather shall be prevented by hanging matings or gunny bags on the outside of the plaster and keeping them wet.

3.0. Mode of measurements & payment:

3.1. The rate shall include the cost of all materials, labour and scaffolding etc. involved in the operations described under workmanship.

3.2. All plastering shall be measured in square metres unless, otherwise specified. Length, breadth or height shall be measured correct to a centimetre.

- 3.3. Thickness of the plaster shall be exclusive of (he thickness of the key i.e. grooves or open joints in brick work, stone work etc. or space between laths. Thickness of plaster shall be average thickness with minimum 10mm. at any point on this surface.
- 3.4. This item includes plastering upto floor two level.
- 3.5. The measurement of wall plastering shall be taken between the walls or partition (dimensions before plastering being taken) for length and from the top of floor or skirting to ceiling for height. Depth of cover of cornices if any shall be deducted.
- 3.6. Soffits of stairs shall be measured as plastering on ceilings. Flowing soffits shall be measured separately.
- 3.7. For jambs, soffits, sills etc. for openings not exceeding 0.5 sq. mt. each in area for ends of joists, beams, posts, girders, steps, etc. not exceeding 0.5 sq. mt. each in area and for openings exceeding 0.5 sq. mt. and not exceeding 3.00 sq. mt. in each area deductions and additions shall be made in the following manner: (a) No deductions shall be made for ends of joints, beams, posts etc. and openings not exceeding 0.5 sq. mt. each and no addition shall be made for reveals, jambs, soffits, sills etc. of these opening for finish to plaster around ends of joints, beams, posts etc. (b) Deduction for openings exceeding 0.5 sq. mt. but not exceeding 3 sq. mt. each shall be made as follows and no additions shall be made for reveals, jambs, soffits, sills etc. of these openings. (i) When both faces of all wall are plastered with same plaster, deduction shall be made for one face only. (ii) When two faces of wall are plastered with different types of plasters or if one, faces is plastered and the other pointed, deductions shall be made from the plaster or pointing on the side of frame for door, window etc. on which width of reveals is less than that on the other side but no deductions shall be made on the other side. Where width of reveals on both faces of all are equal, deductions of 50% of area of opening on each face shall be made from area of plaster and/or pointing as the case may be.
- 3.8. For openings having door frames equal to projecting beyond the thickness of wall, full deduction for opening shall be made from each plastered face of the wall.
- 3.9. In case of openings of area above 3 sq. mt. each, deduction shall be made for opening but jambs, soffits and sills shall be measured.
- 3.10. The rate shall be for a unit of one sq. metre.

Item no. 16 Provdg. 10 mm th. Cement plaster in single coat on brick/concrete walls for interior plastering up to floor two level & finished even & smooth in (1) cement mortar 1:3 (1 cement : 3 sand)

17.58.(I) 10 mm. thick cement plaster in single coat on fair side pf brick concrete walls for interior plastering upto floor two level and finished even and smooth in (i) C.M. 1:3.

1.0. Materials: 1.1. Water M-1. The cement mortar of proportion 1 : 3 shall conform to M-13.

2.0. Workmanship:

2.1. Scaffolding : Wooden ballies, bamboos, planks, treaties and other scaffolding shall be sound. These shall be properly examined before erection and use. Stage scaffolding shall be provided for ceiling plaster which shall be independent of the walls.

2.2. Preparation of back-ground:

2.2.1. The surface shall be cleaned of all dust, loose mortar droppings, traces of algae, efflorescence and other foreign matter by water or by brushing. Smooth surface shall be roughened by wire brushing if it is not hard and by racking if it is hard. 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. Trimming of projections on brick/concrete surface where necessary shall be carried out to get an even surface.

2.2.2. Raking of joints in case of masonry where necessary shall be allowed to dry out for sufficient period before carrying out the plaster work.

2.2.3. The work shall not be soaked but only damped evenly before applying the plaster. If the surface becomes dry such area shall be moistened again.

2.2.4. For external plaster, the plastering operation shall be started from top floor and carried downwards. For internal plaster, the plastering operations may be started wherever the building frame and cladding work are ready and the temporary supporting ceiling resting on the wall of the floor have been removed. Ceiling plaster shall be completed before starting plaster to walls.

2.3. Applications of plaster :

2.3.1. The plaster about 15 x 15 cms. shall be first applied horizontally and vertically at not more than 2 metres intervals over the entire surface to serve as gauge. The surfaces of these gauges shall be truly in plane of the finished plastered surface. The mortar shall then be applied in uniform surface slightly more than the specified thickness, then brought to a true surface by working a wooden straight edge reaching across the gauges with small upward and sideways movement at a time. Finally, the surface shall be finished off true with a trowel or wooden float according as a smooth or a sandy granular texture is required. Excessive trowelling or overworking the float shall be avoided. All corners, arrises, angles and junctions be truly vertical or horizontal as the case may be and shall be carefully finished. Rounding or chamfering corners, arrises junctions etc. shall be carried out with proper templates to the size required. 105

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

2.3.3. In suspending the work at the end of the day, the plaster shall be left out clean to the line both horizontally and vertically. When recommencing the plaster, the edges of the old work shall be scraped clean and wetted with cement putty 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 the wall and nearer than 15 cm. to any corners or arrises. Horizontal joints in plaster work shall not also occur on parapet tops and copings as these invariably lead to leakage. No portion of the surface shall be left out initially to be packed up later on.

2.3.4. Each coat shall be kept damp continuously till the next coat is applied or for a minimum period of 7 days. Moistening shall commence as soon as plaster is hardened sufficiently. Soaking of walls shall be avoided and only as much water as can be readily absorbed shall be used, excessive evaporation on the sunny or windward side of building in hot air or dry weather shall be prevented by hanging mattings or gunny bags on the outside of the plaster and keeping them wet.

3.0. Mode of measurements & payment:

3.1. The rate shall include the cost of all materials, labour and scaffolding etc. involved in the operations described under workmanship.

3.2. All plastering shall be measured in square metres unless, otherwise specified. Length, breadth or height shall be measured correct to a centimetre.

3.3. Thickness of the plaster shall be exclusive of (the thickness of the key i.e. grooves or open joints in brick work, stone work etc. or space between laths. Thickness of plaster shall be average thickness with minimum 10mm. at any point on this surface.

3.4. This item includes plastering up to floor two level.

3.5. The measurement of wall plastering shall be taken between the walls or partition (dimensions before plastering being taken) for length and from the top of floor or skirting to ceiling for height. Depth of cover of cornices if any shall be deducted.

3.6. Soffits of stairs shall be measured as plastering on ceilings. Flowing soffits shall be measured separately.

3.7. For jambs, soffits, sills etc. for openings not exceeding 0.5 sq. mt. each in area for ends of joists, beams, posts, girders, steps, etc. not exceeding 0.5 sq. mt. each in area and for openings exceeding 0.5

sq. mt. and not exceeding 3.00 sq. mt. in each area deductions and additions shall be made in the following manner: (a) No deductions shall be made for ends of joints, beams, posts etc. and openings not exceeding 0.5 sq. mt. each and no addition shall be made for reveals, jambs, soffits, sills etc. of these opening for finish to plaster around ends of joints, beamsposts etc.(b) Deduction for openings exceeding 0.5 sq. mt. but not exceeding 3 sq. mt. each shall be made as follows and no additions shall be made for reveals, jambs, soffits, sills etc. of these openings.(i) When both faces of all wall are plastered with same plaster, deduction shall be made for one face only.

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

3.8. For openings having door frames equal to projecting beyond the thickness of wall, full deduction for opening shall be made from each plastered face of the wall.

3.9. In case of openings of area above 3 sq. mt. each, deduction shall be made for opening but jambs, soffits and sills shall be measured.

3.10. The rate shall be for a unit of one sq. metre.

Item No. 17 20 mm thick sand faced cement plaster on walls upto height 10 meters above ground level consisting of 12 mm thick backing coat of C.M.1:3 (1 Cment : 3 sand) and 8 mm thick finishing coat of C.M.1:1 (1 Cement 1 Sand) Watering curing etc. comple.

17.58.(I) 20 mm. thick cement plaster in single coat on fair side pf brick concrete walls for interior plastering upto floor twolevel and finished even and smooth in (i) C.M. 1:3.

1.0. Materials: 1.1. Water M-l. The cement mortar of proportion 1 : 3 shall conform to M-13.

2.0. Workmanship:

2.1. Scaffolding : Wooden ballies, bamboos, planks, treaties and other scaffolding shall be sound. These shall be properlyexamined before erection and use. Stage scaffolding shall be provided for ceiling plaster which shall be independent of thewalls.

2.2. Preparation of back-ground:

2.2.1. The surface shall be cleaned of all dust, loose mortar droppings, traces of algae, efflorescence and other foreign matterby water or by brushing. Smooth surface shall be roughened by wire brushing if it is not hard and by racking if it is hard. Incase 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 onthe surface. Trimming of projections on brick/concrete surface where necessary shall be carried out to get an even surface.

2.2.2. Raking of joints in case of masonry where necessary shall -be allowed to dry out for sufficient period before carryingout the plaster work.

2.2.3. The work shall not be soaked but only damped evenly before applying the plaster. If the surface becomes dry such areashall be moistened again.

2.2.4. For external plaster, the plastering operation shall be started from top floor and carried downwards. For internal plaster,the plastering operations may be started wherever the building frame and cladding work arc ready and the temporary supporting ceiling resting on the wall of the floor have been removed. Ceiling plaster shall be completed before starting plaster to walls.

2.3. Applications of plaster :

2.3.1. The plaster about 15 x 15 cms. shall be first applied horizontally and vertically at not more than 2 metres intervals over the entire surface to serve as gauge. The surfaces of these gauges shall be truly inplane of the finished plastered surface. The mortar shall then be applied in uniform surface slightly more than the specified thickness, then brought to a true surface by working a wooden straight edge reaching across the gauges with small upward and sideways movement at a time. Finally, the surface shall be finished off true with a trowel or wooden float according as a smooth or a sandy granular texture is required. Excessive trowelling or overworking the float shall be avoided. All corners, arrises, angles and junctions be truly vertical or horizontal as the case may be and shall be carefully finished. Rounding or chamfering corners, arrises junctions etc. shall be carried out with proper templates to the size required. 105

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

2.3.3. In suspending the work at the end of the day, the plaster shall be left out clean to the line both horizontally and vertically. When recommencing the plaster, the edges of the old work shall be scraped clean and wetted with cement putty 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 the wall at least nearer than 15 cm. to any corners or arrises. Horizontal joints in plaster work shall not also occur on parapet tops and copings as these invariably lead to leakage. No portion of the surface shall be left out initially to be packed up later on.

2.3.4. Each coat shall be kept damp continuously till the next coat is applied or for a minimum period of 7 days. Moistening shall commence as soon as plaster is hardened sufficiently. Soaking of walls shall be avoided and only as much water as can be readily absorbed shall be used, excessive evaporation on the sunny or windward side of building in hot air or dry weather shall be prevented by hanging matings or gunny bags on the outside of the plaster and keeping them wet.

3.0. Mode of measurements & payment:

3.1. The rate shall include the cost of all materials, labour and scaffolding etc. involved in the operations described under workmanship.

3.2. All plastering shall be measured in square metres unless, otherwise specified. Length, breadth or height shall be measured correct to a centimetre.

3.3. Thickness of the plaster shall be exclusive of the thickness of the key i.e. grooves or open joints in brick work, stone work etc. or space between laths. Thickness of plaster shall be average thickness with minimum 10mm. at any point on this surface.

3.4. This item includes plastering upto floor two level.

3.5. The measurement of wall plastering shall be taken between the walls or partition (dimensions before plastering being taken) for length and from the top of floor or skirting to ceiling for height. Depth of cover of cornices if any shall be deducted.

3.6. Soffits of stairs shall be measured as plastering on ceilings. Flowing soffits shall be measured separately.

3.7. For jambs, soffits, sills etc. for openings not exceeding 0.5 sq. mt. each in area for ends of joists, beams, posts, girders, steps, etc. not exceeding 0.5 sq. mt. each in area and for openings exceeding 0.5 sq. mt. and not exceeding 3.00 sq. mt. in each area deductions and additions shall be made in the following manner: (a) No deductions shall be made for ends of joints, beams, posts etc. and openings not exceeding 0.5 sq. mt. each and no addition shall be made for reveals, jambs, soffits, sills etc. of these opening for finish to plaster around ends of joints, beams, posts etc. (b) Deduction for openings exceeding 0.5 sq. mt. but not exceeding 3 sq. mt. each shall be made as follows and no addition shall be made for reveals, jambs, soffits, sills etc. of these openings. (i) When both faces of all wall are plastered with same plaster, deduction shall be made for one face only.

