

SPECIFICATIONS OF MATERIALS INDEX

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GENERAL TECHNICAL SPECIFICATIONS FOR BUILDING WORKS

GENERAL :

1. In the specifications "as directed" / "approved" shall be taken to mean "as directed" / "approved by the Engineer-in-charge".
2. Wherever a reference to any Indian Standard appears in the specifications, it shall be taken to mean as a reference to the latest edition of the same in force on the date of agreement.
3. In "Mode of Measurement" in the specifications wherever a dispute arises in the absence of specific mention of a particular point of aspect the provisions on these particular points, or aspects in the relevant Indian Standards shall be referred to
4. All measurements and computations, unless otherwise specified, shall be carried out nearest to the following limits:
 - (i) Length, width and depth (height) 0.01 meter
 - (ii) Areas 0.01 Sq.Mt.
 - (iii) Cubic Contents 0.01 Cu.Mt.

In recording dimensions of work the sequence of length, width and height (depth) or thickness shall be followed.
5. The distance which constitutes lead shall be determined along the shortest practical route and note necessarily the route actually taken The decision of the Engineer-in-charge in this regard shall be taken as final.
6. Where no lead is specific, it shall mean "all leads"
7. Lift shall be measured from plinth level.
8. Upto "floor two level" means actual height of floor (Maxi. 4 m) up to 3 mt. above plinth level.
9. Definite particulars covered in the items of work, though not mentioned or elucidated in it specifications shall be deemed to be included therein.
10. Reference to specifications of materials as made in the detailed specification of the items of works is in the form of a designation containing them number of the specification of the material and prefix 'M' e.g. 'M-5',
11. Approval to the samples of various materials given by the Engineer-in-charge shall not absolve the contractor from the responsibility of replacing defective material brought on site or materials used in the work found defective at a later date. The contractor shall have no claim to any payment or compensation whatsoever on account of any such materials being rejected by the Engineer-in-charge.
12. The contract rate of the item of work shall be for the work completed in all aspects.
13. No collection of materials shall be made before it is got approved from the Engineer-in-charge.

14. Collection of approved materials shall be done at site of work in a systematic manner. Materials shall be stored as per IS 4082-1996 and in such a manner as to prevent damage, deterioration or intrusion of foreign matter and to ensure the preservation of their quality and fitness for the work.

15. Materials, if and when rejected by the Engineer-in-charge, shall be immediately removed from the site of work.
16. No materials shall be stored prior to, during and after execution of a structure in such a way as to cause or lead to damage or overloading of the various components of the structure.
17. All works shall be carried out in a workmanlike manner as per the best techniques for the particular item.
18. All tools, templates, machinery and equipment for correct execution of the work as well as for checking lines, levels, alignment of the works during execution shall be kept in sufficient numbers and in good working condition on the site of the work.
19. The mode, procedure and manner of execution shall be such that it does not cause damage or over-loading of the various components of the structure during execution or after completion of the structure.
20. Special modes of construction not adopted in general Engineering practice if proposed to be adopted by the Contractor, shall be considered only if the contractor provides satisfactory evidence that such special mode of construction is safe, sound and helps in speedy construction and Completion of work to the required strength and quality. Acceptance of the same by the Engineer-in-Charge shall not, however absolve the contractor of the responsibility of any adverse effects and consequences of adopting the same in the course of execution of completion of the work.
21. All installations pertaining to water supply and fixtures there of as well as drainage lines and sanitary fittings shall be deemed to be completed only after giving satisfactory tests by the contractor.
22. The contractor shall be responsible for observing the rules and regulations imposed under the "Minor Minerals Act", and such of the laws and rules prescribed by Government from time to time.
23. All necessary safety measures and precautions (including those laid down in the various relevant Indian Standards) shall be taken to ensure the safety of men. Materials and machinery on the works as also of the work itself.
24. The testing charges of all materials shall be borne by the Contractor.
25. Approval to any of the executed items for the work does not in any way relieve the contractor of his responsibility for the correctness, soundness and strength of the structure as per the drawings and specifications.

SPECIFICATIONS OF MATERIALS

M-1 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 and 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 handling of water shall be clean. Water shall conform to the standard specified in I.S. 456-1978.
- 1.2.** If required by the Engineer-in-Charge it shall be tested by comparison with distilled water. Comparison 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 30 minutes or more or decrease of more than 10 per cent in strength, of mortar prepared with water sample when compared with the results 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 or too alkaline.
It shall be free of elements which significantly affect the hydration reaction or otherwise interfere with the hardening of mortar or concrete during curing or those which produce objectionable stains or other unsightly deposits on concrete or mortar surfaces
- 1.4.** Hard and bitter water shall not be used for curing.
- 1.5.** Potable water will generally found suitable for curing mortar or concrete.

M-2. Lime

- 2.1.** Lime shall be hydraulic lime as per I.S. 712-1973. Necessary tests shall be carried out as per I.S. 6932 (Parts I to X) 1973
- 2.2.** The following field tests for limes are to be carried out:
 - (1) A very rough idea can be formed about the type of lime by its visual examination i.e. fat lime bears pure white colour, lime in form of porous lumps of dirty white colour indicates quick lime, and solid lumps are the unburnt lime stone.
 - (2) Acid tests for determining the carbonate content in lime. Excessive amount of impurities and rough determination of class of lime.
- 2.3.** Storage shall comply with I.S. 712-1973. The slaked lime, if stored, shall be kept in a weather proof and damp-proof shed with impervious floor and sides to protect it against rain, moisture, weather and extraneous materials mixing with it. All lime that has been damaged in any way shall be rejected and all rejected materials shall be removed from site of work.
- 2.4.** Field testing shall be done according to I.S. 1624-1974 to show the acceptability of materials.

M-3. Cement

- 3.1.** Cement shall be ordinary Portland slag cement as per I.S. 269-1976 or Portland slag cement as per I.S. 455-1976

M-4. White Cement

- 4.1.** The white cement shall conform to I. S. 8042-E-1978.,

M-5. Coloured Cement

- 5.1.** Coloured cement shall be with white or grey Portland cement as specified in the item of the work.

- 5.2. The pigments used for coloured cement shall be of approved quality and shall not exceed 10% of cement used in the mix. The mixture of pigment add cement shall be properly ground to have a uniform colour and shade. The pigments shall have such properties to provide for durability underexposure to sunlight and weather.

- 5.3. The pigment shall have the property such that it is neither affected by the cement nor detrimental to it

M-6 Sand

- 6.1. Sand shall be natural sand, clean, well graded hard strong, durable and gritty particles free from injurious amounts of dust, clay kankar nodules, soft or flaky particles shale, alkali salts organic matter, loam, mica or other deleterious substances and shall be got approved from the Engineer-in-Charge. The sand shall not contain more than 8 percent of silt as determined by field test, if necessary the sand shall be washed to make it clean.
- 6.2. **Coarse Sand** :The fineness modulus of coarse sand shall not be less than 2.5 and shall not exceed 3.0. The sieve analysis of coarse shall be as under :

I.S. Sieve Designation	Percentage by Weight Passing sieve	I.S. Sieve Designation	Percentage by Weight Passing Sieve
4.75 mm	100	600 Micron	30 - 100
2.36 mm	90 to 100	300 Micron	5 - 70
1.18 mm	70 - 100	150 Micron	0 - 50

- 6.3. **Fine Sand** :The fineness modulus shall not exceed 1.0. The sieve analysis of fine sand shall be as under :

I.S. Sieve Designation	Percentage by Weight Passing through	I.S. Sieve Designation	Percentage by Weight Passing through
4.75 mm	100	600 Micron	40 - 85
2.36 mm	100	300 Micron	5 - 50
1.18 mm	70 - 100	150 Micron	0 - 10

M-7 Stone Dust :

- 7.1. This shall be obtained from crushing hard black trap or equivalent. It shall not contain more than 8% of silt as determined by field test will measuring cylinder. The method of determining silt contents by fields test is given as under :

- 7.2. A sample of stone dust to be tested shall be placed without drying in 200 mm. measuring cylinder. The quantity of the sample shall be such that it fills the cylinder up to 100 mm. mark. The clean water shall be added up to 150 mm. mark. The mixture shall be stirred vigorously and the content allowed to settle for 3 hours.

- 7.3. The height of silt, visible as settled layer above the stone dust shall be expressed as percentage of the height of the stone dust below. The stone dust containing more than 8% silt shall be washed so as to bring the content within the allowable limit.

- 7.4. The fineness modules of stone dust shall not be less than 1.80.

M-8. Stone Grit

- 8.1. Grit shall consist of crushed or broken stone and be hard, strong, dense, durable, clean of proper gradation and free from skin or coating likely to prevent proper adhesion of mortar Grit shall generally be cubical in shape and as far as possible flakey elongated pieces shall be avoided. It shall generally comply with the provisions of I.S. 383-1970. Unless special stone of particular quarries is mentioned grit

shall be obtained from the best black trap or equivalent hard stone as approved by the Engineer-in-charge. The grit shall have no deleterious with cement.

8.2. The Grit shall conform to the following gradation as per sieve analysis :

I.S. Sieve Designation	Percentage Passing through sieve	I.S. Sieve Designation	Percentage by Weight Passing through Sieve
4.75 mm	100	600 Micron	40 - 85
2.36 mm	100	300 Micron	5 - 50
1.18 mm	70 - 100	150 Micron	0 - 10

8.3 The crushing strength of grit will be such as to allow the concrete in which it is used to built up the specified strength of concrete.

8.4. The necessary tests for grit shall be carried out as per the requirements of I.S.2386 (Parts I to VIII) 1963 as per instructions of the Engineer-in-charge. The necessity of test will be decided by the Engineer-in-charge.

M-9. Cinder

9.1. Cinder is will burnt furnace residue which has been fused or sintered into lumps of varying sizes.

9.2. Cinder aggregates shall be well burnt furnace residue obtained from furnace using coal fuel only it shall be sound clean and tree from clay dirt, ash or other deleterious matter.

9.3 The average grading for under aggregates shall be as mentioned below :

I.S. Sieve Designation	Percentage Passing	I.S. Sieve Designation	Percentage Passing
20 mm	100	4.75 mm	70
10 mm	86	2.36 mm	32

M-10 Lime Mortar

10.1 Lime shall conform to specification M-2. Water shall conform to specification M-1. Sand shall conform to specification M-6.

10.2. Proportion of Mix:

10.2.1. mortar shall consist of such proportions of slaked lime and sand as may be specified in item The slaked lime and sand shall be measured by volume

10.3. Preparation of mortar:

10.3.1. Lime mortar shall be prepared by wet process as per I S 1625-1971 .Power driven mill shall be used for preparation of lime mortar. The slaked lime shall be placed in the mill in an even layer and ground for 180 revolutions with a sufficient water. Water shall be added as required during grinding (care being taken not to add more water) that will bring the mixed material to a consistency of stiff paste. Thoroughly wetted sand shall then be added evenly and the mixture ground for another 180 revolutions.

10.4. Storage:

10.4.1. Mortar shall always be kept damp, protected from sun and ram till used up, covering it by tarpaulin or open sheds.

10.5. Use:

10.5.1. All mortar shall be used as soon as possible after grinding. It should be used on the day on which it prepared, But in no case mortar made earlier than 36 hours shall be permitted for use.

M-11. Cement Mortar

11.1. Water shall conform to specification M-1. Cement shall conform to specifications M-3 and Sand shall conform to M-6

11.2. Proportion of Mix

11.2.1. 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 or machine mixed as directed.

11.3. Preparation of Mortar :

11.3.1. 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

11.3.2. 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.

M-12. Stone Coarse Aggregate for Nominal Mix Concrete

12.1. Coarse aggregate shall be of machine crushed stone of black trap or equivalent and be hard strong, dense, durable, clean and free from skin and coating likely to prevent proper adhesion of mortar.

12.2. The aggregate shall generally be cubical in shape unless special stones of particular quarries are mentioned aggregates shall be machine crushed from the best black trap or equivalent hard stone as approved. Aggregate shall have no deleterious reaction with cement. The size of the coarse aggregate for plain cement and ordinary reinforced cement concrete shall generally be as per the table given below.

However in case of reinforced cement concrete the maximum limit may be restricted to 6 mm. less than the minimum lateral clear distance between bars or 6- mm. less than the cover whichever is smaller.

TABLE

I.S. Sieve Designation	Percentage passing for single sized aggregates of Nominal size			I.S. Sieve Designation	Percentage passing for single sized aggregates of Nominal size		
	40 mm	20 mm	16 mm		40 mm	20 mm	16 mm
80 mm	-	-	-	12.5 mm	-	-	-
63 mm	100	-	-	10 mm	0.5	0.02	0.30
40 mm	85-100	100	-	4.75 mm	-	0.5	0.5
20 mm	0-20	85-100	100	2.35 mm	-	-	-
16 mm	-	-	85-100				

Note : This percentage may be varied somewhat by the Engineer-in-charge when considered necessary for obtaining better density and strength of concrete.