(ii) When two faces of wall are plastered with different types of plasters or if one face is plastered and the other pointed, deductions shall be made from the plaster or pointing on the side of frame for door, window etc. on which width of reveals is less than that on the other side but no deductions shall

be made on the other side. Where width of reveals on both faces of all are equal, deductions of 50% of area of opening on each face shall be made from area of plaster and/or pointing as the casemaybe.

3.8. For openings having door frames equal to projecting beyond the thickness of wall, full deduction for opening shall be made from each plastered face of the wall.

3.9. In case of openings of area above 3 sq. mt. each, deduction shall be made for opening but jambs, soffits and sills shall be measured.

3.10. The rate shall be for a unit of one sq. metre.

Item No. 18 Item no. 12 Providing and laying 24" x 24" Vitrified 8 mm thick Tile flooring over 20 mm (Avg) base of C.M. 1:6 on new surface or fixing on Extg. Flooring by adhesive material incl. Dismantling of extg. Flooring & jointed with colour cement slurry finished with flush pointing & cleaning the surface etc. complete for light shade.

1.0. Materials

Water shall conform to M-1 Cement mortar shall conform to M-11. **Vitrified flooring tiles** shall conform to M-55. The size, thickness and shade & quality of vitrified tiles shall be got approved from Engineer in charge before use.

2.0. Workmanship

2.1. Bedding :

2.1.1. The sub grade shall be cleaned, wetted and mopped. The bedding shall then be laid evenly over the surface tamped and corrected to desired level and allowed to harden enough to offer a rigid cushion to tiles and to enable the monsoon to place wooden planks across and squat on it.

2.1.2. The **vitrified flooring tiles** shall be laid on cement mortar bedding of 12 mm. thick in C.M. 1:3. The mortar shall have sufficient plasticity for laying and there shall be no hard lumps that would interfere with the evenness of bedding. The base shall be cleared and well wetted. The mortar shall then be spread in thickness not less than 10 mm. at any place and average 20 mm. thickness. The proportion of the cement mortar shall be as specified in the item.

2.2. Fixing tiles :

2.2.1. The tiles before laying shall be soaked in water for at least tow hours. Neat gray cement grout at 33 kg/Cement/Sq.mt. of honey like consistency shall be spread over the mortar bedding as directed. The edges of the tiles shall be smeared with neat cement slurry. The tiles shall be well pressed and gently tapped with a wooden mallet till they are properly bedded and in level with the adjoining tiles. There shall be no hollows in bed or joints. The joints between the tiles shall be as thin as possible in straight line or as per pattern.

2.2.2. The tiles shall not have staggered joints. The joints shall be true to centre line both ways. The Nahni trap coming in the flooring shall be so positioned that its grating shall replace only one tile as far as possible. Where full size tiles cannot be fixed they shall be cut (Swan) to the required size and the edges rubbed smooth to ensure straight and true joints. The joints shall be filled with grey cement grout with wire brush or trowel to a depth of 5 mm. and loose material removed. White cement shall be used for pointing

the joints. After fixing the tiles finally in an even plane the flooring shall be kept wet and allowed to nature undisturbed for 7 days.

2.3. Cleaning :

2.3.1. The surplus cement grout that may have come out of the joints shall be cleaned off before it sets. Once the floor has set, it shall be carefully washed, cleared by dilute acid and dried. Proper precautions and measures shall be taken to ensure that the tiles are not damaged in any way till the completion of the .construction.

3.0. Mode of measurements & payment

- 3.1. The work done shall be measured in sq.mt. for visible area of work done. The length and width of the flooring shall be measured not between the faces of skirting or dedos or plastered face of wall as the case may be. The paving under dedo or skirting shall not be measured. No deduction shall be made not extra paid for any opening in the floor of area upto 0.1 sq.mt. Nothing extra shall be paid for laying the floors at different levels in the same rooms.
- 3.2. The rate shall be for a unit of one sq. meter.

Item No- 19 Providing and laying Vitrified tiles 8 to 10 mm thick in skirting risers of steps and dedo on 10 mm thick cement plaster 1:3 (1 Cement 3 coarse sand) and jointed with white cement slurry

1.0. Materials

Water shall conform to M-1. Cement mortar shall conform to M-11. **Vitrified flooring tiles** shall conform to ISO 13006. The size, thickness and shade & quality of vitrified tiles shall be got approved from Engineer in charge before use.

2.0. Workmanship

2.1. Preparation of Surface:

In case of brick masonry wall, the joints shall be raked out to a depth of least 10 mm. while the masonry is being laid. In case of concrete wall the surface shall be chiseled and roughed with wire brushes. The surface shall be cleaned and wetted thoroughly before commencing the laying work.

2.2. Laying ;

2.2.1. The wall surface shall be covered with 10 mm. thick plaster of cement mortar 1:3 mix and allowed to harden. The plaster shall be roughened with wire brushes both way. The back of tiles shall be floated with grey cement slurry set and edges with white cement slurry in bedding mortar. The tiles shall be gently tapped in position on after the other keeping the joints as thin as possible. Top of skirting or dedo shall be truly horizontal and the joints vertical or as per required pattern.

2.2.2. Risers of steps, skirting and dedo shall rest on top of treads or flooring. Where full size tiles cannot be fixed. They shall be cut to the required size and the edges be smoothened.

2.2.3. The joints shall be cleaned and flush pointed with white cement. The surface shall be kept wet for seven days. After curing the surface shall be washed clean.

3.0. Mode of measurements and payment

3.1. The rate shall include the cost of all materials and labour required for various operations described above.

Risers of steps : skirting and dedo shall be measured in square meters, length and height shall be measured along the finished face of the skirting or dedo including curves, where special such as covers internal and external angles, etc. used. The length and height shall be measured correct to the centimeter except in case of risers and skirting where height shall be measured correct to 3 mm.

3.2. The rate shall be for a unit of one sq. meter.

Item No. 20 : Providing & laying broken china mosaic flooring for terrace using 12 mm to 20 mm broken pieces of glazed tiles to be laid over cement mortar 1:3 in plain or slope and to be tempered to bring mortar crême out up to surface using white cement including rounding off junction and extending them up to 15 cm along the well cleaning with water and oxalic acid as directed.

1.0 MATERIAL - WATER

1.1 Water shall not be salty brackish and shall be clean, reasonably clear and free objectionable quantities of silt and traces of oil injurious alkalis salts organic matter and other deleterious material which will either weaken the mortar or concrete or cause efflorescence or attack the steel in R.C.C. container for transport storage and huddling of water shall be clean. Water shall conform to the Standard Specification in I.S. 455 - 1978.

1.2 If required by the Engineer in charge, it shall be tested by comparison with distilled water compression shall be made by means of standard cement tests for soundness, time of setting and mortar strength as specified in I.S. 269 - 1976. Any indication of unsoundness change in time of setting by 50 minutes or more or decrease of more than 10 percent strength of mortar prepared with distilled water sample when compared with the result obtained with mortar prepared with distilled water shall be sufficient cause for rejection of water under test.

- 1.3 Water for curing, mortar concrete or masonry should not be too acidic/too alkaline.
- 1.4 It shall be free of elements which significantly affect the hydration reaction or otherwise interface with the hardening of mortar or concrete during curing or those which produce objectionable stains or other unsightly deposits on concrete or mortar surfaces.
- 1.5 Hard and bitter water shall not be used for curing.
- 1.6 Potable water will generally found suitable for curing mortar or concrete.

2.0 CEMENT

- 2.1 Cement shall be ordinary Portland slag cement as per I.S. 1624 - 1974 or Portland slag cement as per I.S.455-1976.
- 2.2 Cement shall be stored above the ground level in perfectly and dry and water tight sheds. Wherever bulk storage containers are used, there capacity should be sufficient to cater to the requirements at site and should be cleaned at least once every 3 to 4 months. The aggregate shall be stored in such a way as to prevent admixture of foreign materials. Different size of fine or coarse aggregate shall be stored in separate stock piles sufficiently away from the each other to prevent inter mixing the materials.

3.0 SAND

- 3.1 Sand shall be natural sand, clean, well graded, hared, strong, durable and gritty particular free from immures amounts of dust, clay, kankar, modules, soft or flaky particles shall alkali salts, organic matter, learn mica or other deleterious substance and shall be got approved from the Engineer in charge. The sand shall not contain more than 8 percent of slit as determined by field test if necessary, the sand

COARSE SAND - The fineness modules of coarse sand shall not be less than 2.5 and shall not exceed 3.0. The sieve analysis of coarse sand be as under :

I.S. Sieve Designation	% by wt. passing
4.75 mm	100
2.36 mm	90 to 100
1.18 mm	70 to 100
600 MC	30 to 100
300 MC	85 to 70
150 MC	00 to 50

- 3.2 **FINE SAND** : The fineness modules shall not exceed 1.0 the sieve analysis of fine sand be as under:

I.S. Sieve Designation	% by wt. passing
4.75 mm	100
2.36 mm	100
1.18 mm	70 to 100
600 MC	40 to 85
300 MC	05 to 50

150 MC	00 to 10
--------	----------

- 3.3 Materials shall be stored as to prevent their deterioration of their quality and fitness for the work. Any material which has deterioration or has been damaged or is otherwise considered defective by the Engineer in charge shall not be used in the work.

1.4 WATER PROOFING COMPOUND

Water proofing compound shall be of approved quality and make as approved by Engineer in charge.

1.5 BRICK BATS

Brick bat aggregates shall be broken from well burnt or slightly over burnt and dense bricks it shall be homogeneous in texture roughly cubical in shape clean and free from dirt or any other foreign material brick bats shall be of 40 to 50 mm nominal size unless otherwise specified in the item the under burnt or over burnt bricks bats shall not be used.

1.6 CHINA MOSAIC TILE PIECES

China mosaic tiles pieces shall be of 50 mm to 90 mm nominal size, tiles pieces shall be made from hard and good quality of tiles.

1.7 WHITE CEMENT

White cement shall be of approved make it shall confirm definition of I.S. 8042-E-1978 the sample of white cement shall be approved by Engineer in charge.

WORKMANSHIP

- A** First of all surface of the entire terrace shall be cleaned by thoroughly brooming and then by wire brushes. All the loose material, dust and debries shall be removed thoroughly from the entire surface of the terrace.

All joints and cracks shall be racked off and cut in trench which shall be filled by neat cement slurry admixed with water proofing compound. The joints with parapet shall be racked up to 30 cm height and shall be applied by neat cement slurry admixed with water proofing compound.

Neat cement slurry shall be prepared and a water proofing compound of approved make shall be mixed with the slurry in proportion specified by the manufacturer of the compound and shall be laid through out the surface of the terrace by the use of brushes mala etc. Cement slurry shall be prepared by adding adequate quantity of water so as to spread it uniformly on the surface.

- B** Cement concrete 1:5:10 (Using 50% of cement mortar 1:5, 1 part of cement and 5 part of coarse sand by volume admixed with water proofing compound of approved make in specified proportion). Of specified thickness shall be laid (Specification of C.C. 1:5:10

shall be followed for the execution of this layer) all over the surface of the terrace in true level and required slope including rounding of junctions of walls and slabs.

- C** After two days of proper curing applying a second coat of cement slurry on entire surface of the terrace.
- D** The entire surface shall be finished with 20 mm thick C.M. 1:4 and China mosaic tilling in true level and slope as directed by Engineer in charge and finally finishing the surface with trowel with white cement slurry (Specification of white glazed tiles flooring shall be followed for the execution of this item).
- E** Finishing the surface with 20 mm thick C.M. 1:4 and China mosaic tilling and finally finishing the surface with trowel with white cement slurry.
- F** After two days proper curing the terrace shall be flooded for 15 days.

7.0 MODE OF MEASUREMENT AND PAYMENT

- 7.1** The unit rate of flooring shall include the cost of all materials, tools and plant required for mixing, laying of base layer in true level and slope as required applying and placing broken pieces of china mosaic tile in position, compacting, finishing, curing, providing treatment of 30 cm high allover the length of parapets and corners and sill of doors etc. and all other incidental expenses for producing flooring work to complete the structure of its components as shown on the drawings and according to these specifications. They shall also include the cost of making, fixing of all scaffolding and forms required for the work.

The rate of plastering shall include the cost of all labour, materials, tools and plants, scaffolding and all incidental expenses as described herein above.

- 7.2** The plaster work shall be measured for its length and width, limiting dimensions to those specified on plan or as directed. The rate shall be for a unit of one Square Meter.

- 7.4** [A guarantee bond on appropriately stamped paper shall be given by the contractor to the Department in the manner and form prescribed below.](#)

- 7.5** The payment will be made on **Square Meter** basis of the finished work.

FORM OF GUARANTEE BOND

Contractor I / We _____) here by guarantee that work will remain unaffected and will not be in anyway damaged by water rain and will not leak from surface for a period for 5 years after completion of the work of water proofing treatment as per the terms and conditions of the contract and damage that might be caused on account of water rain and or other similar type of dampness of leakage from walls or above floor.

The guarantee shall remain in force for the period of 5 years from the completion of the work under the contract and it shall remain binding to the contractor for period of 5 years.

The deposit at the rate of 20% of the cost of this item from the running and final bills shall be recovered and remained for the first one year after completion of the work or at least on monsoon season passed whichever ever is later and 10% shall be retained for the balance of the guarantee period and shall be returned only after completion of the guarantee period.

MODE OF MEASUREMENT AND PAYMENT

The length and breadth shall be measured correct to cm. as per the dimension of the sanctioned plants. No deduction shall be made nor extra for paid for any opening for pipes etc. upto 0.1 sq.mt. The rate shall include the cost of all labour and materials required for the operation involved. For satisfactory completion.

Item No- 21 Prov'dg. & laying white glazed tiles 6 mm th. In flooring, treads of steps & landings laid on a bed of 12 mm th. Cement mortar 1:3 (1 cement : 3 coarse sand) finished with flush pointing in white cement.

14.29. White glazed tiles 6 mm. thick in flooring treads of steps and landings laid on a bed of 12 mm. thick cement mortar 1:3 (1 cement: 3 coarse sand) finished with flush pointing in white cement.

1.0. Materials : Water shall conform to M-1. Cement mortar shall conform to M-11. White glazed tiles shall conform to M-55.

2.0. Workmanship:

2.1. Bedding:

2.1.1. The sub-grade shall be cleaned, wetted and mopped- The bedding shall then be laid evenly over the surface tamped and corrected to desired level and allowed to harden enough to offer a rigid cushion to tiles and to enable the mason to place wooden planks across and squat on it.

2.1.2. The white glazed tiles shall be laid on cement mortar bedding of 12 mm. thick in C.M. 1 : 3 The mortar shall have sufficient plasticity for laying and there shall be no hard lumps that would interfere with the evenness of bedding. The base shall be cleared and well wetted. The mortar shall then be spread in thickness not less than 10 mm. at any place and average 12 mm. thickness. The proportion of the cement mortar shall be as specified in the item.

2.2. Fixing tries:

2.2.1. The tiles before laying shall be soaked in water for atleast two hours. Neat grey cement grout at 3.3. Kg/Cement/Sq. mt. of honey like consistency shall be spread over the mortar bedding as directed. The edges of the tiles be smeared with neat cement slurry. The tiles shall be well pressed and gently tapped with a wooden mallet till they are properly bedded and in level with the adjoining tiles. There shall be no hollows in bed or joints. The joints between the tiles shall be as thin as possible in straight line or as per pattern.

2.2.2. The tiles shall not have staggered joints. The joints shall be true to centre line both ways. The Nehni trap coming in the flooring shall be so positioned that its grating shall replace only one tile as far as possible. Where full size tiles cannot be fixed, they shall be cut (Sawn) to the required size and the edges rubbed smooth to ensure straight and true joints. The joints shall be filled with grey cement grout with wire brush or trowel to a depth of 5 mm. and loose material removed. White cement shall be used for pointing the joints. After fixing the tile finally in an even plane the flooring shall be kept wet and allowed to mature undisturbed for 7 days.

2.3. Cleaning: 2.3.1. The surplus cement grout that may have come out of the joints shall be cleared off before it sets. Once the floor has set, it shall be carefully washed, cleared by dilute acid and dried. Proper precaution and measures shall be taken to ensure that the tiles are not damaged in any way till the completion of the construction.

3.0. Mode of measurements & payment:

3.1. The work done shall be measured in sq. mt. for visible area of work done. The length and width of the flooring shall be measured not between the faces of skirting or dados or plastered face of wall as the case may be. The paving under dado or skirting shall not be measured. No deduction shall be made nor extra paid for any opening in the floor of area upto 0.1 sq. mt. Nothing extra shall be paid for laying the floors at different levels in the same rooms.

3.2. The rate shall be for a unit of one sq. metre.

Item No- 22 Provdg. & laying white glazed tiles 6 mm th. In flooring, treads of steps & landings laid on a bed of 10 mm th. Cement mortar 1:3 (1 cement : 3 coarse sand) finished with flush pointing in white cement.

14.29. White glazed tiles 6 mm. thick in flooring treads of steps and landings laid on a bed of 12 mm. thick cement mortar 1:3 (1 cement: 3 coarse sand) finished with flush pointing in white cement.

1.0. Materials : Water shall conform to M-I. Cement mortar shall conform to M-11. White glazed tiles shall conform to M-55.

2.0. Workmanship:

2.1. Bedding:

2.1.1. The sub-grade shall be cleaned, wetted and mopped- The bedding shall then be laid evenly over the surface tamped and corrected to desired level and allowed to harden enough to offer a rigid cushion to tiles and to enable the mason to place wooden planks across and squat on it.

2.1.2. The white glazed tiles shall be laid on cement mortar bedding of 12 mm. thick in C.M. 1 : 3 The mortar shall have sufficient plasticity for laying and there shall be no hard lumps that would interfere with the evenness of bedding. The base shall be cleared and well wetted. The mortar shall then be spread in thickness not less than 10 mm. at any place and average 12 mm. thickness. The proportion of the cement mortar shall be as specified in the item.

2.2. Fixing tries:

2.2.1. The tiles before laying shall be soaked in water for at least two hours. Neat grey cement grout at 3.3. Kg/Cement/Sq. mt. of honey like consistency shall be spread over the mortar bedding as directed. The edges of the tiles be smeared with neat cement slurry. The tiles shall be well pressed and gently tapped with a wooden mallet till they are properly bedded and in level with the adjoining tiles. There shall be no hollows in bed or joints. The joints between the tiles shall be as thin as possible in straight line or as per pattern.

2.2.2. The tiles shall not have staggered joints. The joints shall be true to centre line both ways. The Nehni trap coming in the flooring shall be so positioned that its grating shall replace only one tile as far as possible. Where full size tiles cannot be fixed, they shall be cut (Sawn) to the required size and the edges rubbed smooth to ensure straight and true joints. The joints shall be filled with grey cement grout with wire brush or trowel to a depth of 5 mm. and loose material removed. White cement shall be used for pointing the joints. After fixing the tile finally in an even plane the flooring shall be kept wet and allowed to mature undisturbed for 7 days.

2.3. Cleaning: 2.3.1. The surplus cement grout that may have come out of the joints shall be cleared off before it sets. Once the floor has set, it shall be carefully washed, cleared by dilute acid and dried. Proper precaution and measures shall be taken to ensure that the tiles are not damaged in any way till the completion of the construction.

3.0. Mode of measurements & payment:

3.1. The work done shall be measured in sq. mt. for visible area of work done. The length and width of the flooring shall be measured not between the faces of skirting or dados or plastered face of wall as the case may be. The paving under dado or skirting shall not be measured. No deduction shall be made nor extra paid for any opening in the floor of area upto 0.1 sq. mt. Nothing extra shall be paid for laying the floors at different levels in the same rooms.

3.2. The rate shall be for a unit of one sq. metre.

Item No- 23 Providingg and fixing extruded aluminium windows having extruded aluminium colour anodized section frame main outer size 95 mm x 24 mm x 1.17 mm (of jindal section No. 2459 @ Wt. 0.738 Kg/ mt) horizontal four trak member size 92 mm x 31.75 mm x 1.30 mm (of jindal section No. 8688@ Wt. 1.07Kg/ mt) vertical member of size 92 mm x 31.75 mm x 1.50 mm (of jindal section No. 8933 @ Wt.1.06 Kg/ mt) with sliding shutters of horizontal member size 40 mm x 18 mm x 1.29 mm (of Jindal Section no. 8947 @ wt. of 0.456 Kg/ mt) Vertical member of size 40 mm x 18 mm x 1.29 mm (of Jindal section No. 8949 @ Wt. of 0.456 Kg/ mt) with 5 mm thick transparent bronze colour tinted float glass with powder coated aluminium silicon sealant glass fixing to frame as per details etc. complete.

1.0 MATERIAL

1.1 Aluminum standard section

1.1.1 Main outer frame of rectangular tube

Aluminum alloy used in the manufacture of extruded Window section shall confirm to I S designation HEA-WP of I S 733-1975 and also Designation WVG –WP of I S 1285-1975 section shall be as specified in the drawing and design

Size of the **rectangular tube** shall confirm **65.0 x 25.0 X 1.25 mm**

All sections shall be Free from any scratches or holes or any damages on surface. All section shall have finished luster surface on all sides

1.1.2. Two track channel frame for window portion

Aluminum alloy used in the manufacture of extruded Window section shall confirm to I S designation HEA-WP of I S 733-1975 and also Designation WVG –WP of I S 1285-1975 section shall be as specified in the drawing and design

Size of the **two track Channel** shall confirm **65.0 x 25.0 X 1.25 mm**

All channels shall be Free from any scratches or holes or any damages on surface. All section shall have finished luster surface on all sides

1.1.3 Window shutter frame of size 50 X 25 x 1.5 mm

Aluminum alloy used in the manufacture of extruded Window section shall confirm to I S designation HEA-WP of I S 733-1975 and also Designation WVG –WP of I S 1285-1975 section shall be as specified in the drawing and design

Size of the **frame** shall confirm **50 X 25 x 1.5 mm**

All sections shall be Free from any scratches or holes or any damages on surface. All section shall have finished luster surface on all sides

1.1.4 PVC two track rubber top and bottom sliding channel

Top and bottom channel of rubber shall be of approved make and quality and shall be Free from any scratches or holes or any damages on surface.
All channels shall have finished luster surface on all sides

1.3 Glass

The glass shall be of approved make having thickness of 5 mm The glass shall be clear and free from scratches and cracks The glass shall be provided on the top

1.5. Rubber Gasket

Rubber gasket shall be of approved make. shall be Free from any scratches or holes or any damages on surface. and shall have finished luster surface on all sides

1.6. Fixtures

1.6.1 Hinges,

Hinges shall be of approved make. shall be Free from any scratches or holes or any damages on surface. and shall have finished luster surface on all sides

1.6.2 Handles,

handles shall be of approved make. shall be Free from any scratches or holes or any damages on surface. and shall have finished luster surface on all sides

1.1.4 Bolts,

All bolts shall be of approved make. shall be Free from any scratches or holes or any damages on surface. and shall have finished luster surface on all sides

1.6.5 Stoppers,

stoppers shall be of approved make. shall be Free from any scratches or holes or any damages on surface. and shall have finished luster surface on all sides

2.0 WORKMANSHIP

The Work of aluminum window shall be done with extreme finishing. The partial board shall be fixed in the bottom panel and glass shall be fitted on top panel as directed by Engineer in charge using glazing clips and rubber gaskets as required All the fixtures and fastenings shall be fitted at right place and as directed by Engineer in charge. Floor spring shall be fitted properly so as to align the window properly and shall be given trial of opening and closing properly.

3.0 Mode of Measurement & Payment :

3.1. The unit rate of aluminum window shall include the cost of all materials, cost of anodizing, cost of all necessary fixtures and fastenings, labour charges for fixing frames, windows and fixing the window in wall at the place shown in drawing and as instructed by Engineer in

charge, all tools and plant required for assembling and fixing in position, finishing as per direction of the Engineer-in-charge, and all other incidental expenses for preparing window frame and shutter of specified size to complete the window structure or its components as shown on the drawings and according to these specifications. They shall also include the cost of making, fixing and making walls good by plaster patch colour etc as required

3.2. The window shall be measured for its improvising and fixing extruded Alluminium window two track sliding shutter with frame section **65.0 x 25.0 X 1.25** mm weighing 0.547 Kg./Rmt., bottom, top and vertical channel section **50 X 25 x 1.5** mm weighing 0.457 Kg./Rmt. extrude alluminium colour anodised section frame with sliding shutter with 5 mm thick transparent bronze colour tinted float glass panel of modi guard or equivalent make with powder coated alluminium fittings and fixtures and transparent silicon glass fixings to from as detail including PVC T in frame silicon based linings handles, locks two nos. PVC gasket screws alluminium joints special runner etc. complete. For **Window** and height, limiting dimensions to those specified on plan or as directed.

3.3. The rate shall be for a unit of one squire meter.

Item No. 24 Providing and fixing single shutter flush door with standard alluminium colour anodized hollow section frame approved shade & colours & rectengluar tube shape main frame of jindal section No. 4656 of the size 101.60 mm x 44.75 mm x 1.63 mm having weight 1.089 kg per metre filled with country wood 35 mm thick flush door laminated both side with 0.8 mm thick lamination of the make sunmica / Decolam formica or equivalent lamination, using U type alluminium beading around door, three nos of stainless steel hinges for shutter of required size fixtures fastenings & all other hardware fixtures and fastenings like handles, stopper, aldrap tadi, shall be of stainless steel of approved quality & size directed by Engineer in charge etc. complete.