12.3. The grading test shall be taken in the beginning and at the change of source of materials. The necessary tests, indicated in I.S. 383-1970 and 456-197f shall have to be carried out to ensure the acceptability. The aggregates shall be stored separately and handled in such a manner as to prevent the intermixing of different aggregates. If the aggregates are covered with dust, they shall be washed with water to make them clean. .

M-13. Black Trap or Equivalent Hard Stone Coarse

- 13.1. Aggregate For Design Mix Concrete :** Coarse aggregate shall be of machine crushed stone of black trap or equivalent hard stone and be hard, strong, dense, durable, clean and free from skin and coating likely to prevent proper adhesion of mortar.
- 13.2.** The aggregates shall generally be cubical in shape. Unless special stones of particular quarries are mentioned, aggregates shall be machine crushed, from the best, black trap or equivalent hard stones as approved, Aggregate shall have no deleterious with cement
- 13.3.** The necessary tests indicated in I S. 383-1970 and I.S.456-1978 shall have to be carried out to ensure the acceptability of the material.
- 13.4.** If aggregate is covered with dust it shall be washed with water to make it clean.

M-14. Brick Bats Aggregate

- 14.1.** Brick bat aggregate 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 of any other foreign material. The brick bats shall be of 40 mm - 50 mm. size unless otherwise specified in the item. The under burnt or over burnt brick bats shall not be allowed.
- 14.2** The brick bats shall be measured by suitable boxes or as directed.

M-15. Bricks

- 15.1.** The bricks shall be hand or machine molded and made from suitable soils and kiln burnt. They shall be free from cracks and flaws and nodules of free lime they shall have smooth rectangular faces with sharp corners and shall be of uniform colour.
- The bricks shall be moulded with a frog of 100 mm. x 40 mm. and 10 mm. to 20 mm. deep on one of its flat sides. The bricks shall not break when thrown on the ground from a height of 600 mm.
- 15.2.** The size of modular bricks shall be 190 mm.x 90 mm.x 90 mm.
- 15.3.** The size of the conventional bricks shall be as under :
- (9" x 4.3/8" x 2,3/4") 225 x 110 x 75 mm.
- 15.4.** Only bricks of one standard size shall be used on one work. The following tolerances shall be permitted in the conventional size adopted in a particular work.
- Length + 1/8" (3.0 mm.) Width \pm 1/16" (1.50 mm.) Height + 1/16" (1.50 mm.)
- 15.5.** The crushing strength of the bricks shall not be less than 35 Kg/Sq. Cm. The average water absorption shall not be more the 20 percent by weight necessary tests for crushing strength and water absorption etc. shall be carried out as per I.S. 3495 (Part-I to IV) - 1976

M-16. Stone

- 16.1.** The stone shall be of the specified variety such as Granite/Trap Stone/ Quartzite or any other type of good hard stones. The stones shall be only from the approved quarry and shall be hard sound, durable and free from defects like cavities, cracks, sand holes, flaws injurious veins, patches of loose or soft materials etc. and weathered portions and other structural defects Or imperfections tending to affect their soundness and strength. The stone with round surface shall not be used. The percentage of water absorption shall not be more than 5% of dry weight. When tested in accordance with I.S. 1124-1974. The minimum crushing strength of stone shall be 200 Kg/.Sq. Cm. unless otherwise specified.
- 16.2.** The samples of the stone to be used shall be got approved before the work is started
- 16.3.** The Khanki facing stone shall be dressed by chisel as specified in the item for khanki facing in required shape and size. The face of the stone shall be-so dressed that the bushing on the exposed face shall not project by more than 40 mm. from the general wall surface and on face to be plastered

it shall not project by more than 19 mm. nor shall it have depressions more than 10 mm. from the average wall surface.

M-17. Laterite Stone

- 17.1. Laterite stone shall be obtained from the approved quarry it shall be compacted in texture sound, durable and free from soft patch. It shall have minimum crushing strength of 100 Kg/Sq. Cm. in its dry condition. It shall not absorb water more than 20% of its own weight, when immersed for 24 hours in water. After quarrying, the stone shall be allowed to weather for some time before using in work.
- 17.2. The stone shall be dressed into regular rectangular blocks so that all faces are free from waviness and unevenness, and the edges true and square
- 17.3. Those types of stone in which white clay occurs should not be used
- 17.4. Special corner stones shall be provided where so directed.

M-18. Mild Steel Bars

- 18.1. Mild steel bars reinforcement for R.C C. work shall conform to I.S. 432 (Part -II) 1966 and shall be of tested quality. It shall also comply with relevant part of I.S. 456-1978.
- 18.2. All the reinforcement shall be clean and free from dirt, paint, grease, mill scale or loose or thick rust at the time of placing
- 18.3. For the purpose of payment, the bar shall be measured correct up to 10 mm. length and weight payable worked out at the rate specified below :

1.	6 mm	0.22 Kg./Rmt.	8.	20 mm.	2.47 Kg/Rmt.
2.	8 mm	0.39 Kg./Rmt.	9.	22 mm.	2.98 Kg/Rmt.
3.	10 mm	0.62 Kg./Rmt.	10.	25 mm.	3.85 Kg/Rmt.
4.	12 mm	0.89 Kg./Rmt.	11.	28 mm.	4.83 Kg/Rmt.
5.	14 mm	1.21 Kg./Rmt.	12.	32 mm.	6.31 Kg/Rmt.
6.	16 mm	1.58 Kg./Rmt.	13.	36 mm.	7.99 Kg/Rmt.
7.	18 mm	2.00 Kg./Rmt.	14.	40 mm.	9.86 Kg/Rmt.

M-19. High Yield Strength Steel Deformed Bars

- 19.1. High yield strength steel deformed bars shall be either cold twisted other rolled and shall conform to I.S. 1786-1966 and I.S. 1139-1966 respectively.
- 19.2. Other provisions and requirements shall conform to specification No. M-18 for Mild Steel Bars.

M-20. High Tensile Steel Wires

- 20.1. The high tensile wires for use in pre stressed concrete work shall conform to I.S,2090-1962.
- 20.2. The tensile strength of the high tensile steel bars shall be as specified in the item. In absence of the given strength the minimum strength shall be taken as per Para 6-1 of the I.S. 1785-1962. Testing shall be done as per I.S. requirements.
- 20.3. The high tensile steel shall be free from loose mill scale, rust, oil, grease, or any other harmful matter. Cleaning of steel bars may be carried out by immersion in solvent solution, wire brushing or passing through a pressure box containing Carborudum.
- 20.4. The high tensile wire shall be obtained from manufacturers. in coils having diameter not less then 350 times the diameter of wire itself so that wire springs back straight on being uncoiled .

M-21. Mild Steel Binding Wire

- 21.1.** The mild steel wire shall be of 1.63 mm. or 1.22 mm. (16 to 18 gauge) diameter and shall conform to I.S. 280-1972.
- 21.2.** The use of black wire will be permitted for binding reinforcement bars. It shall be free from rust oil paint, grease loose mill scale or any other undesirable coating which may prevent adhesion of cement mortar.

M-22. Structural Steel

- 22.1.** All structural Steel shall conform to I S. 226-1985: The steel shall be free from the defects mentioned in I.S 226-1975 and shall have a smooth finish. The material shall be free from loose mill scale, rust pits or other defects affecting the strength and durability. River bars shall conform to I.S. 1148-1973.
- 22.2.** When the steel is supplied by the Contractor test certificate of the manufacturers shall be obtained according to I.S. 226-1975 and other relevant Indian Standards.

M-23. Galvanised Iron Sheets

- 23.1.** The galvanised iron sheets shall be plain or corrugated sheets of gauges as specified in item The G.I. Sheets shall conform to I.S.277-1977. The sheets shall be undamaged in carnage and handling either by rubbing off of zinc coating or otherwise. They shall have clean and bright surface and shall be free from dents, bends, holes, rust or white powdery deposit.
- 23.2.** The length and width of G.I. sheets shall be as directed as per site condition.

M-23.A : G.I. Valleys gutter, ridges

- 23.A.1.** The G.I. ridges and hips shall be of plain galvanised sheets Class - 3 of the thickness as specified in item. These shall be 600 mm. in width and properly bent up to shape without damage to the sheets in process of bending.
- 23.A.2.** Valleys gutters and flashings shall also be of galvanised sheet of thickness as specified in item Valleys Shall be 900 mm. wide overall and flashing shall be 380 mm. wide overall They shall be bent to the required shape without damage to the sheet in the process of bending.

M-24. Asbestos Cement Sheets

- 24.1.** Asbestos cement sheets plain, corrugated of semi-corrugated shall conform to I.S.459-1970 The thickness of the sheets shall be as specified in the item. The sheets shall be free from all defects such as cracks, holes, deformities chipped edges or otherwise damaged.
- 24.2. Ridges & Hips :**
- 24.2.1.** Ridges and hips shall be of same thickness as that of A.C. sheets. The types, of ridges shall be suitable for the type of sheets and location.
- 24.2.2.** Other accessories to be used in roof such as flashing pieces eaves filler pieces, valley gutters, north light, and ventilator curves, barge boards etc, shall be of standard manufacture and shall be suitable for the type of sheets and location.

M-25. Manglore Pattern Roof Tiles

- 25.1.** The mangalore pattern tiles shall conform to I S 654-1972 for Class AA or Class A type as specified in item. Samples of the tiles to be provided shall be got approved from the Engineer-in-charge. Necessary tests shall be carried out as directed.

M-26. Shuttering

- 26.1.** The shuttering shall be either of wooden planking of 30 mm. minimum thickness with or without steel lining or of steel plates stiffened by steel angles The shuttering shall be supported on battens and beams and props of vertical bullies properly cross braced together so as to make the centering rigid. In places of bullies props, brick pillar of adequate section built in mud mortar may be used.

- 26.2. The form work shall be sufficiently strong and shall have camber so that it assumes correct shape after deposition of the concrete and shall be able to resist forces caused by vibration of live load of men working over it and other incidental loads associated with it. The shuttering shall have smooth and even surface and its joints shall permit leakage of cement grout.
- 26.3. If at any stage of work during or after placing concrete in the structure, the form work sags or bulges out beyond the required shape of the structure, the concrete shall be removed and work redone with fresh concrete and adequately rigid form work. The complete form work shall be got inspected by and got approved from the Engineer-in charge, before the reinforcement bars are placed in position.
- 26.4. The props shall consist of bulbies having 100 mm minimum diameter measured at mid length and 80 mm. at thin end shall be placed as per design requirement. These shall rest squarely on wooden sole plates 40 mm. thick and minimum bearing area of 0-10 sq.m laid on sufficiently hard base.
- 26.5. Double wedges shall further be provided between the sole plate and the wooden props so as to facilitate tightening and easing of shuttering without jerking the concrete
- 26.6. The timber used in shuttering shall not be so dry as to absorb water from concrete and swell or bulge nor so green or wet as to shrink after erection. The timber shall be properly sawn and planed on the sides and the surface coming in contact with concrete wooden form work with metal sheet lining or steel plates stiffened by steel angles shall be permitted
- 26.7. As far as practicable, clamps shall be used to hold the forms together and use of nails and spikes avoided.
- 26.8. The surface of timber shuttering that would come in contact with concrete shall be well wetted and coated with soap solution before the concreting is done. Alternatively coat of raw linseed oil or oil of approved manufacture may be applied in place of soap solution. In case of steel shuttering either soap solution or raw linseed oil shall be applied after thoroughly cleaning the surface. Under no circumstances black or burnt oil shall be permitted.
- 26.9. The shuttering for beams and slabs shall have camber of 4 mm per meter (1 in 250) or as directed by the Engineer-in-charge so as to offset the subsequent deflection. For cantilevers, the camber at free end shall be 1/50 of the projected length or as directed by the Engineer-in-charge.

M- 27. Expansion Joints - Premoulded filler

- 27.1. The item provides for expansion joints in R.C C. frame structures for internal joints, as well as exposed joints, with the use of premoulded bituminous joint filler.
- 27.2. Premoulded bituminous joints filler i.e. premoulded strip of expansion joints filler shall not get deformed, or broken by twisting bending or other handling when exposed to atmospheric condition. Pieces of joints filler that have been damaged shall be rejected
- 27.3. Thickness of the per-moulded joints filler shall be 25 mm. unless otherwise specified.
- 27.4. Premoulded bituminous joints filler shall conform to I S 1838-1961

M-28. Expansion joints-Copper strips & hold fasts

- 28.1. The item provides for expansion joints in R.C.C. frame structure for internal joints, as well as exposed joints, with the use of premoulded bituminous joints filler.
- 28.2. Copper sheet shall be of 1.25 mm. thickness and of 125 mm. width and the " U " shape in the middle. Copper strip shall have holdfast of 3 mm diameter copper rod fixed to the plate soldered on strip at intervals of about 30 cm or as shown in the drawing or as directed. The width of each flange (horizontal side) of the copper plate to be embedded in the concrete work shall be 25 mm depth of "U" to be provided in the expansion joint, in the copper plate shall be of 25 mm.