1.0. Materials Flush door shall conform to M-30. Plywood shall conform to M-37. Anodised aluminum butt hinges shall conform to M43. 2.0. Workmanship 2.1. The relevant specifications of item No. 10.23 shall be followed except that the shutters be non decorative type and block board core with face veneer or plywood with 35 mm. thickness. 2.2. Ready made shutters shall be of correct size and shall fit into the door or other openings without excessive scraping of edges. Adding of battens etc., to make up to the size shall not be allowed. 3.0. Mode of measurement & payment 3.1. The relevant specification of item No. 10.12 A (I) shall be followed. 3.2. The rate shall be for a unit of one sq. meter. 10.37. Extra for using bright finished M.S. Piano hinges instead of anodised aluminum butt hinges in flush door shutter (A) Nickel Plated Piano hinges. 1.0. Materials and workmanship 1.1. The relevant specification of item No. 10.30 shad be followed except that the nickel plated piano hinges shall be provided and fixed. It shall conform to the latest Indian Standards and shall be got approved by the Engineer-incharge. 2.0. Mode of measurement & payment 2.1. The extra payment shall be made on sq. M. basis of door over and above item No. 10.30 for providing finish M.S. planed hinges instead of anodised aluminum butt hangs. 2.2. The rate shall be for a unit of one sq. meter.

Item No. 25 Providing & fixing urinal of approved quality including connecting the urinal with waste pipe trap etc.

1.0. Materials: The white earthenware flat back or corner type urinal of size 4'30 mm. x 260 mm. x 350 mm. shall conform to M-64. 2.0. Workmanship 2.1. The urinals shall be fixed in position by using wooden plugs and screws and shall be at a height 65 cms. from the Moor level to the top of the lip of urinal, unless otherwise directed. The wooden plugs shall be of 50 mm. x 50 mm. at base tapering to 38 mm. x 38 mm. at top 50 mm. in length shall be fixed in wall in steel waste pipe which shall discharge in the channel or floor a tap. The connection between the urinal and flush or waste pipe shall be made by means of putty or white lead mixed with chopped hemp. 3.0. Mode of measurements and payment 3.1. The rate shall include cost all labours, materials, tools and plants etc. required for satisfactory completion of this item. 3.2. The rate shall be for a unit of One number.

Item No. 26 Applying two coats of Birla or Asian acrylic lapy (putty) & two coats of primer of approved brand and manufacture on new wall surface to give an even shade including thoroughly brushing the surface free from mortar dropping and otheer foreeign matter and sand papered smooth.

1.0. Materials : Water shall be conform to M-I. The plastic emulsion shall conform to I.S. 5411-1969 (part-I).

2.0. Workmanship:

2.1. Scaffolding : The relevant specifications of item No. 18.11 para 2.1. shall be followed.

2.2. Preparation of surface : The relevant specifications of item No. 18.44 para 2.2. shall be followed.

2.3. Preparation of Mix : This shall be done as per manufacturers instructions. The thinning of emulsion is to be done with water and not with turpentine. The quantity of thinner to be added shall be as per manufacturer instructions.

2.4. Applications:

2.4.1. Before pouring into small containers for use, the paint shall be stirred thoroughly in its container. When applying also, the paint shall be continuously stirred in the smaller container, so that its consistency is kept uniform.

2.4.2. The paint shall be laid on evenly and smoothly by meant of crossing and laying off the crossing and laying off consist of covering the area over with paint, brushing the surface hard for the first lime over and then brushing alternately in opposite direction two or three times and then finally brushing lightly in a direction at right angles to the same. In this process, no brush marks shall be left after the laying off is finished. No hair marks from the brush or clogging of paint puddles in the corners of panels, angles of mouldings, etc. shall be left on the work. The full process of crossing and laying off will constitute one coat.

2.4.3. The paint shall be applied with brush or rollers. For undecorated surfaces, the surface shall be treated with minimum two coats of cement water proofing paint. The second or subsequent coat shall not be started until the preceeding coat has become sufficiently hard to resist marking by brush being used.

2.4.4. The surface on finishing shall present a flat velvety smooth finish. It shall be even and uniform in shade without patches, brush marks, paint drops etc.

2.5. Precautions:

(a) Old brushes if they are to be used with emulsion paints, shall be completely dried of turpentine oil paint by washing in warm soap wafer.

Brushes shall be quickly washed in water immediately after use and kept immersed in water during break periods to prevent the paint from hardening on the brush.

12l

(b) In the preparation of wall for plastic emulsion painting, no oil base putties shall be used in filling cracks, holes etc.

(c) Splashes on floors etc. shall be cleaned out without delay as they will be difficult to remove after hardening.

(d) Washing of surfaces treated with emulsion paint shall not be done within 3 to 4 weeks of application.

2.6. Protective measures: 2.6.1. The relevant specifications of item No. 18.17. para 2.3. shall be followed:

3.0. Mode of measurements & payment:

3.1. The relevant specifications of item No. 18.11 shall be followed.

3.2. The rate shall be for a unit of one sq. metre.

Item No. 27 Wall painting (Three coats) with plastic emulsion paint of approved brand and manufacture on undercoated wall surfaces to give an even shade incl. thoroughly brushing the surface free from mortar droppings and other foreign matter and sand papered smooth.

1.0. Materials

Water shall be conform M-1. The plastic emulsion shall conform to I.S.: 5411-1969 (part-I).

2.0. Workmanship

2.1. Scaffolding : The relevant specifications of item-No. 18.11 Para 2.1 From Building Specification Book shall be followed.

2.2. Preparation of surface : The relevant specification of item No. 18.44 Para 2.2 From Building Specification Book shall be followed.

2.3. Preparation of Mix :

This shall be done as per manufacture's instructions. The thinning of emulsion is to be done with water and not with turpentine. The quantity of thinner to be added shall be as per manufacturer instructions.

2.4. Application :

2.4.1. Before pouring into small containers for use, the paint shall be stirred thoroughly in item container. When applying also, the paint shall be continuously stirred in the smaller container, so that its consistency is kept uniform.

2.4.2. The paint shall be laid on evenly and smoothly by means of crossing and laying off the crossing and consist of covering the area over with paint, brushing the surface hard for the first time over and then, brushing alternately in opposite direction two or three times and then finally brushing lightly in direction at right angles to the same. In this process, no brush Marks shall be left after the laying off is finished. No hair marks from the brush or clogging of paint puddles in the corners of panels, angles of moldings, etc. shall be left on the work. The full process of crossing and laying off will constitute one coat.

2.4.3. The paint shall be applied with brush or rollers. For undecorated surfaces, the surface shall be treated with minimum two coats of cement water proofing paint. The second or subsequent coat shall not be started until the proceeding coat as become sufficiently hard to resist marking by brushing being used.

2.4.4. The surface on finishing shall present a flat velvety smooth finish. It shall be even and uniform in shade without patches, brush marks, paint drops etc.

2.5. Precautions :

(a) Old brushes if they are to be used with emulsion paints, shall be completely dried of turpentine or oil paint by washing in warm soap water. Brushes shall be quickly washed in water immediately after use and kept immersed in water fusing break periods to prevent the paint from hardening on the brush.

(b) In the preparation of wall for plastic emulsion painting, no oil base petals shall be sued in filling cracks, holes etc.

(c) Splashes on floors etc. shall be cleaned out without delay as they will be difficult to remove after hardening.

(d) Washing or surfaces treated with emulsion paint shall not be done within 3 to 4 weeks of application

2.6. Protective payment : The relevant specifications of item No. 18.11 From Building Specification Book shall be followed.

3.0. Mode of measurements and payment

3.1. The relevant specifications of item No. 18.11 From Building Specification Book shall be followed.

3.2. The rate shall be for a unit of One sq. meter.

Item No. 28 Finishing wall with weather proof exterior emulsion paint on wall surface (Two coats) to give an required shape even shade after thoroughly brushing the surface to reemove all dirt and remains of loose powdered materials etc. complete.

1.0. Materials : 1.1. The weather proof exterior emulsion paint shall be of approved brand like Asian or Neriolec or other equivalent make of ISI.

2.0. Workmanship :

2.1. Preparation of surface:

2.2.1. The surface shall be throughly cleaned of all dust, dirt, mortar croppings and other foreign matter before .white wash is to be applied.

2.2.2. The surface spoiled by smoke soot shall be scraped with steel wire brushes or steel scrapers or shall be rubbed withover-burnt surkhi or brick bats. The surface shall be then broomed to remove all dust, dirt and shall be washed with clean water.

2.1.3. Oil or grease spots shall be removed by suitable chemical and smooth surface shall be rubbed with wire brushes.

2.2.4. All unsound portion of the surface plaster shall be removed to full depth of plaster in rectangular patches and plastered again after raking the masonry joints properly. Such portion shall be wetted and allowed to dry. They shall then be given one cat of white wash.

2.2.5. All unnecessary nails shall be removed, the holes cracks patches etc. shall be made good with materials similar in imposition to the surface to be prepared.

2.4. Application of Paint:

2.4.1. No painting shall be done when the paint is likely to be exposed to a temperature of below 7°C within 48 hours after application.

2.4.2. When weather conditions are such as to cause damage the work shall be carried out in the shadow as far as possible. This helps the proper hardening of the paint film by keeping the surface moist for a longer period.

2.4.3. To maintain the uniform mixture and to prevent segregation, the paint shall be stirred frequently in the bucket.

2.4.4. For undercoated surfaces, the surfaces shall be treated with minimum two coats of Exterior Emulsion paint. Not less than 24 hours shall be allowed between two coats. Next coat shall not be started untill the proceeding coat has become sufficiently hard to resist marking by the brush being used. In hot dry weather, the proceeding coat shall be allowed between

two coats. Next coat shall not be started until the proceeding coat has become sufficiently hard to resist marking by the brush being used. In hot dry weather, the proceeding coat shall be slightly moistened before applying the subsequent coat.

2.4.5. The finished surface shall be even and uniform in shade, without patches, brush marks, paint drops etc.

2.4.6 The Exterior Emulsion paint shall be applied with a brush with relatively short stiff hog or fibre bristles. The paint shall be brushed in uniform thickness and shall be free from excessive heavy brush marks. The lamps shall be well brushed out.

3.0. Mode of measurements & payment :

3.1. All the work shall be measured in the decimal system as under :

(a) Dimensions shall be measured to the nearest 0.01 M.

(b) Area in individual items shall be worked out to the nearest 0.01 Sq. M.

All the work shall be measured in sq. mt. Deductions for jambs, soffits, sills etc. for opening not exceeding 0.5 sq. mt. each in

area for ends of joints, posts, beams, girders, steps etc. not exceeding 0.5 sq. mt. each in area and for opening exceeding 0.3

sq. mt. and not exceeding 3.0 sq. mt. each in area deductions and additions shall be made as under :

3.2. No deductions shall be made for ends of joints beams, posts etc. and openings not exceeding 0.5 sq. mt. each. No addition

shall be made for reveals, jambs, soffits, sills etc. of these openings nor for finish arounds ends of joints, beams, posts etc.

3.3. Deductions for openings exceeding 0.5 sq. mt. but not exceeding 3 sq. mt. each shall be made as follows and no addition

shall be made for reveals, jambs, soffits etc. of these openings:

(a) When both the faces or walls are provided with finish, deduction shall be made for one face only.

(b) When each face of wall is provided with different finish deduction shall be made for that side of frame for door, windows

etc. on which width of reveals is less than that of 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 total area of finish.

(c) When only one face of wall is treated and the other face is not treated, full deduction shall be made if the width of reveal

on the treated side is less than that on the untreated side, but if the width of the reveal is equal or more than on the untreated

side neither deductions nor additions be made for reveals, jambs, soffits, sills etc.

3.4. In case of area of opening exceeding 3 sq. mt. each, deduction shall be made for openings but jambs, soffits, shall be measured.

3.5. No deduction shall be made for attachment such as casing, conducts, pipe, electric wiring and the like.

3.6. Corrugated surfaces shall be measured flat as fixed and not girth. The quantities so measured shall be increased by the

following percentage and the resultant shall be included with the general areas.

(a) Corrugated steel sheets 14%

(b) Corrugated A. C. Sheets 20%

(c) semi corrugated A. C. Sheets 10%

(d) Nainital pattern roof (Plain sheeting with rolls) 10%

(e) Nainital pattern roof (with corrugated sheets) 25%

3.7. Cornices and other wall features, when they are not picked out in a different finish/colour shall be girthed and included

in the general area

3.8. The rate shall include the cost of all materials, labour, scaffolding, protective measures etc. involved in all the operations

described above.

3.9. The rate shall be for a unit of one sq. metre.

Item No. 29 Provdg. & fixing water closet squatting pna (Indian type W.C. Pan) size 580 mm (Earthwork, bed concrete, foot rests and trap to be measured and paid for separately). (A) Vitreous China :(I) In white colour

General

This work shall consist of **Providing and fixing wash down water closet (Indian, W.C. Pan Size 580 mm with 100 mm I 'P' or 'S' trap including jointing the trap with soil pipe** of the shape and dimensions shown on the drawings and conforming to these Specifications or as approved by the Engineer in charge

MATERIAL

1.0. wash down water closet (Indian type)

1.1. The Indian type white glazed water closet of first quality shall be of size as specified in the item and conforming to I.S. 771-1979 and I.S. 2556 – (Part-II) 1981. Each pan shall have integral flushing. It shall also have an inlet at black an or front for connecting flush pipes as directed. The inside of the bottom of the pan shall have sufficient slope from the front towards the outlet and surface shall be uniform and smooth. Pan shall be provided with 100 mm. diameter 'P' or 's' trap with approximately 50 mm. Water seal and 50 mm . diameter vent horn.

2.0. Foot Rests

2..1. A pair of whit glazed earthen ware rectangular foot to minimum size 250 mm 130 mm. x 20 mm shall be provided with the water closet.

3.0. 'P' or 'S' trap for water closet squatting pan Vitreous China.

3.1. 'P' or 'S' trap shall be of white porcelain first quality best Indian make and it shall conform to general Indian IS standards The size of the 'P' or 'S' trap shall be as specified in item. 'P' or 'S' trap shall be of one piece All internal angles shall be designed so as to facilitate cleaning.

3.2. 'P' or 'S' trap shall have single piece as specified.

3. 0. WATER

3.1 Water shall not be salty brackish and shall be clean reasonably clear and free objectionable quantities of silt and traces of oil injurious alkalis salts organic matter and other deleterious material which will either weaken the mortar of concrete or cause efflorescence or attack the steel in R C C container for transport storage and huddling of water shall be clean, Water shall confirm to the standard specified in I S 455 -1978

3.2. If required by the Engineer in charge it shall be tested by comparison with distilled water compression shall be made by means of standard cement tests for soundness time of setting and mortar strength as specified in I S 269-1976 Any indication of unsoundness charge in

time of setting by 30 minutes or more or decrease of more than 10 percent strength of mortar prepared with distilled water sample when compared with the result obtained with mortar prepared with distilled water shall be sufficient cause for rejection of water under test.

3.3 Water for curing mortar concrete or masonry should not be too acidic or too alkaline

3.4 It shall be free of elements which significantly affect the hydration reaction or otherwise interface with the hardening of mortar or concrete during curing or those which produce objectionable stains or other unsightly deposits on concrete or mortar surfaces

3.5 Hard and bitter water and sea water shall not be permitted for curing

3.6 Potable water will generally found suitable for curing mortar or concrete

3.7. Storage Water shall be stored in containers/ tanks covered at top and cleaned at regular intervals in order to prevent intrusion by foreign matter or growth of organic matter Water from shallow muddy or marshy surface shall not be permitted The intake pipe shall be enclosed to exclude silt, mud grass and other solid materials and there shall be a minimum depth of 0.60 m on water below the intake at all times

3.8. As a guide following concentrations represent the maximum permissible values

(a) to neutralize 200 ml sample of water using phenolphthalein as indicator, it should not require more than 2 ml of 0.1 normal NaOH

(b) To neutralize 200 ml of water using methyl orange as an indicator, it should not required more than 10 ml of 0.1 normal HCl

(c) the permissible limits for solids shall be as follows when tested in accordance with IS 3025

	Permissible limits (Max)
Organic	200 mg/lit
Inorganic	3000 mg/lit
Sulphates (SO ₄)	500 mg/lit
Chlorides (Cl)	500 mg/lit
Suspended matter	2000 mg/lit

In case of structures of length 30 m and below, the permissible limit of chlorides may be increased up to 1000 mg/lit

All samples of water (including potable water shall be tested and suitable measures taken where necessary to ensure conformity of the water to the requirements stated herein.

(d) The pH value shall not be less than 6

4.0 CEMENT

4.1. Cement to be used in the works shall be any of the following types with the prior approval of the Engineer:

a) Ordinary Portland cement, 33 Grade, conforming. to *IS:269*.

b) Rapid Hardening Portland cement, conforming to *IS:8041*.

c) Ordinary Portland Cement, 43 Grade, conforming to *IS: 8112*.

d) Ordinary Portland Cement, 53 Grade, conforming to *IS: 12269*.

e) Soleplate Resistant Portland cement, conforming to *IS: 12330*.

4.2. Cement conforming to IS:269 shall be used only after ensuring that the minimum required design strength can be achieved without exceeding the maximum permissible cement content of 540 kg/cum. of concrete.

4.3. Cement conforming to IS: 8112 and IS: 12269 may be used provided the minimum cement content mentioned elsewhere from durability considerations is not reduced. From strength considerations, these cements shall be used with a certain caution as high early strengths of cement in the 1 to 28-day range can be achieved by finer grinding and higher constituent ratio of C_3S/C_2S , where C_3S is Tri-calcium Silicate and C_2S is D-calcium Silicate. In such cements, the further growth of strength beyond say 4 weeks may be much lower than that traditionally expected. Therefore, further strength tests shall be carried out for 56 and 90 days to fine tune the mix design from strength considerations.

4.4. Cement conforming to IS: 12330 shall be used when sodium soleplate and magnesium soleplate are present in large enough concentration to be aggressive to concrete. The recommended threshold values as per IS:456 are soleplate concentration in excess of 0.2 per cent in soil substrata or 300 ppm (0.03 percent) in ground water. Tests to confirm actual values of soleplate concentration are essential when the structure is located near the sea coast, chemical factories, agricultural land using chemical fertilizers and sites where there are effluent discharges or where soluble soleplate bearing ground water level is high. Cement conforming to IS:12330 shall be carefully selected from strength considerations to ensure that the minimum required design strength can be achieved without exceeding the maximum permissible cement content of 540 kg/cum. of concrete.

4.5. Cement conforming to IS 8041 shall be used only for pre cast concrete products after specific approval of the Engineer in charge

4.6. Total chloride content in cement shall in no case exceed 0.05 percent by mass of cement also total sulfur content calculated as sulfuric anhydride (SO_3) shall in no case exceed 2.5 per cent and 3.0 percent when tri-calcium aluminates per cent by mass in up to 5 or greater than 5 respectively

4.7. Storage

Cement shall be transported, handled and stored on the site in such a manner as to avoid deterioration or contamination, Cement shall be stored above ground level in perfectly dry and water tight sheds and shall be stacked not more than eight bags high. Wherever bulk storage containers are used their capacity should be sufficient to cover the requirement at site and should be cleaned at least once every 3 to 4 months

4.8. Each consignment shall be stored separately so that it may be readily identified and inspected and cement shall be used in the sequence in which it is delivered in any way, during storage shall not be used in the works and shall be removed from the site by the contractor without charge to the employer

The contractor shall prepare and maintain proper records on site in respect of delivery handling storage and use of cement and these records shall be available for inspection by the engineer in charge at all times

4.9. The contractor shall make a monthly return to the engineer in charge on the date corresponding to the interim certificate date showing the quantities of cement received and issued during the month in stock at the end of the month.

5.0 SAND

5.1 Sand shall be natural sand, clean well graded, hard strong durable and gritty particular free from immures amounts of dust, clay, kankar modules

5.2. For masonry works sand shall confirm to the requirements of IS: 2116

5.3. For plain and reinforced cement concrete (PCC and RCC) or pre stressed concrete (PSC) works fine aggregates shall consist of clean, hard strong and durable prices of crushed stone, crushed gravel or suitable combination of natural sand crushed stone or gravel, They shall not contain dust lumps soft or flaky materials mica or other deleterious materials in such quantities as to reduce the strength and durability of concrete, or to attack the embedded steel. Motorized sand washing machines should be used to remove impurities from sand. Fine aggregate having positive alkali-silica reaction shall not be used. All fine aggregates shall conform to IS L 383 and tests for conformity shall be carried out as per IS : 2386 (Part I to VIII) The contractor shall submit to the Engineer in charge the entire information indicated in Appendix A of IS : 383. The fineness modulus of fine aggregate shall neither be less than 2.00 nor greater than 3.5.

5.4. Sand fine aggregates for structural concrete shall conform to the following grading requirements as shown in the table below

5.5 Fine Sand: The fineness module shall not exceed 1.0 the sieve analysis of fine sand be as under:

IS. Sieve Designation % by wt. passing			
	Zone I	Zone II	Zone III
10 mm	100	100	100
4.75 mm	90-100	90-100	90-100
2.3 6mm	60-95	75-100	85-100
1.18 mm	30-70	55-90	75-100
600 MC	15-34	35-59	60-79
300 MC	5-20	8-30	12-40
150 MC	0-10	0-10	0-10

5.6. Coarse Sand: The fineness modules of coarse sand shall not be less than 2.5 and shall not exceed 3.0. The sieve analysis of coarse sand be as under:

I. S. Sieve Designation	% by wt. passing
4.75 mm	100
2.36mm	90 to 100
1.18 mm	70 to 100
600 MC	30 to 100
300 MC	85 to 70
150 MC	00 to 50

5.2. Proportion of Mix

5.2.1. Cement and sand shall be mixed to specified proportion, sand being measured by measuring boxes, the proportion of cement will be by volume on the basis of 50 Kg/Bag of cement being equal to 0.0342 Cu.m. The mortar may be hand mixed of machine mixed as directed.

5.3. Proportion of Mortar :

5.3.1. In hand mixed mortar, cement and sand in the specified proportions shall be thoroughly mixed dry on a clean impervious platform by turning over at least 3 times or more till a homogeneous mixture of uniform colour is obtained. Mixing platform shall be so arranged that no deleterious extraneous material shall get mixed with mortar or mortar shall flow out. While mixing, the water shall be gradually added and thoroughly mixed to form a stiff plastic mass of uniform colour so that each particle of sand shall be completely covered with a film of wet cement. The water cement ratio shall be adopted as directed

5.3.2. The mortar so prepared shall be used within 30 minutes of adding water. Only such quantity of mortar shall be prepared as can be used within 30 minutes

6.0. WORKMANSHIP

6.1. The (Indian type) pan shall be sunk into the floor and embedded in a cushion of average 15cm. cement concrete 1:5:10 (1 cement : 10 graded stone aggregate or brick aggregate 40 mm. nominal size) or and its bed concrete. The floor should be left 15 mm below the top level of the pan so as to allow for flooring and its bed concrete. The floor should be suitably stopped so that the waste water is drained into the pan. The shall be provided with 100 mm. 'P' or 'S' trap as specified in the item No. 23.113 with approximately 50 mm. seal. The joints between the pan and the trap shall be made leak- proof with cement mortar 1:1 (1 cement : 1 fine sand).

6.2. The 'P' or 'S' trap shall be fixed with pan cast iron pipe with C.M. 1.1. The pan shall be provided with a 100 mm. 'P' or 'S' trap as specified in the item with an approximately 50 mm . seal The joint between the pan and the trap shall be made leak-proof with cement mortar 1:1(1 cement : 1 fine sand).

6.0 MODE OF MEASUREMENT & PAYMENT :

6.1. The unit rate Water Closet shall include the cost of all materials, tools and plant required for lifting to required height with all lead and lift, placing & fixing in position, all required specials and jointing adhesive compound, finishing as per direction of the Engineer-in-charge, and all other incidental expenses for producing Water Closet work of specified size to complete the structure or its components as shown on the drawings and according to these specifications.

6.2. The rate includes cost of labour for fixing pans and seat cover, inlet outlet connections , including the cost of seat and covers and water jet including testing the same

6.3. The Water Closet work shall be measured for its number limiting to specified capacity to those specified on plan or as directed. The rate shall be for a unit of one number.

6.4 The payment will be made on number basis of the finished work.

Item No. 30 Provdg. & fixing 100 mm size P or S trap for water closet squatting pan incl. Jointing the trap with the pan & soil pipe in cement mortar 1:1 (1 cement : 1 fine sand) (A) Vitreous China.

General

This work shall consist of **Providing and fixing wash down water closet (Indian, W.C. Pan Size 580 mm with 100 mm I 'P' or 'S' trap including jointing the trap with soil pipe** of the shape and dimensions shown on the drawings and conforming to these Specifications or as approved by the Engineer in charge

MATERIAL

1.0. wash down water closet (Indian type)

1.1. The Indian type white glazed water closet of first quality shall be of size as specified in the item and conforming to I.S. 771-1979 and I.S. 2556 – (Part-II) 1981. Each pan shall have integral flushing. It shall also have an inlet at black an or front for connecting flush pipes as directed. The inside of the bottom of the pan shall have sufficient slope from the front towards the outlet and surface shall be uniform and smooth. Pan shall be provided with 100 mm. diameter 'P' or 's' trap with approximately 50 mm. Water seal and 50 mm . diameter vent horn.