M-29. Teak wood

- 29.1.** The teak wood shall be of good quality as required for the item to be executed. When the kind of wood is not specifically mentioned, good Indian teak wood as approved shall be used.
- 29.2.** Teak wood shall generally be free from large, loose dead or cluster knots, flaws, shakes, warps, twists, bends or any other defects. It shall generally be uniform in substance and of straight fibers as far as possible. It shall be free from rot decay, harmful fungi and other defects of harmful nature which will affect the strength, durability or its usefulness for the purpose for which it is required. The colour shall be uniform as far as possible. Any effort like painting using any adhesive materials made to hide the defects shall render the pieces liable to rejection by the Engineer-in-charge.
- 29.3.** All scantlings, planks etc. shall be sawn in straight lines and planes in the direction of grains and of uniform thickness.
- 29.4.** The tolerances in the dimensions shall be allowed at the rate of 1.5 mm per face to be planed.
- 29.5. First class teak wood**
- 29.5.1.** First class teak wood shall have no individual hard and-sound knots, more than 6 sq. cm. in size and the aggregate area of such knots shall not be more than 1% of area of piece, The timber shall be closed grained.
- 29.6. Second Class Teak Wood:**
- 29.6.1.** No individual hard and sound knots shall be more than 15 sq. cms. in size and aggregates area of such knots shall be not exceed 2% of the area of piece.

M-29. A Non-teak wood:

The non-teak wood shall be chemically treated, seasoned as per I.S. Specifications and of good quality. The type of wood shall be got approved before collecting the same on site Fabrication of wooden members shall be started only after approval. For this purpose wood of Bio, Kalai, Sires. Saded, Behda, Jamun, Sisoo will be used for door where as only Kalai. Sires, Halda. Kalam etc. will be permitted for shutters after proper seasoning and chemical treatment.

The non-teak wood shall be free from large loose dead of cluster knots, flows, shakes, warps, bends or any other defects, It shall be uniform in substance and of straight fibers as far as possible It shall be free fro rots, decay, harmful fungi and other defects of nature which will effect the strength, durability or its usefulness for the purpose for which it is required. The colour of wood shall be uniform as far as possible. The scantlings planks etc. shall be saw in straight lines and planes in the direction of grain and of uniform thickness. The department will use the Agency to produce certificate from Forest Department in event of dispute and the decision of the Department shall be final and binding to the contractor. The tolerance in the dimension shall be allowed at 1.5 mm. per face to be planed.

M-30. Wooden flush door shutters (solid core)

- 30.1.** The solid core type flush door shutters shall be of decorative or non-decorative type as specified in the drawing. The size and thickness of the shutter shall be as specified in drawings or as directed. The timber species for core shall be used as per I.S.2202 (part -I) 1980. The timber shall be free from decay and insect attack Knots and knot holes less than half the width of cross-section of the members in which they occur may be permitted. Pitch pockets, pitch streaks and harmless pin holes shall be permissible except in the exposed edges of the core members. The commercial plywood, cross-bands shall conform to I.S. 303-1275.
- 30.2.** The face panel of the shutters shall be formed by gluing by the hot press process on both faces of the core with either plywood or cross-bands and face veneers. The1 hopping, rebating. opening of glazing, venation etc., shall be provided if specified in the drawing.

- 30.3.** All edges of the door shutters shall be square. The shutters shall be free from twist or warp in its plane. Both faces of the shutters shall be sand papered to smooth even texture.
- 30.4.** The shutters shall be tested for-
- (1) End immersion test:** The test shall be carried out as per I.S.2202 (part-1) 1980 There shall be no delamination at the end of the test.
- (2) Knife Test :** The face panel when tested in accordance with I.S 1659-1979 shall pass the test.
- (3) Glue adhesion test :** The flush door shall be tested for glue adhesive test in accordance with I S 2202 (part -I) 1980. The shutters shall be considered to have passed the test, if no delamination occurs in the glue lines in the plywood and if no single determination more than 80 mm in length and more than 3 mm in depth has occurred in the assembly glue lines between the plywood face and the style and rail. Delamination at the corner shall be measured continuously around the corner Delamination at the knots, knot hole and other permissible wood defects shall not be considered in assessing the sample.
- 30.5.** The tolerance in size of scud core type flush door shall be as under :
In Nominal thickness ± 1.2 mm. In Nominal height ± 3 mm
- 30.6.** The thickness of the shutter shall be uniform throughout with a permissible variation of not more than 0.8 mm. when measured at any points.

M-31. Aluminum doors, windows, ventilators

- 31.1.** Aluminum alloy used in the manufacture of extruded window sections shall conform to I.S. designation HEAWP of I.S. 733-1975 and also to I S. Designation WVG-WP of I.S 1285-1975 The section shall be as specified in the drawing and design. The fabrication shall be done as directed
- 31.2.** The hinges shall be cast or extruded aluminum hinges of same type as in window but of larger size.
- 31.3.** The hinges shall normally be of 50 mm. projecting type. Non-projecting type of hinges may also be used if directed. The handles of door shall be of specified design A suitable lock for the door Operable either from outside or inside shall be provided. In double shutter door, the first closing shutter shall have concealed aluminum alloy bolt at top and bottom.

M-32. Rolling Shutters

- 32.1.** The rolling shutters shall conform to I.S.6248-1979 Rolling shutters shall be supplied of specified type with accessories. The size of the rolling shutters shall be specified in the drawings. The shutters shall be specified in the drawings. The shutters shall be constructed with interlocking lath sections formed from cold rolled steel strips not less than 0.9 mm. thick and 80 mm. wide for shutters up to 3.5 m .width not less than 1.25 mm. thick and 80 mm wide for shutters 3.5 m. in width and above unless otherwise specified.
- 32.2.** Guide channels shall be of mild steel deep channel section and of rolled pressed or built up (fabricated) joint less construction The thickness of sheet used shall not be less than 3.15 mm.
- 32.3.** Hood covers shall be made of M S. Sheets not less than 0.90 mm. thick. For shutters having width 3.5 Meter and above, the thickness of M.S. sheet for the hood cover shall be not less than 1 25 mm.
- 32.4.** The spring shall be of best quality and shall be manufactured from tested high tensile spring steel wire of strip of adequate strength to balance the shutters in all position. The spring pipe shaft etc. shall be supported on strong M S of malleable C I. brackets. The brackets shall be fixed on or under the lintel as specified with raw plugs and screws bolts etc.
- 32.5.** The rolling shutters shall be of self rolling up to 8 Sq. m. clear area without ball bearing and up to 12 Sq.m. clear area with ball bearing. If the rolling shutters are of larger, then gear operated type shutters shall be used.

- 32.6.** The locking arrangement shall be provided at the bottom of shutter at both ends The shutters shall be opened from outside.
- 32.7.** The Shutters shall be completed with door suspension shafts, locking arrangements, pulling hooks, handles and other accessories.

M-33. Collapsible Steel Gate

- 33.1.** The collapsible steel gate shall be in one or two leaves and size as per approved drawings or as specified. The gate shall be fabricated from best quality mild steel channels, flats etc. Either steel pulleys or ball-bearings shall be provided in every double channel Unless otherwise specified the particulars of collapsible gate shall be as under.
- (a) Pickets : These shall be of 20 mm. M.S. channels of heavy sections unless otherwise shown on drawings. The distance centre to centre of pickets shall be 12 cms .with an opening or 10 Cms
- (b) Pivoted M.S. flats shall be 20 mm x6 mm
- (c) Top and bottom guides shall be from tee of flat iron of approved size.
- (d) The fittings like stoppers fixing, locking cleats, brass handles and cast iron rollers shall be of approved design and size

M-34. Welded Steel Wire Fabric

- 34.1** Welded steel wire fabric for general purpose shall be manufactured from cold drawn steel wire "as drawn" or galvenised steel conforming to I.S. 226-1975 with longitudinal and transverse wire securely connected at every intersection by a process of electrical resistance welding and conforming to I.S.4948-1974. it shall be fabricated and finished in workmanlike manner and shall be free from injurious defects and shall be rust proof The type of mesh shall be oblong or square as directed The mesh sizes and sizes if wire for square 3b well as oblong welded steel wire fabric shall be as directed The steel wire fabric in panels shall be in one whole piece in each panel as far as stock sizes permit.

M-35 Expanded Metal Sheets

- 35.1.** The expanded metal sheets shall he free from flaws joints broken strands laminations and other harmful surface defects. Expanded metal steel sheet shall confirm to IS-412-1975. except that blank sheets need not be with guaranteed mechanical properties The size of the diamond mesh of expanded metal and dimensions of strands (width and thickness) shall be as specified. The tolerance on nominal weight of expanded metal sheets shall be of + 10 percent.
- 35.2.** Expanded metal in panels shall be in one whole piece in each panel as far as stock sizes permit. The expanded metal sheets shall be coated with suitable protective coating to prevent corrosion.

M-36. Mild Steel Wire (Wire Gauze Jali)

- 36.1.** Mild steel wire may be galvanized as indicated. All finished steel wire shall be well cleanly drawn to the dimensions and size of wire as specified in item. The wire shall be sound free from splits surface flaws, rough jagged and imperfect edges and other harmful surface defects and shall conform to I.S. 280-1978.

M-37. Plywood

37.1. The plywood for general purpose shall conform I.S. 303-17-1975.

Plywood is made by cementing together than boards or starts of wood into panels. There are always an odd number of layers, 3,5,7,9, ply etc. The piles are placed so that grain of each layer is at right angles to the grain in the adjacent level.

37.2. The chief advantages of plywood a single board of the same thickness is the more uniform strength of the plywood, along the length and width of the plywood and greater resistance to cracking and splitting with charge in moisture content.

37.3. Usually synthetic resins are used to gluing, phenolic resins are usually cured in a hot press which compresses and simultaneously heats the plies between hot plates which maintain a temperature of 90 degree C to 140 degree C and a pressure of 11 to 14 Kg/ Sq. Cm on the wood. The time of heating may be anything from 2 to 60 minutes depending upon thickness

37.4. When water glue are used the wood absorbs so much water that the finished plywood must be dried carefully. When synthetic resins are used as adhesive the finished plywood must be exposed to an atmosphere of controlled humidity until the proper amount of moisture has been absorbed.

37.5. According to I.S. 303-1975 the plywood for general purpose shall be of the grades namely BWR, WWR and CWR depending up to the adhesives used for bonding the veneers and it will be further classified into six types namely AA, AB, AC, BB, BC and CC based on the quality of the two faces each face being of three kinds namely A, Band C After pressing, the finished plywood should be reconditioned to a moisture content not less than 8 percent and not more than 16 percent.

37.6. Thickness of plywood Boards

Board	Thickness	Board	Thickness	Board	Thickness	Board	Thickness
3 Ply	3 mm	5 Ply	5 mm	7 Ply	9 mm	9 Ply	16 mm
	4 mm		6 mm		13 mm		19 mm
	5 mm		8 mm		16 mm	11 Ply	19 mm
	6 mm		9 mm	9 Ply	13 mm		25 mm

M-38. Glass

38.1. All glass shall be of the brief quality, free from specks, bubbles, smokes veins, air holes blisters and other defects. The kind of glass to be used shall be as mentioned in the item or specification or in the special provision or as shown in detailed drawings. Thickness of glass panes shall be uniform. The specifications for different kinds of glass shall be as under.

38.2. Sheet Glass

38.2.1. In absence of any specified thickness or weight in the item or detailed specifications of the item of work, sheet glass shall be weighing 7.5 Kg/Sq. m for panes up to 600 mm x 600 mm.

38.2.2. For panes larger than 600 mm x 600 mm and up to 800 mm x 800 mm the glass weighing not less than 8.75 Kg/Sq m shall be used for bigger panes up to 900 mm x 900 mm. glass weighing not less than 8.75 Kg/Sq. m shall be used. For bigger panes up to 900 mm x 900 mm. glass weighting not less than 11.25 Kg/Sq. m. shall be used

38.2.3. Sheet glass shall be patent flattened glass of best quality and for glazing and framing purposes shall conform to I.S. 1761-1960. Sheet glass of the specified colours shall be used, if so shown, on detailed drawings or so specified For important buildings and for panes with any dimension over 900 mm plate glass of specified thickness shall be used

38.3. Plate Glass:

38.3.1. When plate glass is specified it shall be "polished patent plate glass" of best quality It shall have both the surface ground flat and parallel and polished to obtain clear undisturbed vision and reflection The plate glass shall be of the thickness mentioned in the item or as shown in the detailed drawing or as specified. In absence of any specified thickness, the thickness of plate glass to be supplied shall be 6 mm. and a tolerance of 0.20 mm shall be admissible

38.4. Obscured Glass:

38.4.1. This type of glass transmits light so that vision is partially or almost completely obscured. Glass shall be plain rolled, figured, ribbed or fluted, or frosted glass as may be specified as required. The thickness and type of glass shall be as per details on drawings or as specified or as directed

38.5. Wired Glass:

38.5.1. Glass shall be with wire netting embedded in a sheet of plate glass. Electrically welded 13 mm Georgian square mesh shall be used Thickness of glass shall not be less than 6 mm Wired glass shall be of type and thickness as specified

M-39. Acrylic Sheets

39.1. Acrylic sheets shall be of thickness as specified in the item and of an specified shape and size as the case may be panels may be flat or curved It should be light in weight it shall be colourless or coloured or opaque as specified in the item. Colourless sheet shall be as transparent as the finest optical glass. Its light transmission rate shall be about 95% Transparency shall not be affected for the sheets of larger thickness, it shall be extremely resistant to sunlight weather and low temperatures. It shall not show any significant yellowing or change in physical properties or loss of light transmission over a longer period of use. The sheet shall be impact resistant also Sheets should be of such quality that they can be cut, bent jointed as desired Solution for the joints shall be used as per the requirement of manufacturer.

M-40. Particle board

40.1. The particle boards used for face panels shall be of best quality free from any defects. The particle boards shall be made with phenolmaldehyde adhesive The particle boards shall conform I S 3087-1905 "Specification for wood particle board for general purpose" The size and the thickness shall be as indicated.

M-41. Expanded polystyrene or framed styrofoam slabs

41.1. The expanded polystyrene ceiling boards and tiles shall be of approved make and shall be of sizes, thickness, finish and colour as indicated. It shall be of high density and suitable for use as insulating material. The insulating material shall be like slabs of Thermocole etc.

M-42. Resin bonded fiber glass.

42.1. The resin bonded fiber glass tiles or rolls shall be of approved make and shall be of sizes, thickness and finish as indicated.

42.2. For test of Mineral wool thermal insulation [Blanket I S 3144-1965 shall be followed

42.3. Insulation wool blankets shall be with the following coverings on one or both sides as indicated

(1) Bituminous Hessian Kraft paper suitable for use in position where moisture has to be excluded.

(2) Hessian cloth or Kraft paper for keeping out dust

(3) G.I wire netting, suitable for surfaces to be plaster over

M-43. Fixtures and fastenings

43.1. General:

- 43.1.1. The fixtures and fastenings, that is butt hinges tee and strap hinges sliding door bolts, tower bolts, door latch, bath-room latch, handles door stoppers, casement window fasteners, casement stays and ventilators catch shall be made of the metal as specified in the item or its specification.
- 43.1.2. They shall be of iron, brass, aluminum chromium plated iron, chromium plated brass, copper oxidised iron, copper oxidised brass or anodised aluminum as specified
- 43.1.3. The fixtures shall be heavy medium or light type. The fixtures and fastenings shall be smooth finished and shall be such as will ensue ease of operations.
- 43.1.4. The samples of fixtures and fastenings shall be got approved as regards, quality and shape before providing them in position.
- 43.1.5. Brass and anodised aluminium fixtures and fastenings shall be bright finished

43.2. Holdfasts:

- 43.2.1. Holdfasts shall be made from mild steel flat 30 cm length and one of the holdfasts shall be bent at right angle and two nos. of 6 mm. diameter holes shall be made in it for fixing it to the frame with screws. At the other end, the holdfast shall be forked and bent at right angles in opposite directions.

43.3. Butt hinges:

- 43.3.1. Railway standard heavy type butt hinges shall be used when so specified
- 43.3.2. Tee and strap hinges shall be manufactured from M S Sheet

43.4. Siding door bolts (Aldrops):

- 43.4.1. The aldrops as specified in the item shall be used and shall be got approved.

43.5. Tower bolts (Barrel Type):

- 43.5.1. Tower bolts as specified in the item shall be used and shall be got approved

43.6. Door Latch:

- 43.6.1. The size of door latch shall be taken as the length of latch.

43.7. Bathroom Latch:

- 43.7.1. Bathroom latch shall be similar to tower bolt.

43.8. Handle:

The size of the handles shall be determined by the inside grip length of the handles. Handles shall have a base plate of length 50 mm. more than the size" of the handle.

43.9. Door Catch:

- 43.9.1. Door stoppers shall be either floor door stopper type or door catch type Floor stopper shall be of overall size as specified and-shall have a rubber cushion.

43.10. Door Stoppers:

- 43.10.1. Door catch shall be fixed at a height to about 900 mm from the floor level such that one part of the catch is fitted on the inside of the shutter and the other part is fixed in the wall with necessary wooden plug arrangements for appropriate fixity The catch shall be fixed 20 mm inside the face of the door for easy operation of catch.

43.11. Wooden Door Stop with hinges:

- 43.11.1. Wooden door stop of size 100 mm x 50 mm x 40 mm shall be fixed on the door frame with a hinges of 75 mm. size and at a height of 900 mm. from the floor level The wooden door stop shall be provided with 3 coats of approved oil paint

43.12. Casement Window Fastener:

43.12.1. Casement window fastener for single leaf window shutter shall be left or right handed as directed.

43.13. Casement stays (Straight Red Stay):

43.13.1. The stays shall be made from a channel section having three holes at appropriate position so that the window can be opened either fully or partially as directed. Size of the stay shall be 250 mm to 300 mm. as directed.

43.14. Ventilator Catch:

43.14.1. The pattern and shape of the catch shall be as approved

43.15. Pivot:

43.15.1. The base and socket plate shall be made from minimum 3 mm. thick plate: and projected pivot shall not be less than 12 mm 'diameter and 12 mm. length and shall be firmly riveted to the base plate in case of iron pivot and in single piece plate in the case of brass pivot.

M-44. Paints:

44.1. (A) Oil paints :

44.1.1. Oil paints shall be of the specified colour and as approved. The ready mixed paints shall only be used. However, if ready mixed paint of specified shade or tint is not available white ready mixed paint with approved stainer will be allowed In such a case the contractor shall ensure that the shade of the paint so allowed shall be uniform.

44.1.2. All the paints shall meet with the following general requirements.

(i) Paint shall not show excessive setting in a freshly opened full can and shall easily be ready spread with a paddle to a smooth homogeneous state. The paint shall show no curdling, levering caking or colour separation and shall be free from lumps and skins.

(ii) The paint as received shall brush easily, possess good leveling properties and show no running or sagging tendencies.

(iii) The paint shall not skin within 48 hours in a three quarters filled closed container.

(iv) The paint shall dry to a smooth uniform finish free from roughness, grit unevenness and other imperfections.

44.1.3. Ready mixed paint shall be used exactly as received from the manufacturers and generally according to their instructions and without any admixtures whatsoever

44.2. (B) Enamel paints:

44.2.1. The enamel paint shall satisfy in general requirements in specification of oil paints, Enamel paint shall conform to I.S. 2933-1975.

M-45. French Polish

45.1. The French polish of required tint and shade shall be prepared with the below mentioned ingredients and other necessary materials:

(i) Denatured spirit of approved quality (ii) Chandras (iii) Pigment.

45.2. The French polish so prepared shall conform to I S : 348-1 9C8.

M-46. Marble chips for marble mosaic terrazzo

46.1. The marble chips shall be of approved quality and shades. It shall be hard, sound, dense and homogeneous in texture with crystalline and coarse grains It shall be uniform in colour and free from stains cracks, .decay and weathering.

46.2. The size of various colours of marble chips ranging from the smallest up to 20 mm shall be used where the thickness of top wearing layer is 6 mm size The marble chips of approved quality and colours only as per grading as decided by the Engineer-in-charge shall be used for marble mosaic tiles or works.

- 46.3.** The marble chips shall be machine crushed. They shall be free from foreign matter, dust etc. Except as above, the chips shall conform to I S 2114-1962

M-47. Flooring Tiles

47.1. (A) Plain Cement tiles;

- 47.1.1.** The plain cement tiles shall be of general purpose type. These are the tiles in the manufacture of which no pigments are used. Cement used in the manufacture of tiles shall be as per Indian Standards.
- 47.1.2.** The tiles shall be manufactured from a mixture of cement and natural aggregates by pressure process. During manufacture the tiles shall be subjected to pressure of not less than 140 Kg/Sq. Cm. The proportion of cement to aggregate in the backing of the tiles shall be not less than 1 .3 by weight The wearing face, through the tiles are of plain cement, shall be provided with stone chips of 1 to 2 mm. size. The proportions of cement to aggregate in the wearing layer of the tiles shall be three parts of cement to one parts chips by weight. The minimum thickness of wearing layer shall be 3 mm. The colour and texture of wearing layer shall be uniform throughout its face and thickness. On removal from mould, the tiles shall be kept in moist condition continuously at least for seven days and subsequently, if necessary, for such long period as would ensure their conformity to requirements of I.S.1237-1980 regarding strength resistance to wear and water absorption.
- 47.1.3** The wearing face of the tiles shall be plane, free from projections, depressions and cracks and shall be reasonably parallel to the back face of the tile. All angles shall be right angle and all edges shall be sharp and true.
- 47.1.4.** The size of tiles generally be square shapes 24.85 Cm x24.85 Cm. or 25 Cm x 25 Cm The thickness of tiles shall be 20 mm.
- 47.1.5.** Tolerance of length and breadth shall be plus of minus one millimeter Tolerance on thickness shall be plus 5mm.
- 47.1.6.** The tiles shall satisfy the tests as regards transverse strength, resistance to wear and water absorption as per I.S 1237-1980.

47.2. (B) Plain Coloured Tiles:

- 47.2.1.** The tiles shall have the same specification as for plain cement tiles as per (A) above expect that they shall have a plain wearing surface wherein pigments are used. They shall conform it I.S. 1237-1980.
- 47.2.2.** The pigments used for colouring cement shall not exceed 10 percent by weight of cement used in the mix. The pigments, synthetic or otherwise, used for colouring tiles shall have permanent colour and shall not contain materials detrimental to concrete
- 47.2.3** The colour of the tiles shall be specified in the item or as directed

47.3. (C) Marble mosaic tiles:

- 47.3.1.** These tiles have same specification as per plain cement tiles except the requirements as stated below.
- 47.3.2.** The marble mosaic tiles shall conform to I.S 1237-1980. The wearing face of the tiles shall be mechanically ground and filled. The wearing face of tiles shall be free from projections depressions and cracks and shall be reasonably parallel to the back face of the tiles. All angles shall be right angles and all edges shall be sharp and true.
- 47.3.3.** Chips used in the tiles be from smallest up to 20 mm. size. The minimum thickness of wearing layer of tiles shall be 6 mm. For pattern of chips to be had on the wearing face; a few samples with or without their full size photographs as directed shall be approved by the Engineer-m-charge, for approval.

47.3.4. Any particular samples if found suitable shall be approved by the Engineer-in-charge, or he may ask for a few more samples to be presented. The samples shall have to be made by the contractor till a suitable sample is finally approved for use in the work. The Contractor shall ensure that the tiles supplied for, the work shall be in conformity with the approved sample only, in terms of its dimensions, thickness of backing layer and wearing surface, materials, ingredients, colour, shade, chips, distribution etc. required.

47.3.5. The tiles shall be prepared from cement conforming to Indian Standards or coloured port land cement generally depending upon the colour of tiles to be used or as directed.

47.4. (D) Chequered Tiles :

47.4.1. Chequered tiles shall be plain cement tiles or marble mosaic tiles. The former shall have the same specification as per (A) above and the latter as per marble mosaic tiles as per (C) except as mentioned below

47.4.2. The tiles shall be of nominal size of 250 mm. x 250 mm. or as specified. The centre to centre distance of chequer shall not be less than 25 mm. and not more than 50 mm. The overall thickness of the tile shall be 22 mm

47.4.3. The grooves in the chequers shall be uniform and straight. The depth of the grooves shall not be less than 3 mm. The chequered tiles shall be plain coloured or mosaic as specified. The thickness of the upper layer measured from the top of the chequers shall not be less than 6 mm. The tiles shall be given the first grinding with machine before delivery to site.

47.4.4. Tiles shall conform to relevant I.S 1237-1980. **47.5.**

47.5. (E) Chequered Tiles For Stair Cases :

47.5.1. The requirements of these tiles shall be the same as chequered tiles as per (D) above except in following respects :

(1) The length of a tile including nosing shall be 300 mm (2) The minimum thickness shall be 28 mm (3) The nosing shall have also the same wearing layer as at the top. (4) The nosing edge shall be rounded (5) The front portion of the tile for a minimum length of 75 mm. from and including the nosing shall have grooves running parallel to nosing and at centers not exceeding 25 mm. Beyond that the tiles shall have normal chequer pattern.

M-48. Rough Kotah Stone

48.1. The Kotah stones shall be hard even, sound, and regular in shape and generally uniform in colour. The colour of the stone shall generally be green. Brown coloured shall not be allowed for use. They shall be without any soft veins, cracks or flaws.

48.2. The size of the stones to be used for flooring shall be of size 600 mm x 600 mm and/or size 600 mm. x 450 mm as directed. However smaller sizes will be allowed to be used to the extent of maintaining required pattern. Thickness shall be as specified

48.3. The edges of stones 30 mm on account of chisel dressing of edges shall be permitted for length as well as breadth. Tolerance in thickness shall be ± 3 mm

48.4. The edges of stones shall be truly chiseled and table rubbed with coarse sand before paving. All angles and edges of the stones shall be true, square and free from chipping and surface shall be true and plain.