2.0. Foot Rests

2..1. A pair of whit glazed earthen ware rectangular foot to minimum size 250 mm 130 mm. x 20 mm shall be provided with the water closet.

3.0. 'P' or 'S' trap for water closet squatting pan Vitreous China.

3.1. 'P' or 'S' trap shall be of white porcelain first quality best Indian make and it shall conform to general Indian IS standards The size of the 'P' or 'S' trap shall be as specified in item. 'P' or 'S' trap shall be of one piece All internal angles shall be designed so as to facilitate cleaning.

3.2. 'P' or 'S' trap shall have single piece as specified.

3. 0. WATER

3.1 Water shall not be salty brackish and shall be clean reasonably clear and free objectionable quantities of silt and traces of oil injurious alkalis salts organic matter and other deleterious material which will either weaken the mortar of concrete or cause efflorescence or attack the steel in R C C container for transport storage and huddling of water shall be clean, Water shall confirm to the standard specified in I S 455 -1978

3.2. If required by the Engineer in charge it shall be tested by comparison with distilled water compression shall be made by means of standard cement tests for soundness time of setting and mortar strength as specified in I S 269-1976 Any indication of unsoundness charge in

time of setting by 30 minutes or more or decrease of more than 10 percent strength of mortar prepared with distilled water sample when compared with the result obtained with mortar prepared with distilled water shall be sufficient cause for rejection of water under test.

3.3 Water for curing mortar concrete or masonry should not be too acidic or too alkaline

3.4 It shall be free of elements which significantly affect the hydration reaction or otherwise interface with the hardening of mortar or concrete during curing or those which produce objectionable stains or other unsightly deposits on concrete or mortar surfaces

3.5 Hard and bitter water and sea water shall not be permitted for curing

3.6 Potable water will generally found suitable for curing mortar or concrete

3.7. Storage Water shall be stored in containers/ tanks covered at top and cleaned at regular intervals in order to prevent intrusion by foreign matter or growth of organic matter Water from shallow muddy or marshy surface shall not be permitted The intake pipe shall be enclosed to exclude silt, mud grass and other solid materials and there shall be a minimum depth of 0.60 m on water below the intake at all times

3.8. As a guide following concentrations represent the maximum permissible values

(a) to neutralize 200 ml sample of water using phenolphthalein as indicator, it should not require more than 2 ml of 0.1 normal NaOH

(b) To neutralize 200 ml of water using methyl orange as an indicator, it should not required more than 10 ml of 0.1 normal HCl

(c) the permissible limits for solids shall be as follows when tested in accordance with IS 3025

	Permissible limits (Max)
Organic	200 mg/lit
Inorganic	3000 mg/lit
Sulphates (SO ₄)	500 mg/lit
Chlorides (Cl)	500 mg/lit
Suspended matter	2000 mg/lit

In case of structures of length 30 m and below, the permissible limit of chlorides may be increased up to 1000 mg/lit

All samples of water (including potable water shall be tested and suitable measures taken where necessary to ensure conformity of the water to the requirements stated herein.

(d) The pH value shall not be less than 6

4.0 CEMENT

4.1. Cement to be used in the works shall be any of the following types with the prior approval of the Engineer:

a) Ordinary Portland cement, 33 Grade, conforming. to *IS:269*.

b) Rapid Hardening Portland cement, conforming to *IS:8041*.

c) Ordinary Portland Cement, 43 Grade, conforming to *IS: 8112*.

d) Ordinary Portland Cement, 53 Grade, conforming to *IS: 12269*.

e) Soleplate Resistant Portland cement, conforming to *IS: 12330*.

4.2. Cement conforming to IS:269 shall be used only after ensuring that the minimum required design strength can be achieved without exceeding the maximum permissible cement content of 540 kg/cum. of concrete.

4.3. Cement conforming to IS: 8112 and IS: 12269 may be used provided the minimum cement content mentioned elsewhere from durability considerations is not reduced. From strength considerations, these cements shall be used with a certain caution as high early strengths of cement in the 1 to 28-day range can be achieved by finer grinding and higher constituent ratio of C_3S/C_2S , where C_3S is Tri-calcium Silicate and C_2S is D-calcium Silicate. In such cements, the further growth of strength beyond say 4 weeks may be much lower than that traditionally expected. Therefore, further strength tests shall be carried out for 56 and 90 days to fine tune the mix design from strength considerations.

4.4. Cement conforming to IS: 12330 shall be used when sodium soleplate and magnesium soleplate are present in large enough concentration to be aggressive to concrete. The recommended threshold values as per IS:456 are soleplate concentration in excess of 0.2 per cent in soil substrata or 300 ppm (0.03 percent) in ground water. Tests to confirm actual values of soleplate concentration are essential when the structure is located near the sea coast, chemical factories, agricultural land using chemical fertilizers and sites where there are effluent discharges or where soluble soleplate bearing ground water level is high. Cement conforming to IS:12330 shall be carefully selected from strength considerations to ensure that the minimum required design strength can be achieved without exceeding the maximum permissible cement content of 540 kg/cum. of concrete.

4.5. Cement conforming to IS 8041 shall be used only for pre cast concrete products after specific approval of the Engineer in charge

4.6. Total chloride content in cement shall in no case exceed 0.05 percent by mass of cement also total sulfur content calculated as sulfuric anhydride (SO_3) shall in no case exceed 2.5 per cent and 3.0 percent when tri-calcium aluminates per cent by mass in up to 5 or greater than 5 respectively

4.7. Storage

Cement shall be transported, handled and stored on the site in such a manner as to avoid deterioration or contamination, Cement shall be stored above ground level in perfectly dry and water tight sheds and shall be stacked not more than eight bags high. Wherever bulk storage containers are used their capacity should be sufficient to cover the requirement at site and should be cleaned at least once every 3 to 4 months

4.8. Each consignment shall be stored separately so that it may be readily identified and inspected and cement shall be used in the sequence in which it is delivered in any way, during storage shall not be used in the works and shall be removed from the site by the contractor without charge to the employer

The contractor shall prepare and maintain proper records on site in respect of delivery handling storage and use of cement and these records shall be available for inspection by the engineer in charge at all times

4.9. The contractor shall make a monthly return to the engineer in charge on the date corresponding to the interim certificate date showing the quantities of cement received and issued during the month in stock at the end of the month.

5.0 SAND

5.1 Sand shall be natural sand, clean well graded, hard strong durable and gritty particular free from immures amounts of dust, clay, kankar modules

5.2. For masonry works sand shall confirm to the requirements of IS: 2116

5.3. For plain and reinforced cement concrete (PCC and RCC) or pre stressed concrete (PSC) works fine aggregates shall consist of clean, hard strong and durable prices of crushed stone, crushed gravel or suitable combination of natural sand crushed stone or gravel, They shall not contain dust lumps soft or flaky materials mica or other deleterious materials in such quantities as to reduce the strength and durability of concrete, or to attack the embedded steel. Motorized sand washing machines should be used to remove impurities from sand. Fine aggregate having positive alkali-silica reaction shall not be used. All fine aggregates shall conform to IS L 383 and tests for conformity shall be carried out as per IS : 2386 (Part I to VIII) The contractor shall submit to the Engineer in charge the entire information indicated in Appendix A of IS : 383. The fineness modulus of fine aggregate shall neither be less than 2.00 nor greater than 3.5.

5.4. Sand fine aggregates for structural concrete shall conform to the following grading requirements as shown in the table below

5.5 Fine Sand: The fineness module shall not exceed 1.0 the sieve analysis of fine sand be as under:

IS. Sieve Designation % by wt. passing			
	Zone I	Zone II	Zone III
10 mm	100	100	100
4.75 mm	90-100	90-100	90-100
2.3 6mm	60-95	75-100	85-100
1.18 mm	30-70	55-90	75-100
600 MC	15-34	35-59	60-79
300 MC	5-20	8-30	12-40
150 MC	0-10	0-10	0-10

5.6. Coarse Sand: The fineness modules of coarse sand shall not be less than 2.5 and shall not exceed 3.0. The sieve analysis of coarse sand be as under:

I. S. Sieve Designation	% by wt. passing
4.75 mm	100
2.36mm	90 to 100
1.18 mm	70 to 100
600 MC	30 to 100
300 MC	85 to 70
150 MC	00 to 50

5.2. Proportion of Mix

5.2.1. Cement and sand shall be mixed to specified proportion, sand being measured by measuring boxes, the proportion of cement will be by volume on the basis of 50 Kg/Bag of cement being equal to 0.0342 Cu.m. The mortar may be hand mixed of machine mixed as directed.

5.3. Proportion of Mortar :

5.3.1. In hand mixed mortar, cement and sand in the specified proportions shall be thoroughly mixed dry on a clean impervious platform by turning over at least 3 times or more till a homogeneous mixture of uniform colour is obtained. Mixing platform shall be so arranged that no deleterious extraneous material shall get mixed with mortar or mortar shall flow out. While mixing, the water shall be gradually added and thoroughly mixed to form a stiff plastic mass of uniform colour so that each particle of sand shall be completely covered with a film of wet cement. The water cement ratio shall be adopted as directed

5.3.2. The mortar so prepared shall be used within 30 minutes of adding water. Only such quantity of mortar shall be prepared as can be used within 30 minutes

6.0. WORKMANSHIP

6.1. The (Indian type) pan shall be sunk into the floor and embedded in a cushion of average 15cm. cement concrete 1:5:10 (1 cement : 10 graded stone aggregate or brick aggregate 40 mm. nominal size) or and its bed concrete. The floor should be left 115 mm below the top level of the pan so as to allow for flooring and its bed concrete. The floor should be suitably stopped so that the waste water is drained into the pan. The shall be provided with 100 mm. 'P' or 'S' trap as specified in the **item No. 23.113 with approximately 50 mm. seal. The joints between the pan and the trap shall be made leak- proof with cement mortar 1:1 (1 cement : 1 fine sand).**

6.2. The 'P' or 'S' trap shall be fixed with pan cast iron pipe with C.M. 1.1. The pan shall be provided with a 100 nun. 'P' or 'S' trap as specified in the item with an approximately 50 mm . seal The joint between the pan and the trap shall be made leak-proof with cement mortar 1:1(1 cement : 1 fine sand).

6.0 MODE OF MEASUREMENT & PAYMENT :

6.1. The unit rate Water Closet shall include the cost of all materials, tools and plant required for lifting to required height with all lead and lift, placing & fixing in position, all required specials and jointing adhesive compound, finishing as per direction of the Engineer-in-charge, and all other incidental expenses for producing Water Closet work of specified size to complete the structure or its components as shown on the drawings and according to these specifications.

6.2. The rate includes cost of labour for fixing pans and seat cover, inlet outlet connections , including the cost of seat and covers and water jet including testing the same

6.3. The Water Closet work shall be measured for its number limiting to specified capacity to those specified on plan or as directed. The rate shall be for a unit of one number.

6.4 The payment will be made on number basis of the finished work.

Item No :- 31 Proc'dg. & fixing wash basin with single hole for pillar tap with C.I. or M.S. brackets painted white incl. Cutting holes and making good the same but excluding

fittings. (A) Vitreous China : (II) Flat back washbasin 550 mm x 400 mm size (I) In white colour including C.P. Brass waste , Waste pipe, Stop tap

1.0 MATERIAL

1.1. WASH BASIN

Wash basin squatting pan shall be European type and of best quality as approved by engineer in charge size of the wash basin shall match as per provision in the item of wash basin. type and shape and colour of the wash basin shall be approved by Engineer in charge.

1.1.2 Wash basin shall be of white porcelain first quality best Indian make and it shall conform to IS 2556 (Part – IV) – 1972 and I.S 771 – 1979. The size of the wash basin shall be as specified in the item Wash basin shall be of one piece construction with continued over flow arrangements. All internal angles shall be designed so as to facilitate cleaning. Wash basin shall have single tap hole or two holes as specified. Each basin shall have a circular waste hole which is either rebated or beveled internally with 65 mm diameter at top and 10 mm depth to suit the waste fitting. The necessary stud slot to receive the bracket on the under side of the basin shall be provided Basin shall have an internal soap holder recess which shall fully drain into the bowl.

1.2. Chromium plated bottle trap

P-trap shall be of best quality as approved by engineer in charge

1.3. Pillar cock

Pillar cock shall be of best quality and make and chromium plated as approved by engineer in charge

1.4. Stop cock

Stop cock shall be of 15 mm dia meter and shall be chromium plated of best quality as approved by engineer in charge

1.5. C P Brass waste

C P Brass waste shall be of best quality as approved by engineer in charge having 40 mm dia meter

2.0. WORKMANSHIP

2.1. The washbasin shall be fixed on the wall as and where directed. The wash basin shall be supported on a pair of M.S. or C.I. brackets fixed in C.M. 1:3 (1 cement : 3 sand). The bracket shall conform to I.S. 775 – 1962. The wall plaster on the rear shall be cut to rest the top edge of the washbasin. After fixing the basing plaster shall be made good and surface finished to match the existing one.