48.5. When machine cut edges are specified, the exposed and the edges at joints shall be machine cut. The thickness of the exposed machine cut edges shall be uniform

M-49. Polished Kotah Stones

- 49.1. Polished kotah stone shall have the same specification as per rough kotah stone except as mentioned below :
- 49.2. The stones shall have machine polished surface. When brought on site, the stones shall be single polished or double polished depending upon its use. The stones for paving shall generally be single polished. The stones to be used for dado, skirting, sink, veneering, sills steps etc. where machine polishing after the stones are fixed in situ is not possible shall be double polished

M-50. Dholpur Stone Slab

- 50.1. Dholpur stone slab shall be of best quality as approved by the Engineer-in-charge. The stone slab shall be without any veins, cracks, and flaws. The stone slab shall be even sound and durable regular in shape and of uniform colour
- 50.2. The size of the stone shall be as specified in the item or detailed drawing or as approved by the Engineer-in-charge. The thickness of the stone shall be as specified in the item of work with the permissible tolerance of plus or minus 2 mm. The provision in respect of polishing as for polished kotah stone shall apply to polished Dholpur stone also. All angles and edges of the face of the stone slab shall be fine chiseled or polished as specified in the item of work and all the four edges shall be machine cut. All angles and edges of the stone slab shall be true and plane.
- 50.3. The sample of stone shall be got approved by the Engineer-in-charge for a particular work. It shall be ensured that the stones to be used in a particular work shall not differ much in shade or tint from the approved sample.

M-51. Marble Slab

- 51.1. Marble slab shall be white or of other and of best quality as approved by the Engineer-in-charge
- 51.2. Slabs shall be hard, close, uniform and homogeneous in texture. They shall have even crystalline grain and free from defects and cracks. The surface shall be machine polished to an even and perfect plane surface and edges machine cut true and square. The rear face shall be rough to provide key for the mortar.
- 51.3. Marble slabs with natural veins, if selected shall have to be laid as per the pattern given by the Engineer-in-charge.
Size of the slab shall be minimum 460 mm x 450 mm and preferably 600 mm x 600 mm. However, smaller sizes will be allowed to be used to the extent of maintaining required pattern.
- 51.4. The slab shall not be thinner than the specified thickness at its thinnest part. A few specimens of finished slab to be used shall be deposited by the Contractor in the office for reference
- 51.5. Except as above the marble slabs shall conform to I.S. 1130-1969

M-52. Granite Stone slab

- 52.1. Granite shall be of approved colour and quality. The stone shall be hard, even sound and regular in shape and generally uniform in colour. It shall be without any soft veins, cracks or flaws.
- 52.2. The thickness of the stone shall be specified in items
- 52.3. All exposed faces shall be double polished to tender truly smooth and even reflecting surface. The exposed edges and corners shall be rounded off as directed. The exposed edges shall be machine cut and shall have uniform thickness.

M-53. P.V.C. Flooring

53.1. P.V.C. sheets for P.V.C., floor covering shall be of homogenous flexible type conforming to I S 3462-1966. The P.V.C. covering shall neither develop any toxic effect while put to use nor shall give off any disagreeable odour.

53.2. Thickness of flexible type covering tiles shall be as specified in the description of the item

53.3. The flexible type shall be backed with Hessian or other woven fabric The following tolerances shall be applicable on the nominal dimensions of the rolls or tiles :

(a) Thickness + 015 mm.

(b) Length or Width

(1) 300 mm. Square tiles ± 0.20 mm. (3) 900 mm Square tiles ± 0.60 mm.

(2) 600 mm. Square tiles ± 0 40 mm. (4) Sheets and roll ±0.10 percent.

53.4. Adhesive:

53.4.1. The adhesive for PVC flooring shall be of the type and make recommended by the manufactures of PVC sheets/tiles.

M-54. Facing Tiles

54.1. The facing tiles (burnt clay facing bricks) shall be free from cracks, and nodules of free lime. They shall be thoroughly burnt and shall have plane rectangular faces with parallel sides and sharp straight right angled faces. The texture of the finished surface that will be exposed when in place shall conform to an approved sample consisting not less than for stretcher bricks each representing the texture desired. The facing tiles shall have a pleasing appearance, sufficient resistance to penetration by ram and greater durability than common bricks. The tiles shall conform to I.S. 2691-1972.

54.2. The standard size of facing brick tiles shall be 19 x 9 x 4 cms. The facing brick tiles shall be provided with frog which shall conform to I.S. 11077-1976.

54.3. The permissible tolerance in dimensions specified above shall be as follows:

Size	Tolerance for	
	1st Class Brick	2nd Class Brick
19 cm.	± 6 mm	± 10 mm
9 cm.	± 3 mm	± 7 mm
4 cm.	± 1.5 mm	± 3 mm

54.4. The tolerance for distortion or warpage of face or edges of individual brick from a plane surface and from a straight line respectively shall be as follows:

Facing dimensions	Permissible tolerance
Max. below 19 cms.	Max. 2.5 mm
- do - above 19 cm.	Max. 3.0 mm

54.5. The average compressive strength obtained as a sample of five tiles when tested in accordance with the procedure laid as per I S 1077-1976 shall be not less than 175 Kg/Sq Cm. The average compressive strength of any individual bricks shall be not less than 160 Kg / Sq.Cm.

54.6. The average water absorption for five bricks tiles shall not exceed 12 percent of average weight of brick before testing. The absorption for each individual bricks shall not exceed 25 percent.

54.7. The brick tiles when tested in accordance with I.S. 1077-1976, the rate of efflorescence shall not be more than "Slightly effloresced"

M-55. White glazed tiles

55.1. The tiles shall be of best quality as approved by the Engineer-in-charge. They shall be flat and true to shape. They shall be free from cracks, crazing, spots, chipped edges and corners. The glazing shall be of uniform shade.

55.2. The tiles shall be nominal size of 150 mm x 150 mm unless otherwise specified. The maximum variation in the stated sizes other than the thickness of tile shall be plus or minus 1.5 mm. The thickness of tile shall be 6 mm. Except as above the tiles shall conform to I.S. 1977-19/0.

M-56. Galvanised iron pipes and fittings

56.1. Galvanised iron pipes shall be of the medium type and of required diameter and shall comply with I.S. 1239-1979. The specified diameter of the pipes shall refer to the inside diameter of the bore, clamps, screw and all galvanised iron fittings shall be of the standard 'R' or equivalent make.

M-57. Bib cock and stop cock

57.1. A bib cock is a draw off tap with a horizontal inlet and free outlet. A stop cock is a valve with suitable means of connection for insertion in a pipe line for controlling or stopping the flow.

57.2. They shall be of screw down type and of brass chromium plated and of diameter as specified in the description of the item. They shall conform to I.S. 781-1977 and they shall be of best Indian make. They shall be polished bright.

57.3. The minimum finished weight of bib cock and stop cock shall be as given below :

Diameter	Bib Cock	Stop Cock	Diameter	Bib Cock	Stop Cock
8 mm	0.25 Kg.	0.25 Kg.	15 mm	0.40 Kg.	0.40 Kg.
10 mm	0.30 Kg.	0.35 Kg.	20 mm	0.75 Kg.	0.75 Kg.

M-58. Gun metal wheel valve

58.1. The gun metal wheel valve shall be of approved quality. These shall be of gun metal fitted with wheel and shall be of gate valve opening full way and of the size specified. These shall conform to I.S. 778-1971.

M-59. White glazed porcelain wash basin

59.1. Wash basin shall be of white porcelain first quality best Indian make and it shall conform to I.S. 2556 (Part -IV) -1972 and I.S. 771-1979. The size of the wash basin shall be as specified in item. Wash basin shall be of one piece construction with continued overflow arrangements. All internal angles shall be designed so as to facilitate cleaning. Wash basin shall have single tap hole as specified. Each basin shall have a circular waste hole which is either riveted 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 which shall fully drain into the bowl.

59.2. White glazed pedestal of the quality and colour as that the basin shall be provided where specified in the item. It shall be completely recessed at the back for reception of supply and wash pipe. It shall be capable of supporting the basin rigidly and adequately and shall be so designed as to make the height from the floor to top of the rim of basin 750 mm. to 800 mm. as directed.

M-60. European type water closet/with low flushing

60.1. The European type water closet shall be white glazed porcelain first quality and shall be of wash down type conforming to I.S. 2556-1973 and I.S. 771-1979.

60.2. 'S' trap shall be provided as required with water seal not less than 50 mm. The solid plastic seat and cover shall be of best Indian make conforming to I.S. 2548-1980. They shall be made of moulded synthetic materials which shall be tough and hard with high resistance to solvents and shall be free from

blisters and surface defects and shall have chromium plated brass hinges and rubber buffer of suitable size.

M-61. Orrissa type water closet

- 61.1.** The Specification of Orrissa type white glazed water closet of first quality shall conform to I.S. 2256 (Part-III) -1981 and relevant specification of Indian type water closet except that pan will be with the integral squatting pan of size 580 mm x 400 mm with raised footrest.

M-62. Indian type water closet

- 62.1.** 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 back and on 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.

M-62. A. Foot Rests

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

M-63. Glazed Earthen Ware Sink

- 63.1.** The glazed earthen-ware sink shall be of specified size, colour and quality. The sink shall conform, to I.S. 771 Part – II – 1979. The brackets for sinks shall conform to I.S 775-1970.
- 63.2.** The pipes shall conform to I.S. 1239-part-I 1973 and I.S. 404-1962 for steel and lead pipes respectively. 32 mm. brass waste coupling of standard pattern with brass chain and rubble plug shall be provided with sink.

M-64. Glazed earthen-ware Lipped type flat back urinal/corner type urinal

- 64.1.** The lipped type urinal shall be flat back or corner type as specified in the item and shall conform to I.S 771-1979. It shall be of best Indian make and size as specified and approved by the Engineer-in-charge. The flat back of corner type urinal must be of 1st quality free from any defects, cracks etc.

M-65. Low level Enamel flushing tank

- 65.1.** The low level enamel flushing tank shall be of 15 liters capacity. It shall conform to I S 774-1971. The flushing cistern shall be of best quality and free from any defects. The flushing tank shall have outlet 32 mm. diameter. The outlet shall be connected with W.C. pan by lead pipe or P.V.C. pipe as specified. The flushing tank shall be provided with inlet and outlet for fixing G.I. inlet pipes and over-flow pipes. The flushing cistern shall be provided with chromium plated handle for flushing. The flushing tank shall be provided with bracket of cast iron so that it can be fixed on wall at specified height. The brackets shall conform to I.S. 775-1970.

M-66. Cast iron flushing cistern.

- 66.1.** The cast iron flushing cistern shall be of 15 liters capacity. It shall conform to I.S. 774-1971. The flushing cistern shall be of best quality free from any defects. The flushing cistern shall have outlet of 32 mm diameter. The lead pipe shall conform to I.S 404 (Part-I) - 1962; For fixing G.I. inlet pipes and overflow pipe 20 mm. dia. inlet and outlet shall be provided. The flushing cistern shall be provided with galvanised iron chain and pull of sufficient length and shall be got approved from the Engineer-in-charge. The cast iron flushing cistern shall be painted with one coat of anticorrosive paint and two coats of paint. The flushing cistern shall be fixed on two C I brackets. The C I brackets shall conform to I S 775-1970.

M-67. Flush cock

- 67.1.** Half turn flush cock (Heavy weight) shall be of gun metal chromium plated of diameter as specified in the description of the item. The flush cock shall conform to relevant Indian Standard.

M-68. Cast iron pipes and fittings.

- 68.1.** All soil water, vent and anti syphonage pipes and fitting shall conform to I S.1729-1964. The pipes shall have spigot and socket ends with head on spigot end. The pipes and fitting shall be true to shape smooth, cylindrical, their inner and outer surfaces being as nearly as practicable concentric. They shall be sound and nicely cast and shall be free from cracks, laps, pinholes or there imperfection and shall be neatly dressed and carefully fettled.
- 68.2.** The end of pipes and fittings shall be reasonable square to their axis.
- 68.3.** The sand of cast iron pipes shall be of the diameter as specified in the description and shall be in lengths of 1.5 M., 1.8 M. including socket ends of the pipe unless shorter lengths are either specified or required at junctions etc. The pipes and fittings shall be supplied without ears unless specified or directed otherwise.

68.4. Tolerances :

- 68.4.1.** The Standard weights and thickness of pipes shall be as shown in the following table A tolerance up to minus 10 per cent may however be -allowed against these standard weights

Sr. No.	Nominal dia. of Bore	Thickness	Overall		
			1.5 m long	1.8 m long	2 m. long
1.	75 mm	5.0 mm	12.83 Kg.	16.52 Kg.	18.37 Kg.
2.	100 mm	5.0 mm	18.14 Kg.	21.67 Kg.	24.15 Kg.

- 68.4.2.** A tolerance up to minus 15 percent in thickness and 20 mm. length will be allowed For fittings tolerance in lengths shall be plus 25 mm. and minus 10 mm.
- 68.4.3.** The thickness of fittings and their socket and spigot dimensions shall conform to the thickness and dimensions specified for the corresponding sizes of straight pipes. The tolerance in weights and thickness shall be the same as for straight pipes.

M-69. Nahni Trap

- 69.1.** Nahni trap shall be of cast iron and shall be sound and free from porosity or other 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 .form craze, chips and other flaws or any other kind of defects which affect serviceability The size of nahni trap shall be specified and shall be of self cleaning design.
- 69.2.** The Nahni trap shall be of-quality approved by the Engineer-in-charge and shall generally conform to the relevant Indian Standards.
- 69.3.** The Nahni trap provide shall be with deep seal, minimum 50 mm. except at places where trap with deep seal cannot be accommodated. The cover shall be cast iron perforated cover shall be provided on the trap of appropriate size.

M-70. Gully Trap

- 70.1.** Gully trap shall conform to I.S. 651-1980. It shall be some, free from defects such as fire-cracks or hair cracks. The glaze of the traps shall be free from crazing. They shall give a sharp clear note when struck with light hammer. There shall be no broken blisters.
- 70.2.** The size of the gully trap shall be as specified in the item.
- 70.3.** Each gully trap shall have one C.I. grating of square size corresponding to the dimensions, of inlet of gully trap. It will also have a water tight C.I. cover with frame inside dimensions 300 mm. x 300 mm. the cover with frame inside dimensions 300 mm. x 300 mm. the cover and weighing not less than

4.53 Kg. and the frame not less than 2.72 Kg. The grating cover and frame shall be of sound and good casting and shall have truly square machined seating faces.

M 71. Glazed Stone Ware pipe And Fittings

71.1. The pipes and fittings shall be of best quality as approved, by the Engineer-in-charge. The pipe shall be of best quality manufactured from stone- ware of fire clay, salt glazed thoroughly burnt through the whole thickness, of a close, even texture, free from air blows, fire blisters, cracks and other imperfections, which affect the serviceability. The inner and outer surfaces shall be smooth and perfectly glazed. The pipe shall be capable to withstand pressures or 1.5 M lead without showing sign of leakage. The thickness of the wall shall not be less than 1/12th of the internal dia. The depth of socket shall not be less than 38 mm. The socket shall be sufficiently large to allow a joint of 6 mm. around the pipe.

71.2. The pipes shall generally conform to relevant I S 651-1980.

M-72. Wall Peg Rail

72.1. The aluminum wall peg rail shall have three aluminum pegs approved quality and size. It shall be fixed on teakwood plank of size 450 mm x 75 mm x 20 mm. The teakwood shall be French polished or oil painted as specified.

M-73. G.I. Water Spot

73.1. The G.I. pipes of 40 mm dia shall be of medium quality and specials shall be of 'R' brand or equivalent brand of best approved quality

73.2. The pipe shall have length as required for the thickness of wall in which it is fixed and at outside end tee bend cut at half the length shall be provided and at other end coupling shall be provided to have better fixing. The water spout shall be provided as per detailed drawing or as directed.

M-74. Asbestos Cement pipe (A.C. pipe)

74.1. The asbestos cement pipe of diameter as specified in the description of the item shall conform to I.S. 1626-1980. Special like bends, shoes, cowls, etc. shall conform to relevant Indian Standards. The intent of pipe shall have is smooth finish, regular surface and regular internal diameter. The tolerance in all dimensions shall be as I.S. 1626-part-I-1980.

M-75. Crydon Ball valve

75.1. Ball valve of screwed type including polythene float and necessary level etc shall be of the size as mentioned in the description of item and shall conform to I.S 1703-1977

M-76. Bitumen Felt For Water proofing And Damp Proofing

76.1. Bitumen felt shall be on the fiber bases and shall be of type 2, self finished felt grade-2 and shall conform to I.S. 1322-1970

M-77. Selected Earth

77.1. The selected earth shall be that obtained from excavated material or shall have to be brought from outside as indicated in the items If item does not indicate anything the selected earth shall have to be brought from outside.

77.2. The selected earth shall be good yellow soil and shall be got approved from the Engineer-in-charge. In no case black cotton soil or similar expansive and shrinkable soil shall be used. It shall be clean and free from all rubbish and perishable materials, stones or brick bats. The clods shall be broken to a size of 50 mm or less. Contractor shall make his own arrangement at his own cost for land for borrowing selected earth. The stacking of material shall be done as directed by the Engineer-in-charge in such a way not to interfere with any construction all activities and in proper stacks.

- 77.3.** When excavated material is to be used only selected stuff got approved from the Engineer-in-charge shall be used. It shall be stacked separately and shall, comply with all the requirements of selected earth mentioned above.

M-78. Barbed Wire

- 78.1.** The barbed wire shall be of galvanized steel and it shall generally conform to I.S. 278-1978. The barbed wire shall be of types-I whose nominal diameter for line wire shall be 2.5 mm. and point wire 2.24 mm. The nominal distance between two barbs shall be 75 mm unless otherwise specified in the item. The barbed wire shall be formed by twisting together two fine wires. One containing the barbs. The size of the line and point wires and barb spacing shall be as specified above. The permissible deviation from the nominal diameter of the line wire and point wire shall not exceed ± 0.08 mm
- 78.2.** The barbs shall carry four points and shall be formed by twisting two point wires, each two turns tightly round one line wire making altogether four complete turns. The barbs shall have a length of not less than 13 mm and not more than 18 mm. The point shall be sharp and cut at an angle not greater than 35 degree of the axis of the wire forming the barbs.
- 78.3.** The line and point wires shall be circular in section, free from scale and other defects and shall be uniformly galvanized. The line wire shall be in continuous length and shall not contain any welds other than those in the rod before it is drawn. The distance between two successive splices shall not be less than 15 meters.
- 78.4.** The lengths per 100 Kg. of barbed wire I.S. type I shall be as under:
- | | | |
|--------------------|-------------------|---------------------|
| Nominal 1000 meter | Minimum 934 meter | Maximum 1066 Meter. |
|--------------------|-------------------|---------------------|

Item No. 1 :- Excavation for foundation upto 1.50 mt depth including sorting out and stacking of useful materials and disposing the excavated stuff for all lead and lift for all sorts of soil.

➤ **All sorts of soil**

Any soil which generally require close application of picks or jumpers or scarifies to loosen it stiff clay, gravel and stone etc. fall under this category.

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 turf loam, 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 removal as directed The materials so obtained shall be property of the Government and shall be conveyed und stacked as directed with all lead. The roots of the trees coming in the sides shall be cut and coated with a hot asphalt

2.2. The rate of side 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 centre 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 work. Contractor shall supply labours 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 leveled both longitudinally and transversely as directed by removing and watering as required no. earth filling will be allowed for brining it to level, if by mistake or any excavation is made deeper or wider than, that 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 mt. 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 leveling 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 up to all lead and lift.

6.0 Mode of measurements & 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 stopping 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 meter**.

Item No. 2 :- Excavation for foundation depth from 1.5 mt. to 3.00 mt. including sorting out and stacking of useful materials and disposing of the excavated stuff with all lead and lift for all sorts of soil.

1.0 All sorts of soil

Any soil which generally require close application of picks or jumpers or scarifies to loosen it stiff clay, gravel and stone etc. fall under this category.

2.0 Workmanship

2.1. The relevant specifications of **Item No. 1** shall be followed except that the excavation work shall be carried out to dense or hard soil with lift from 1.50 M. to 3.0 mt. depth.

3.0 Mode of Measurement & Payment

3.1. The relevant specifications of **Item No. 1** shall be followed.

3.2. The excavation work of depth from 1.50 M. to 3.0 M. shall be measured under this item

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

Item No. 3 :- Providing and laying cement concrete work 1:2:4 (1- Cement : 2- Coarse sand : 4 graded stone aggregates 20 mm nominal size) and curing complete excluding cost of formwork and reinforcement for reinforced concrete work in (A) Foundations, footings, base or columns and mass concrete.

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. 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 or 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-150, 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. 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.

- 2.9. 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 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 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 mixer 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 be 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 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 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 of 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 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.
- 3.2.4. 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 to safeguard 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 mm..... | 14 days. |
| (d) Removal of props & beams and Arches: | |
| (i) Spanning up to 6 mm..... | 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 form 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 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.
- 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 from weather including rain, running water, shocks, vibration, traffic, rapid temperature changes, frost and drying out process. It shall be covered with wet sacking 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. 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 shutting, 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 tiles 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 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 centre of specified strength. The rate **includes** the cost of form work.
- 10.5.** The volume occupied by reinforcement shall not be deducted from R.C.C. work.
- 10.6.** The rate shall be for a unit of **one cubic meter**.

Item No. 4 :- Providing and laying controlled cement concrete M-250 and finishing smooth with curing etc complete, including the cost of formwork but excluding the cost of reinforcement for R.C.C. work in Foundations, footings base of columns & mass concrete.

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 1:2:4 (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 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 250 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 weigh 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 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 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 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.

- 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 contact 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. 5 :- Providing and laying controlled cement concrete M-250 and curing complete including the cost of form work but excluding the cost of reinforcement for reinforced concrete work in Columns, pillars, posts & struts upto floor two level for G.F.

The work shall be executed as per specification of **Item No. 4** except for the item is work of providing and laying controlled cement concrete M-250 and curing complete including the cost of form work but excluding the cost of reinforcement for reinforced concrete work in Columns, pillars, posts & struts upto floor two level for G.F.

Measurement shall be taken and paid on Cum. basis.

Item No. 6 :- Providing and laying controlled cement concrete M-250 and finishing smooth with curing etc. complete including the cost of formwork but excluding the cost of reinforcement for R.C.C. work in Plinth beams.

The work shall be executed as per specification of **Item No. 4** except for the item is work of Providing and laying controlled cement concrete M-250 and finishing smooth with curing etc. complete including the cost of formwork but excluding the cost of reinforcement for R.C.C. work in Plinth beams.

Measurement shall be taken and paid on Cum. basis.

Item No. 7 :- Filling available excavated earth (excluding rock) in trenches plinth side of foundation etc. in layer not exceeding 20 cm in depth consolidation each deposited layer by ramming and watering etc. complete.

1.0 WORKMANSHIP

- 1.1. The earth to be used for filling shall be free from salts, organic or other foreign matter all clots of earth shall be broken.
- 1.2. As soon as the work in foundation has been completed and measured the site of foundation shall be cleared of all debris brick bats mortar dropping etc. and filled with earth in layers not exceeding 20 cms. each layer shall be adequately watered, rammed and consolidated before the succeeding layer is laid. The earth shall be rammed with iron rammers where feasible and with the ends of crow-bars, where rammer cannot be used.
- 1.3. The plinth shall be similarly filled with earth in layers not exceeding 20 cms adequately watered and consolidated by ramming with iron or wooden rammers. When filling reaches finished level the surface shall be flooded with water for at least 24 hours and allowed to dry and then rammed and consolidated.
- 1.4. The finished level of filling shall be kept to shape intended to be given to floor.
- 1.5. In case of large heavy duty flooring like factory flooring, the consolidation may be done by power rollers, where so specified. The extent of consolidation required shall also be as specified.

2.0. Mode of Measurements & Payment

- 2.1. The payment shall be made for filling in plinth and trenches. No deduction shall be made for shrinkage or voids, if consolidated as instructed above.
- 2.2. The rate shall be for a unit of one cubic meter.

Item No. 8 :- Filling in foundation and plinth with murrum or selected soil in layers of 20 cm thickness including watering, ramming and consolidation etc. complete.

1.0 MATERIALS

- 1.1. Murrum or selected soil shall be clean, of good binding quality and of approved quality obtained from approved pits / quarries of disintegrated rocks which contain silicon's material and natural mixture of clay of clastic origin. The P.I. value of selected soil used shall not be more than 6.0.

2.0 WORKMANSHIP

- 2.1 The murrum or selected soil to be used for filling shall be free from salts, organic or other foreign matter all clods of murrum or selected soil shall be broken.
- 2.2 As soon as the work in foundation has been completed and measured the site of foundation shall be cleared of all debris brick bats mortar dropping etc. and filled with murrum or selected soil in layers not exceeding 20 cms. Each layer shall be adequately watered, rammed and consolidated before the succeeding layer is laid. The murrum shall be rammed with iron rammers where feasible and with the but ends of crow bars. Where rammer cannot be used.
- 2.3 The plinth shall be similarly tilled with murrum or selected soil in layers not exceeding 20 cms adequately watered and consolidated by ramming with iron or wooden rammers. When filling reaches finished level the surface shall be flooded with water for at least 24 hours and allowed to dry and then rammed and consolidated.
- 2.4 The finished level of filling shall be kept to shape intended to be given to floor.
- 2.5 In case of large heavy duty flooring like factory flooring, the consolidation may be done by power rollers, where so specified. The extent of consolidation required shall also be as specified.

3.0. MODE OF MEASUREMENTS & PAYMENT

- 3.1 The payment shall be made for filling in plinth and foundation no deduction shall be made for shrinkage or voids, if consolidated as instructed above.
- 3.2 The rate includes cost of collecting and carting murrum / or selected earth of approved quality with all lead and labour required for filling in trenches and plinth.
- 3.3 The rate shall be for a unit of one Cum.