2.2. The brackets shall be painted white with ready – mixed paint.

2.3. The C.I. brass trap and union shall be connected to 32 mm dia waste pipe which shall be suitably bent towards the wall and which shall discharge into an open drain leading to a gully trap or direct in to gully-trap on the ground floor and shall be connected to a waste pipe through a floor trap on the upper floors. C.P. brass trap and union may not be provided where the surface drain or a floor trap is placed directly under basin and the waste is discharged in to vertically.

2.4. The height of the front edge to the wash basin from the floor level shall be 80 cms.

2.5. The necessary inlet, outlet, connections and fittings such as pillar cocks, CP dress waste trap waste pipe, stop cock, chain wish rubber plug etc. shall be fixed.

2.6. The payment of fittings shall be made separately under separate items.

3.0 MODE OF MEASUREMENT & PAYMENT :

3.1. The unit rate Wash basin shall include the cost of all materials, tools and plant required for lifting to required height with all lead and lift, placing & fixing in position, all required specials and jointing adhesive compound, finishing as per direction of the Engineer-in-charge, and all other incidental expenses for producing Wash basin work of specified size to complete the structure or its components as shown on the drawings and according to these specifications.

3.2. The Wash basin work shall be measured for its number limiting to specified capacity to those specified on plan or as directed. The rate shall be for a unit of one number.

3.3. The payment will be made on number basis of the finished work.

Item No. 32 Providing laying and jointing in true line and level UPVC pipe (SCH-40) of following dia. Including fittings of standard make as approved by Engineer in charge pipe shall be fixed on the wall with the help of clamp at every 2000 mm center to center or shall be concealed as directed including necessary fittings etc. including testing of pipe and joints and fixing the same with adhesive solvent, including cost of all materials
(A) 15 mm

Item No. 33 Providing laying and jointing in true line and level UPVC pipe (SCH-40) of following dia. Including fittings of standard make as approved by Engineer in charge pipe shall be fixed on the wall with the help of clamp at every 2000 mm center to center or shall be concealed as directed including necessary fittings etc. including testing of pipe and joints and fixing the same with adhesive solvent, including cost of all materials
(C) 25 mm

Item No - 34 Providing & fixing screw down bib taps of following size (A) Brass screw down bib tap polished bright (ii) 20 mm dia

1.0 MATERIAL

1.0 Towel Rail

1.1. Towel rail shall be of iron and shall be sound and free from porosity or any defects which affect serviceability. The thickness of the base metal shall not be less than 6.5 mm. The surface shall be smooth and free from scale, chips and other flaws or any other kind of defect which affect serviceability. The size of Towel rail shall be specified and shall be of self cleaning design.

1.2 The Towel rail shall be of quality approved by Engineer in charge and shall generally conform to the relevant Indian standard

1.3 The Towel rail provided shall be with fitted on brackets fitted on wall of glazed tiled surface of wall by drilling holes duly plugged by wooden gummies by appropriate size of screws as approved by Engineer in charge.

1.2. The Necessary galvanized fittings like sockets, screws etc, shall be of best quality and makes as approved by the Engineer-in-charge.

2.0. WORKMANSHIP

FITTING & FIXING

2.1. When the Towel rail are to be Fitted, the surface of wall or tiles shall not be damaged. The Towel rail shall be fitted on walls carefully by drilling holes in surface of walls or tiled surface of wall carefully while fitting of sockets

2.2 In fitting of the Towel rail the socket shall be fitted by means of screws

3.0 MODE OF MEASUREMENT & PAYMENT :

3.1. The unit rate of Towel rail shall include the cost of all materials, tools and plant required for fitting, the same to specified position as per drawings, and as directed by Engineer in charge finishing structure, etc, and all other incidental expenses for producing Towel rail work to complete the structure or its components as shown on the drawings, and as directed by Engineer in charge and according to these specifications. They shall also include the cost of making, fixing and removing of all scaffolding and forms required for the work.

The rate of Towel rails shall include the cost of all labour, materials, G I fittings as required, tools and plant scaffolding and all incidental expenses as described herein above.

3.2. The Towel rail shall be measured for its **Number**, limiting dimensions to those specified on plan or as directed. The rate shall be for a unit of one Number.

3.3. The payment will be made on number basis of the finished work.

Item No- 35 Providing & fixing PVC SWR Nahni trap Is 14735 for drain 100 mm diameter with jali of the following nominal diameter of self cleansing design with CI screed down or hinged grating including the cost of cutting and making good the walls.

1.0. Materials

1.1. The **PVC SWR Nahni Trap** shall conform to **IS 14735 for drain**. The C.I. hinged or screwed down cover shall be of best quality & as approved by Engineer in charge.

2.0. Workmanship

2.1. The Nahni trap with 100 mm. dia inlet and 50 mm. dia. outlet shall be fixed as per drawing or as directed.

2.2. The Nahni trap shall be jointed with drainage Pipe.

3.0. Mode of measurements and payment

3.1. The rate includes cost of all labour, materials, tools and plants etc. required for satisfactory completion of this item including lead, jointing and testing.

3.2. The rate shall be for a unit of one number.

Item No. 36 Provdg. & fixing S.W. Gully trap with C.I. grating brick masonry chamber & water tight C.I. cover with frame of 300 mm x 300 mm size (inside) with standard weight (A) 100 mm x 100 mm size P-type.

1.0 Materials : (1) Water shall conform to M-I. (2) Cement mortar of proportion 1: 5 shall conform to to M-I 1. (3) Burnt

brick shall conform to M-15. (4) The S.W. Gully trap of 100 mm. x 100 mm. size shall conform to M-70.

2.0. Workmanship : **2.1.** Excavation for gully trap shall be done true to dimensions and levels as indicated on plans or as directed.

The excavation work shall generally be done as per relevant specification of item 4.0.0. of earth work.

2.2. Fixing : **2.2.1.** The gully trap shall be fixed over cement concrete 1: 5 : 10 (1 cement: 5 sand : 10 graded brick bats

aggregate 40 mm. nominal size) foundation 650 mm. square and 100 mm. thick. The depth of top of concrete below the

ground level shall be 675 mm. The jointing of gully outlet to the branch drain shall be done similar to jointing of S. W. pipe

as described in item No. 24.1.(A).

2.3. Brick masonry chamber: After fixing and testing gully and branch drain, a brick masonry 300 x 300 mm. inside with

bricks in C.M. 1 : 5 (1 cement: 5 sand) shall be built With a 100 mm. brick work round the gully trap from the top of bed

concrete upto ground level. The space between the chamber walls and the trap shall be filled with cement concrete 1:5:10.

The upper portion of the chamber i.e. above the top level of the trap shall be plastered inside with cement mortar 1 : 3 (1

cement: 3 sand) finished with floating coat of neat cement. The corners and bottom of the chamber shall be rounded of so as

to slope towards the grating.

2.4. C.I. cover with frame 300 mm. x 300 mm. (inside) size shall than be fixed on the top of the brick masonry with C.C. 1:2:4

(1 cement: 2 coarse sand: 4 graded stone aggregate 20 mm. nominal size) 40 mm. thick and rendered smooth. The finished

top of the cover shall be left about 40 mm. above the adjoining ground level so as to exclude the surface water from entering

the gully trap.

3.0. Mode of measurements & payment:

3.1. The rate includes cost of all labour, materials, tools and plant etc. required for satisfactory completion of this item as described above.

3.2. The rate shall be for a unit of one number basis.

Item no. 37 Provdg. & fixing to wall ceiling and floor 10.0 kg.F/cm² (UPVC) working pressure polythelene pipes of the following outside dia, low density, complete with special flange compression type fittings, wall clips etc. incl. Making good the wall ceiling and floor.(A) 110 mm

1.0. Materials : 1.1. The low density polythene pipe of specified diameter with 6 Kg./F. Sq. Cm. working pressure shall conform to I.S. 3076-1968. The specials and fillings required shall be of best quality.

2.0. Workmanship:

2.1. The P.V.C. Pipes of specified diameter shall be fixed as directed. Due to thermal expansion of rigid P.V.C. Pipes, due allowance shall be made particularly in over ground pipe lines for any change in length of pipe line which may occur during installation or when pipe line is in service.

2.2. Above ground installation of rigid P.V.C. pipe should be undertaken after precautions are observed for their protection against dirt sun rays and mechanical damage.

2.3. The rigid P.V.C. pipe lines should not be kept exposed above ground when it passes through public place, railway lines, roads, road side and footpaths.

2.4. P.V.C. pipes shall be supported at the followings intervals :

20 mm. dia. 500 mm.

25 mm. dia. 750 mm.

32mm. dia. 900mm.

2.5. Closet support spacings shall be provided, if recommended by the manufacturer.

2.6. The guide line indicated by the manufacturer regarding handling, transportation, storing, laying and jointing of pipes shall be kept in view during execution.

2.7. P.V.CV. pipes shall be fixed on wall with wooden plugs and suitable clamps.

2.8. Jointing the pipes :

2.8.1. The pipes and sockets shall be accurately cut. The ends of the pipes and filling should be absolutely free from dirt and

dust The outside surface of the pipes and the inside of the fillings shall then be roughened with emery paper, and then solvent

cement shall be applied to the matching surface and pushed home and joint. Since solvent cement is aggreswive to P.V.C.

care must be taken to avoid applying excessive cement to the inside of pipe sockets as any surplus cement cannot be wiped

off after jointing. Empty solvent cement tins, brushes, rags, of paper unpregneted with cement should not be buried in the

trenches. They should be gathered, not left scatcrred about, as they can prove to be a hazard to animals which may chew them.

2.8.2. If any manufacturer recommends its own methods of jointing the same shall be adopted after necessary approval from the Engineer-in-charge.

2.9. Laying pipes in trenches :

2.9.1. The pipes shall be laid over uniform relatively soft fine grained soil found to be free of presence of hard objects such as large flints, rocky projections, large tree roots etc. The width of the trenches shall be minimum width required for working.

2.9.2. The pipes laid underground shall not be less than one metre from the ground level. The pipe shall be positioned in the trenches so as to avoid any induced stresses due to reflection. Any deviation required shall be obtained by using proper type of rubber ring joints.

3.0. Mode of measurements & payment:

3.1. The relevant specifications of item No. 23.2 (A) shall be followed except that the P.V.C. pipes of specified dia. shall be paid under this item.

3.2. The rate shall be for a unit of one running metre.

Item no. 38 Provdg. & fixing to wall ceiling and floor 6.0 kg.F/cm² (UPVC) working pressure polythelene pipes of the following outside dia, low density, complete with special flange compression type fittings, wall clips etc. incl. Making good the wall ceiling and floor.(A) 110 mm

1.0. Materials : 1.1. The low density polythene pipe of specified diameter with 6 Kg./F. Sq. Cm. working pressure shall conform to I.S. 3076-1968. The specials and fillings required shall be of best quality.

2.0. Workmanship:

2.1. The P.V.C. Pipes of specified diameter shall be fixed as directed. Due to thermal expansion of rigid P.V.C. Pipes, due allowance shall be made particularly in over ground pipe lines for any change in length of pipe line which may occur during installation or when pipe line is in service.

2.2. Above ground installation of rigid P.V.C. pipe should be undertaken after precautions are observed for their protection against dirt sun rays and mechanical damage.

2.3. The rigid P.V.C. pipe lines should not be kept exposed above ground when it passes through public place, railway lines, roads, road side and footpaths.

2.4. P.V.C. pipes shall be supported at the followings intervals :

20 mm. dia. 500 mm.

25 mm. dia. 750 mm.

32mm. dia. 900mm.

2.5. Closet support spacings shall be provided, if recommended by the manufacturer.

2.6. The guide line indicated by the manufacturer regarding handling, transportation, storing, laying and jointing of pipes shall be kept in view during execution.

2.7. P.V.CV. pipes shall be fixed on wall with wooden plugs and suitable clamps.

2.8. Jointing the pipes :

2.8.1. The pipes and sockets shall be accurately cut. The ends of the pipes and filling should be absolutely free from dirt and

dust. The outside surface of the pipes and the inside of the fillings shall then be roughened with emery paper, and then solvent

cement shall be applied to the matching surface and pushed home and joint. Since solvent cement is aggressive to P.V.C.

care must be taken to avoid applying excessive cement to the inside of pipe sockets as any surplus cement cannot be wiped

off after jointing. Empty solvent cement tins, brushes, rags, or paper impregnated with cement should not be buried in the

trenches. They should be gathered, not left scattered about, as they can prove to be a hazard to animals which may chew them.