Item No. 9 :- Filling in plinth with sand under floors including watering, ramming, consolidating and dressing complete.

1.0. Materials

1.1. Sand shall conform to M-6.

2.0 Workmanship

The relevant specifications of **Item No. 7** shall be followed except that sand shall be filled in under floors, including watering, ramming, consolidating and dressing etc. complete.

3.0 Mode of Measurements & Payment

3.1. The relevant specifications of **Item No. 7** 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 meter**.

Item No. 10 :- Anti-Termite System : Providing and laying of permanent piping technology anti-termite treatment before flooring work by installing LLDP (Low linear density polyethylene) tube of 8 mm O.D. & 6.4 mm I.D. with inbuilt pressure compensation chip every 30 cm interval in the tube, having working pressure of 2 Kg/cm² and release rate of 1.9 ltr/hour fixed by P-clips and nails. The LLDP pipe shall be installed at the entire periphery of the building and at internal network of building at a depth of 20 to 200 mm under floor at every 2 to 3 mtr. c/c distance (adjusted as per building layout) & Ends of loop pass through a PVC elbow of minimum 32 mm ID at junction box of wall and floor level, entering into a steel reinforced grooved flexible pipe of minimum 22 mm ID leading into junction box and the loops shall terminate in junction boxes & test every junction during injecting chemicals for termite control treatment. The anti termite chemical Imidacloprid 30.5% SC mix as per IS-6313 (part III) shall be injected by the pressure pump diluted with water @ 10.5 ml/5 ltr of water at the rate of 2 Kg/sq.cm @ 5 Ltr/SMT. The contractor shall submit approved line plan for piping system and junction boxes dully approved by Engineer-in-charge with bond of 5 year warranty. (i) Permanent pipe system with junction boxes (Only pipe network)

1.0. Materials : The chemicals used for the anti-termite treatment shall be only one of the following with concentration shown against each in aqueous emulsion.

Chemicals Concentration

	Chemicals	Concentration
1	Aldrin or other same this properties	0.50% (By Weight)
2	Imidacloprid	0.305% (By Weight)
3	Chlordane	1.00% (By Weight)

2.0. Workmanship

2.1. The permanent piping technology anti-termite treatment before flooring work by installing LLDP (Low Linear Density Polyethylene) tube of 8mm O.D. & 6.4 mm I.D. with inbuilt pressure compensation chip every 30 cm interval in the tube, having working pressure of 2 Kg/cm² and release rate of 1.9 Ltr/hour fixed by P-clips and nails. The LLDP pipe shall be installed at the entire periphery of the building and at internal network of building at a depth of 20 to 200mm under floor at every 2 to 3 mtr. C/C distance (adjusted as per building layout) & ends of loop pass through a PVC elbow of minimum 32mm ID at junction box of wall & floor level, entering into a steel reinforced grooved flexible pipe of minimum 22mm ID leading into junction box and the loops shall terminate in junction boxes & test every junction during injecting chemicals for termite control treatment. The anti-termite chemical Imidacloprid 30.5% SC mix as per IS-6313 (Part III) shall be injected by the pressure pump diluted with water @ 10.5

ml/Ltr of water at the rate of 2 Kg/Sq.cm. @ 5 Ltr/smt. The contractor shall submit approved line plan for piping system and junction boxes dully approved by Engineer in charge.

- 2.2. A guarantee bond on appropriately stamped paper shall be given by the contractor to the department in the manner and form prescribed below:

FORM OF GUARANTEE BOND

I/We..... (Contractor) hereby guarantee that work will remain unaffected and will not be any way damaged by termite or any other germs of similar types, for a period for **5 years** after completion of the work of anti-termite as per the terms and conditions of the contract and or damage that might be caused on account of termite and or other similar type of germs and hereby Guarantees to make good any loss of damages suffered by the Government of Gujarat and further guarantee to redo effective work without claiming any extra cost.

- 2.7. This 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**.
- 2.8. The deposit at the rate of 50% of the cost of this item from the running and final bills shall be recovered and retained for the first one year after completion of the work and 10% shall be retained for the balance of guarantee period and shall be refunded only after the completion of the guarantee period.
- 3.0. **Mode of measurements & payment**
- 3.1. The length and breadth shall be measured correct to a cm. as per the dimensions of sanctioned plans. No deduction shall be made nor extra paid for any opening for pipes etc. up to 0.1 sq.mt. The rate shall include the cost of all labour and materials required for the operation involved for satisfactory completion of this item. The sides of the trenches 30 cms. each side and bottom shall be measured under this item.
- 3.2. The vertical area of sub-structure in contact with filled up earth above ground level to top filled up earth shall be measured for payment.
- 3.3. The rate shall be for a unit of One sq. meter.

Item No. 11 :- Providing and laying Damp proof course 25mm thick cement concrete 1:2:4 (1 cement : 2 coarse sand : 4 stone aggregate 10 mm nominal size) and curing complete.

1.0 The specifications of Item No. 3 of ordinary concrete with or without reinforcement shall be followed except that 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.

2.0 Mode of measurements & payment

2.1. The rate includes cost of all materials and labour required to complete the item.

2.2. The rate shall be for a unit one sq. meter.

Item No. 12 :- Providing and laying brick work using common burnt clay building conventional type bricks having crushing strength not less than 35 Kg./Sq.cm. in super structure above plinth level and up to floor two level in cement mortar 1:6 (1 cement : 6 fine sand) including the cost of all materials and labour charges etc. complete.

1.0 Materials

Water shall conform to M-1. Cement shall conform to M-3. Sand shall conform to M-6. 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 properly 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, man son'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 fixtures, 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 exceed 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 be 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, the shall be leveled, cleared of all loose materials, cleaned and wetted before starting 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.

3.0 Mode of measurements & payment

- 3.1.** The measurements of this item shall be taken for the brick masonry fully completed in foundation up to plinth. The limiting dimensions not exceeding those shown on the plinths or as directed shall be final. Battered tapered and curved portions shall be measured net.
- 3.2.** 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.
- 3.3** 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. 13 :- Providing and laying brick work using common burnt clay building conventional type bricks having crushing strength not less than 35 Kg/sq.cm. in super structure above floor two level in cement mortar 1:6 (1 cement : 6 fine sand) for Ground Floor including the cost of all materials and labour charges etc. complete.

The work shall be executed as per specification of **Item No. 12** except for the work of **Providing and laying brick work using common burnt clay building conventional type bricks having crushing strength not less than 35 Kg/sq.cm. in super structure above floor two level in cement mortar 1:6 (1 cement : 6 fine sand) for Ground Floor including the cost of all materials and labour charges etc. complete.**

Measurement shall be taken and paid on Cum. basis.

Item No. 14 :- Providing and laying brick work using common burnt clay building conventional type bricks having crushing strength not less than 35 Kg/sq.cm. in super structure above floor two level in cement mortar 1:6 (1 cement : 6 fine sand) for First Floor including the cost of all materials and labour charges etc. complete.

The work shall be executed as per specification of **Item No. 12** except for the work of **providing and laying brick work using common burnt clay building conventional type bricks having crushing strength not less than 35 Kg/sq.cm. in super structure above floor two level in cement mortar 1:6 (1 cement : 6 fine sand) for First Floor including the cost of all materials and labour charges etc. complete.**

Measurement shall be taken and paid on Cum. basis.

Item No. 15 :- Providing and laying half brick work using common burnt clay building conventional type bricks having crushing strength not less than 35 Kg/Sq.cm in cement mortar 1:4 (1 cement : 4 coarse sand) in super structure above floor two level for Ground floor including the cost of all materials and labour charges etc. complete.

1.0 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. 12** 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 bars shall be embedded in cement mortar.

3.0 Mode of measurement and payment

- 3.1. The half brick masonry work in super structure 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. 12** shall be followed. The length shall be measured nearest to one cm.
- 3.3. The rate includes the cost of providing 2 nos. of 6mm steel bars after every three course.
- 3.4. The rate shall be for a unit of one sq. meter.

Item No. 16 :- 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 formwork in (A) Wall Caps / Coping.

1.0. Materials

1.1. Water shall conform to M-1. Cement shall conform to M-3. Sand shall conform to M-6. Crushed Stones aggregate 20 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 stone aggregate shall be one part of cement. 3 parts of coarse sand and **6** parts of **crushed** 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-in-charge in case of breakdown 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 1½ 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 ponding for a period of not less than 7 days from the date of placement.

2.7 The concrete work of wall caps/coping.

3.0. Mode of Measurement & Payment:

3.1. The concrete shall be measured for its length, breadth and depth, limiting dimensions to those specified on plan or as directed. Rate includes cost of necessary form work.

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

Item No. 17 :- Providing and laying controlled cement concrete M-200 and curing etc. complete including the cost of form work but excluding the cost of reinforcement in (C) Slabs landings shelves balconies, lintel-chhaja, beams, girders and cantilever up floor to level.

The work shall be executed as per specification of **Item No. 4** except for the item is work of providing and laying controlled cement concrete M-200 and curing etc. complete including the cost of form work but excluding the cost of reinforcement in (C) Slabs landings shelves balconies, lintel -chhaja, beams, girders and cantilever up floor to level.

Measurement shall be taken and paid on Cum. basis.

Item No. 18 :- Providing and laying controlled cement concrete M-200 and curing etc. complete including the cost of form work but excluding the cost of reinforcement in (C) Slabs landings shelves balconies, lintel-chhaja, beams, girders and cantilever up floor to level.

The work shall be executed as per specification of **Item No. 4** except for the item is work of providing and laying controlled cement concrete M-200 and curing etc. complete including the cost of form work but excluding the cost of reinforcement in (C) Slabs landings shelves balconies, lintel-chhaja, beams, girders and cantilever up floor to level.

Measurement shall be taken and paid on Cum. basis.

Item No. 19 :- Providing and laying controlled cement concrete M-200 and curing etc. complete including the cost of form work but excluding the cost of reinforcement in (C) Slabs landings shelves balconies, lintel-chhaja, beams, girders and cantilever up floor to level (Ground floor).

The work shall be executed as per specification of **Item No. 4** except for the item is work of providing and laying controlled cement concrete M-200 and curing etc. complete including the cost of form work but excluding the cost of reinforcement in (C) Slabs landings shelves balconies, lintel-chhaja, beams, girders and cantilever up floor to level (Ground floor).

Measurement shall be taken and paid on Cum. basis.

Item No. 20 :- Providing and laying controlled cement concrete work of M-200 and curing complete including cost of formwork and Excluding reinforcement for reinforced concrete work in (E) Staircases excluding landing upto floor two level for staircase in below give fair finish surface.

The work shall be executed as per specification of **Item No. 4** except for the item is work of providing and laying controlled cement concrete work of M-200 and curing complete including cost of formwork and Excluding reinforcement for reinforced concrete work in (E) Staircases excluding landing upto floor two level for staircase in below give fair finish surface.

Measurement shall be taken and paid on Cum. basis.

Item No. 21 :- Providing and laying controlled cement concrete M-200 and curing complete including the cost of formwork but excluding the cost of reinforcement for reinforced concrete work in (D) Columns, pillars posts and struts, upto floor two level for Ground floor.

The work shall be executed as per specification of **Item No. 4** except for the item is work of providing and laying controlled cement concrete M-200 and curing complete including the cost of formwork but excluding the cost of reinforcement for reinforced concrete work in (D) Columns, pillars posts and struts, upto floor two level for Ground floor.

Measurement shall be taken and paid on Cum. basis.

Item No. 22 :- Providing and laying controlled cement concrete M-200 & curing complete including the cost of form work but excluding the cost of reinforcement for reinforced concrete work in Beam upto floor two level for G.F.

The work shall be executed as per specification of **Item No. 4** except for the item is work of providing and laying controlled cement concrete M-200 & curing complete including the cost of form work but excluding the cost of reinforcement for reinforced concrete work in Beam upto floor two level for G.F.

Measurement shall be taken and paid on Cum. basis.

Item No. 23 :- Providing and laying controlled cement concrete M-200 & curing complete including the cost of form work but excluding the cost of reinforcement for reinforced concrete work in Beam upto floor two level for F.F.

The work shall be executed as per specification of **Item No. 4** except for the item is work of providing and laying controlled cement concrete M-200 & curing complete including the cost of form work but excluding the cost of reinforcement for reinforced concrete work in Beam upto floor two level for F.F.

Measurement shall be taken and paid on Cum. basis.

Item No. 24 :- Providing and laying controlled cement concrete M-200 & curing complete including the cost of form work but excluding the cost of reinforcement for reinforced concrete work in Slabs, landing, cantilevers upto floor two level for G.F. slab for Grade slab.

The work shall be executed as per specification of **Item No. 4** except for the item is work of providing and laying controlled cement concrete M-200 & curing complete including the cost of form work but excluding the cost of reinforcement for reinforced concrete work in Slabs, landing, cantilevers upto floor two level for G.F. slab for Grade slab.

Measurement shall be taken and paid on Cum. basis.