2.8.2. If any manufacturer recommends its own methods of jointing the same shall be adopted after necessary approval from the Engineer-in-charge.

2.9. Laying pipes in trenches :

2.9.1. The pipes shall be laid over uniform relatively soft fine grained soil found to be free of presence of hard objects such

as large flints, rocky projections, large tree roots etc. The width of the trenches shall be minimum width required for working.

2.9.2. The pipes laid underground shall not be less than one metre from the ground level.

The pipe shall be positioned in the

trenches so as to avoid any induced stresses due to reflection. Any deviation required shall be obtained by using proper type

of rubber ring joints.

3.0. Mode of measurements & payment:

3.1. The relevant specifications of item No. 23.2 (A) shall be followed except that the P.V.C. pipes of specified dia. shall be paid under this item.

3.2. The rate shall be for a unit of one running metre.

Item No. 39 Construction underground sock well 1.50 m diameter & 3 mt in depth with Honey comb Brick masonry having crushing stg. Not less than 35 Kg/ sqmt in C.M. 1:5, 0.35 m thick at bottom 1.50 mt & 0.23 mt thick 1.00 m of honey comb masonry and 0.23 m thick 0.50 m Ht at top level RCC 1:2:4 slab 0.10 m thick of top including inspection gap 0.60 m x 0.45 m and cover Ready made F.R.c. cover whole work as per instruction of Engineer in charge etc. complete

1.0 Materials : (1) Water shall conform to M-I, (2) Cement mortar of proportion 1: 1 shall conform to M-11. (3) 100mm.

dia. glazed stoneware pipe shall conform to M-71.

2.0. Workmanship: 2.1. The trenches for stoneware pipe drains shall be carried out as per relevant specifications of item No.

23.4(A) except that the work is for stoneware pipes of 100 mm. dia.

2.2. Laying: 2.2.1. The pipes shall be laid accurately and perfectly true to line, levels and gradients. Great care shall be taken

to prevent sand etc., from entering the pipes. The pipes between two manholes shall be laid truly in a straight line without vertical or horizontal undulation. All junctions and changes in direction and diameter shall be made inside manholes by means of curved tapered channels formed in cement concrete finished smooth and benched on both sides. The body of the pipe shall rest for its entire length, on an even level bed grips being made or left on the bed to receive the sockets of the pipes.

2.3. Jointing:

2.3.1. Tarred gaskin or yam socked in neat cement slurry first be placed around the spigot of each pipe and the spigot shall then be placed well home into the socket of the pipe previously laid. The pipe shall then be adjusted and fixed in the correct position and gaskin cculked home so as to fill not more than 1/4th of the total dept or (13 mm. in depth) of the socket.

2.3.2. The remainder of the socket shall be filled with stiff mixture of cement mortar in porportion of one part of cement and one part of sharp sand. When the socket is filled, a fillet, shall be formed round the joints trowel, forming an angle of 45° with the barrel of the pipe.

2.3.3. The mortar shall be mixed as necessary for immediate use.

2.3.4. After the joint is made, any extraneous materials shall be removed from the inside of the joints with a suitable scraper of 'badger'. The newly made joint shall be protected, until set, from the sun, dry winds, rain or *host*, sacking or other suitable materials which shall be used for the purpose.

2.3.5. The mortar shall be cured to 10 days.

2.4. Testing of Joints: The pipe line shall be tested as directed.

2.4.1. If any leakage is visible, the defective part of the work shall be made good at no extra cost.

2.4.2. A slight amount of sweating which is uniform may be overlooked, but excessive sweating from a particular pipe or joints shall be watched for and taken as indicating a defect to be made good.

3.0. Mode of measurements & payment:

3.1. Pounding or bottaning of the trenches bed to fit the lower part of the pipe and 'Grips' left to take socket, collars etc. are included in the rate of laying the pipes.

3.2. The measurements shall be net without any allowance for cutting and waste. The length of bends, junctions and other connections shall be included in the total length of the drain pipes. Nothing extra shall be paid for the same. The rate includes necessary excavation refilling trenches etc. complete.

3.3. The rate shall be for a unit of one running metre.

Item No. 40 Providing cement vata (10x10 cm.size quarter round in C.M.1:1 including neat cement finishing watering etc, complete.

1.0. Materials 1.1. Water shall conform to M-1 .Cement mortar shall conform to M-11. 2.0. Workmanship 2.1. The work of cement vata of 10 cms x 10 cms. size shall be earned out at Functions of parapets and terraces as directed. The vata shall be finished in quarter round shape. The work shall be earned out in the best workman like manner. The inter portion of rain water pipe shall be rounded off properly during constructing the vata. The work shall be cured for 7 days. 3.0. Mode of measurements and payment 3.1. The work shall be measured for finished item in running meter. 3.2. The rate shall be for a One running meter.

Item No. 41 Providing & fixing double coated Syntex or equivalent PVC (ISI) water tank or required capacity each with all necessary fittings and connection etc. complete on terrace.

1.0. MATERIAL

1.1. PVC Water tank

PVC Water tank of specified capacity and of I.S.I. mark of approved in liters of approved make and quality

Net capacity shall be net volume of water stored between the lowest level of overflow and lowest specified level.

1.2. Nipple

Galvanise pipe nipple shall be of approved make and of best quality

1.3. Ball valve

Ball valve shall be of approved make and of best quality

1.4. Connections

Connections shall be of approved make and of best quality

2.0 WORKMAN SHIP

2.1. Tank shall be approved quality and as per IS standard make. Material used in manufacturing tank shall be confirmed to relevant IS code. The material of tank and lead and fittings which may come in contact of water should be such that it does not impart any taste, colour or odour. It does not have any toxic effect and it does not contaminate the water. Thereby making it unpotable.

2.2. The tank shall be fixed properly in a level position and making all required necessary correction like inlet outlet flushing overflow and air vent. Tank shall be satisfying the standards of public health.

3.0 MODE OF MEASUREMENT & PAYMENT :

3.1. The unit rate PVC tank shall include the cost of all materials, tools and plant required for lifting to required height with all lead and lift, placing & fixing in position, all required specials and jointing adhesive compound, finishing as per direction of the Engineer-in-charge, and all other incidental expenses for producing PVC water tank work of specified diameter to complete the structure or its components as shown on the drawings and according to these specifications. They shall also include the cost of making, fixing and removing of all scaffolding and forms required for the work.

3.2. The PVC water tank work shall be measured for its number limiting to specified capacity to those specified on plan or as directed. The rate shall be for a unit of one number.

3.3. The payment will be made on number basis of the finished work.

Item No. 42 provdg & fixing M.S. grills of required pattern to wooden frames of window etc. with M.S. flats at required spacings and frame alround, square or round bars with round headed bolts and nuts or by screws (A) plain grill

\

1.0. Materials

The structural steel shall conform to M-22 Paint shall conform to M44

2.0. Workmanship

2.1. The M.S. Grill shall be prepared as per the drawing or as directed for fixing to wooden frames of windows etc.

2.2. The grill shall be fabricated to the designs and patterns shown in the drawings and the weight shall be as directed, and the joints shall be reverted or welded as shown in the plan or as directed. The grill so formed shall be fixed into the frames of the windows etc. before they are erected in position. The outside strip frame of the grill shall be housed to its full thickness into the recess cut into the frame of the windows etc. The grill shall be fixed to the frame with number of bolts and nuts or screws viz. bolt nut/screw per 30 cm. of the length of outer strip subject to minimum of 2 Nos. on each side of the frame or as indicated in the drawing or as directed.

2.3. The bolts and nuts or screws shall be counter sunk and shall be fixed with the top of their heads flush with the face of the frame strips.

2.4 Grill shall be painted Mat finished oil paint two coats followed by one coat of red lead primer.

3.0. Mode of measurements & payment

3.1. No payment shall be made for weight of screws, bolts nuts etc. only weight of grill shall be paid.

3.2. The rate shall be for a unit of one kg.

Item No. 43 Provdg. & fixing gun metal check or nonreturn full way wheel valve. (C) 25 mm dia.

1.0. Materials:

1.1. The gun metal check or non return full way wheel valve of specified dia. shall conform to I.S. 778-1964. The non return valve shall be of tested quality.

2.0. Workmanship :

2.1. The gun metal check or non return valve" shall be fully cleared of all foreign matter before fixing. The fixing of valve shall be done by means of bolts nuts and 3 mm. rubber insertions with flanges of spigot and socked tail pieces, drilled to the same specification as in case of socket and spigot and with flanges in case of flanged pipes. The jointing shall be done leak proof.

3.0. Mode of measurements & payment:

3.1. The rate includes all labours, materials, tools and plant etc. required for satisfactory completion of this item.

3.2. The rate shall be for a unit of one number.

Item no. 44 to 54 Specifiaon as per Electrification Book Attached

**Name of Work :- Const. Of Multi Purpose Center Hall at Village Devadthal
Ta.Bavla Dist. Ahmedabad Package No. AHD/ADIMJUTH/05 (2026-2027)**

SCHEDULE FOR TESTING OF MATERIALS

For ensuring quality control and workmanship, Various tests prescribed below for materials shall be taken at periodical intervals as stipulated below.

The materials shall be got tested at Government recognised Laboratory, (R & B) of field Laboratory of GERI (R & B) for which 1 % of the estimated amount pur to Tender shall be recovered from the contractor from the R.A. bills and final bills at the testing charges shall be paid to the GERI by the Government However if the charges increase over 1 % no excess recovery shall be made from the contractor as per resolution of B & C Department dated 10th May 1985 vide TNC/1085 (4)s.

Item No. as per schedule B	Brief Description of Materials to be tested	Qty. of Materials	Prescription of test which shall be carried out	Frequency @ which test shall be carried out		Total No. of Test to be taken
	40 MM		Gradation Test	1 to 100 Cmt – 1 Test		
	20 MM			100 to 500 cmt – 3 Test		
	25 to 40 mm metal		Impact value	500 to 1500 cmt – 5 Test		
	10 to 20 mm kapchi		Flakiness Index	1500 to 5000 cmt – 7 Test		
	6 mm size grit					
	10 to 12 mm kapchi					
	6 to 10 mm grit					
	19.20 to 26.5 mm					
	13.20 to 19.20 mm					
	4.75 to 13.20 mm					
	2.36 to 4.75 mm					
	5.60 to 11.20 mm					
	2.80 to 5.60					
	Quarry Spall					
	40 mm nominal sie					
	20 mm MCBT					
2	Sand		Stripping Value	-As above-		
3	Murum		P. I. Value	One test per / 50 Cmt		
4	Sand		Silt Content	One test per work		
	Stone dust		Gradation	One test per 200 Cmt		
5	Asphalt		1 Penetration Test as per I.S. 1203	No. of Tankar	Test	
	(ii) Emulsion			1 to 10	1	
				11 to 20	2	
				21 to 50	3	
				50 to 100	4	
				Remaining every 50 tankar		
			2. Ductility Test	As per I.S. 1208		
			3. Specification Gravity Test	As per I.S. 1202		
			4. Softening point Test	As per I.S. 1204		
			5. Viscosity Test	As per I.S. 1206		
6	Tack coat		Binder temperature for application	Irregular close in intervals Two tests per day		
			Rate of spread of binder			

7	WOOD				
8	Bricks		Water absorption	1 test per 50000 Bricks	
			Efflorence		
			Size		
			Compressive Strength		
9	Cement		Consistency	Up to 50 T	1 test
			Setting time	100 T	2 tests(As per
			Compressive stemgth	200 T	3 tests GERI
			Fineness	300 T	4 tests Manual
			Chemical analysis	500 T	5 Tests 2002)
			Soundess	800 T	6 tests
				1300 T	7 tests
				and 8 tests for longer consingment	
10	Steel T.M.T. Bar		Tensile Strength	1 Test/40tonnes/per category	
	M.S. Bar		Yield Stress		
			Elongation		
			Size		
11	C C cube 1.1.5.3		Compressive Strength	Only C.C. M.P	No. of test
	M-100		(I.S. 516 – 1959)	1 to 5	1 No
	M-150			6 to 15	2 No
	M-200			16 to 20	3 No
	M-250			31 to 50	4 No
	C.C. 1:3:6			51 & above	4 + 1
				(For each additional 50 or part thereof)	

The number of test will be as per Manual of Quantity Control of latest Govt. G.R./ Circulars will be final .

The Contractor shall have to pay 1 % of the estimate cost put to tenders all testing of materials & same shall be deducated from their bills for the works. The testing of various materials shall be carried out in DERI and result received shall be binding to all i.e. the contractor and Govt.

Testing charges of GERI shall be born by Govt. No refund be made nor extra charges over 1 % shall be recoverable from the ccontractor.s

Deputy Executive Engineer
R & B Panchayat Sub Division
Dholka

Executive Engineer
R & B Panchayat Division
Ahmedabad