Item No. 25 :- Providing and laying controlled cement concrete M-200 & curing complete including the cost of form work but excluding the cost of reinforcement for reinforced concrete work in Slabs, landing, cantilevers upto floor two level for G.F. slab

The work shall be executed as per specification of **Item No. 4** except for the item is work of providing and laying controlled cement concrete M-200 & curing complete including the cost of form work but excluding the cost of reinforcement for reinforced concrete work in Slabs, landing, cantilevers upto floor two level for G.F. slab

Measurement shall be taken and paid on Cum. basis.

Item No. 26 :- Providing and laying controlled cement concrete M-200 & curing complete including the cost of form work but excluding the cost of reinforcement for reinforced concrete work in Slabs, landing, cantilevers upto floor two level for F.F. slab

The work shall be executed as per specification of **Item No. 4** except for the item is work of

Item No. 27 : providing and laying controlled cement concrete M-200 & curing complete including the cost of form work but excluding the cost of reinforcement for reinforced concrete work in Slabs, landing, cantilevers upto floor two level for F.F. slab Measurement shall be taken and paid on Cum. basis.

Item No. 28 :- Providing I.S.I. Mark T.M.T. bar Fe-500D reinforcement for R.C.C. work including bending, binding and placing in position complete upto all floor level.

1.0 GENERAL

This work shall consist of furnishing and placing coated, or uncoated or high strength deformed reinforcement, bars (intentioned) of the shape and dimensions shown on the drawings and conforming to these specifications or as approved by the Engineer in charge.

2.0 MATERIAL

2.1. TMT Bars

Reinforcements may be either T.M.T. tensile steel, confirms to IS 1786-2008 bars. They may be uncoated or coated with epoxy or with approved protective coatings.

2.2. T.M.T. bars reinforcement for R.C.C. work shall conform IS 432 (Part II) 1982 (Reaffirmed 1995) and shall be of tested quality. It shall also comply with relevant part of IS 456-2000.

2.3. All reinforcement shall be clean and free from dirt, paint, grease or oil, all scale or loose or thick rust at the time of placing.

2.4. All steel shall be procured from original producers no re-rolled steel shall be incorporated in the work.

2.5. Only new steel shall be delivered to the site every bar shall be inspected before placing to its position and defective brittle or burnt bar shall be discarded cracked ends of bars shall be discarded.

3.0 Pitch

3.1. Distance between bars shall be as specified in drawings and as directed by the Engineer in charge all bars shall be placed at an accurate distance from each other and shall be bind tightly to maintain the desired pitch Suitable means shall be provided for holding bars securely in position.

4.0 Binding wire

4.1. Mild steel binding wire shall be of 1.63 mm or 1.22 mm (16 to 18 gauge diameter and shall conform IS 280-2006.

4.2. The use of black wire will be permitted for binding reinforcement bars. It shall be free from dirt, paint, grease or oil, oil scale or loose or thick rust and any other undesirable coating which may prevent adhesion of cement mortar at the time of binding.

4.3. Only new binding wire shall be delivered to the site all binding wire shall be inspected before binding to its position and defective brittle, rusted, used wire, shall be discarded.

5.0 PROTECTION OF REINFORCEMENT

5.1. Uncoated reinforcing steel shall be protected from rusting or chloride contamination. Reinforcements shall be free from rust, mortar, loose mill scale, grease, oil or paints. This may be ensured either by using reinforcement fresh from the factory or thoroughly cleaning all reinforcement to remove rust using any suitable method such as sand blasting, mechanical wire brushing, etc. as directed by the Engineer. Reinforcements shall be stored

on bricks, racks or platforms and above the ground in a clean and dry condition and shall be suitably marked to facilitate inspection and identification.

5.2. Portions of uncoated reinforcing steel and dowels projecting from concrete shall be protected within one week after initial placing of concrete with a brush coat of neat cement mixed with water to a consistency, of thick paint. This coating shall be removed by lightly tapping with a hammer or other tool not more than one week before placing of the adjacent pour of concrete. Coated reinforcing steel shall be protected against damage to the coating. If the coating on the bars is damaged during transportation or handling and cannot be repaired, the same shall be rejected.

6.0 Workmanship

6.1. The work shall consist of furnishing and placing reinforcement to the shape and dimensions shown as on the drawings or as directed by The Engineer in charge.

6.2. Reinforcing steel shall conform accurate to the dimensions given in the bar bending schedules shown on relevant drawing

7.0 BENDING OF REINFORCEMENT

7.1. Bar bending schedule shall be furnished by the Contractor and got approved by the Engineer before start of work.

7.2. Reinforcing steel shall conform to the dimensions and shapes given in the approved bar bending Schedules.

7.3. Bars shall be bent cold to the specified shape and dimensions or directed by the Engineer using a proper bar bender operated by hand power to obtain the correct radius of bends and shape.

Bars shall not be bent or straightened in a manner that will damage parent material or the coating bars bent during transport or handling shall, be straightened before being used on work and shall not be heated to facilitate straightening.

8.0 PLACING OF REINFORCEMENT

8.1. The reinforcement cage should generally be fabricated in the yard at ground level, and then shifted and placed in position. The reinforcement shall be placed strictly, in accordance with the drawings and shall be assembled in position, only when structure is otherwise ready for placing of concrete. Prolonged time gap, between assembling of reinforcements and casting of concrete, which may result in rust formation on the surface, shall not be permitted.

8.2. Reinforcement bars shall be placed accurately in position as shown on the drawings. The bars, crossing one another shall be tied together at every intersection with binding wire (annealed), conforming to IS:280 to make the skeleton of the reinforcement rigid such that the reinforcement does not get displaced during placing of concrete, or any other operation. The diameter of binding wire shall not be less than 1 mm.

8.3. Bars shall be kept in position usually by the following methods:

In case of beam and slab construction, industrially produced polymer cover blocks of thickness equal to the specified cover shall be placed between the bars and formwork subject to Satisfactory evidence that the polymer composition is not harmful to concrete and reinforcement. Cover blocks made of concrete may be permitted by the Engineer, provided they have the same strength and specification as those of the member.

8.4. In case of dowels for Columns and walls the vertical reinforcement shall be kept in position by means of timber templates with slots in them accurately, or with cover blocks tied to the reinforcement timber templates shall be removed after the concreting has progressed up to a level just below their location.

8.5. Layers of reinforcements shall be separated by spacer bars at approximately One meter intervals. The minimum diameter of spacer bars shall be 12 mm or: equal to maximum size of main reinforcement or maximum size of coarse aggregate, whichever is greater. Horizontal reinforcement shall not be, allowed to sag between supports.

8.6. Necessary stays, blocks, metal chairs, spacers, metal hangers supporting wires etc, or other subsidiary, reinforcement shall be provided to fix the reinforcements firmly in its correct position.

8.7. Use of pebbles, broken stone, metal pipe, brick, mortar or wooden blocks etc as devices for positioning reinforcement shall not be permitted.

8.8. Bars coated with epoxy or any other approved protective coating shall be placed on supports that do not damage the coating. Supports shall be installed in a manner such that planes of weakness are not created in hardened concrete. The coated reinforcing steel shall be held in place by use of plastic or plastic coated binding wires especially manufactured for the purpose.

8.9. Placing and fixing of reinforcement shall be inspected and approved by the Engineer before concrete is deposited.

9.0 Lapping

9.1. All reinforcement shall be furnished in full lengths as indicated on the drawing. No splicing of bars, except where shown on the drawing; will be permitted without approval of the Engineer. The lengths of the splice shall be as indicated on drawing or as approved by the Engineer. Where practicable, overlapping bars shall not touch each other, and shall be kept apart by 25 mm or 1 1/4 times the maximum size of coarse aggregate, whichever is greater. If this is not feasible, overlapping bars shall be bound with annealed steel binding wire, not less than 1 mm diameter and twisted tight in such a manner as to maintain minimum clear cover to the reinforcement from the concrete surface. Lapped splices shall be staggered or located at points, along the span where stresses are low.

10.0. Welding

10.1 Splicing by welding of reinforcement will be permitted only if detailed on the drawing or approved by the Engineer. Weld shall develop an ultimate strength equal to or greater than that of the bars connected.

10.2. While welding may be permitted for T.M.T. reinforcing bars conforming to IS:432, welding of deformed bars conforming to IS: 1786 shall in general be prohibited. Welding may be permitted in case of bars of other than S 240 grade including special. Welding grade of S 500D grade bars conforming to IS:1786, for which necessary chemical analysis has been secured and the carbon equivalent (CE) calculated from the chemical composition using the formula:

$$CE = C + \frac{Mn}{6} + \frac{Cr + Mg + V}{5} + \frac{Ni + Cu}{15}$$

is 0.4 or less.

10.3. The method of welding shall conform to IS:2751 and IS:9417 and to any supplemental specifications to the satisfaction of the Engineer

10.4. Bars shall be bent cold to the specified shape and dimensions or as directed by Engineer in charge using the proper bender tool, operated by hand or power to attain proper radius of bends. Bars shall not be bend or straightened in a manner that will injure the material. Bars bent during transport or handling shall be straightened before being used in the work. Bars shall not be heated to facilitate bending

10.5. Unless otherwise specified a 'U' type hook at the end of each bar shall invariably be provided to main reinforcement. The radius of the bane shall not be less then twice the diameter of the round bar and the length of the straight part of the bar beyond the end of the curve shall be at least four times of 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 spiting of the concrete

10.6. All reinforcement bars shall be accurately placed in exact position shown on the drawings 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 say blocks or metal chairs spacers, metal hangers, supporting wires or other approved devices at sufficiently close intervals, Bars shall not be allowed to sag between supports not displaced during concreting or any other operations of the work All devices used for positioning shall be of not corrodible material wooden and metal supports shall not extended to the surface of the concrete, except where shown in 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 blocs shall not be used Layers of bars shall be separated by spacer bars pre-cast mortar blocks or other approved devices. Reinforcement after bending placed in position shall be maintained 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 form corrosion, concrete cover shall be provided as indicated on drawings. All bars protruding from concrete and to which other bars are to be sliced and which are likely to be exposed for a period exceeding 10 days shall be protected by a thick coat of neat cement grout Bars crossing each other where required shall be secured by binding wire (annealed) of size not less than 1 mm in such a manner that they do not slip over at the time of fixing and concreting As far possible bars of full length shall be used in case this is not possible, overlapping of bars shall be done as directed by the Engineer in charge When practicable overlapping bars shall not touch each other, but be kept apart by 25 mm Where no 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 sheer not bending moments is maximum.

10.7. Whenever indicated on drawing or desired the Engineer in charge bars shall be jointed by coupling which shall have a cross section sufficient to transmit the full stresses of bars The end of the bars that are jointed by coupling shall be upset for sufficient length so that the effective cross section at the base of threads is not less than the normal cross section of the bar. Threads shall be standards threads Steel for coupling shall conform to IS 226

10.8. When permitted or specified on the drawings joints of reinforcement bars shall butt-welded so as to transmit their full stresses Welded joints shall preferably be located at points when steel will not be subject to more than 75 percent 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 are welding using a process which excludes air form the molten metal and conforms to any or 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 bars shall be cleaned of all loose scale rust stages 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 IS 814 Welded pieces of reinforcement shall be tested. Specimen shall be taken form the actual site and their number shall frequency to test shall be as directed by the Engineer in charge

11.0 MODE OF MEASUREMENTS & PAYMENT

11.1. For the purpose of payment the bar shall be measured correct up to 10 mm length and weight payable works out at the rate specified below

Sr · N o	Diameter of steel	weight of steel per running meter	Sr. No	Diameter of steel	weight of steel per running meter
1	6 mm	0.22 Kg / Rmt	8	20 mm	2.47 Kg / Rmt
2	8 mm	0.39 Kg / Rmt	9	22 mm	2.98 Kg / Rmt
3	10 mm	0.62 Kg / Rmt	10	25 mm	3.85 Kg / Rmt
4	12 mm	0.89 Kg / Rmt	11	28 mm	4.83 Kg / Rmt
5	14 mm	1.21 Kg / Rmt	12	32 mm	6.31 Kg / Rmt

6	16 mm	1.58 Kg / Rmt	13	36 mm	7.99 Kg / Rmt
7	18 mm	2.00 Kg / Rmt	14	40mm	9.86 Kg / Rmt

- 11.1.** Excess consumption over 5% will be charged at penal rate.
- 11.2.** Reinforcement shall be measured in length including hooks, if any, separately for different diameters as actually used in work, excluding overlaps. From the length so measured, the weight of reinforcement shall be calculated in tonnes on the basis of IS: 1732. Wastage, overlaps, couplings, welded joints, spacer bars, chairs, stays, hangers and annealed steel wire or other methods for binding and placing shall not be measured and cost of these items shall be deemed to be included in the rates for reinforcement.
- 11.3.** The contract unit rate for coated/uncoated reinforcement shall cover the cost of material, fabricating, transporting, storing, bending, placing, binding and fixing in position as shown on the drawings as per these specifications and as directed by the Engineer, including all labour, equipment, supplies, incidentals, sampling, testing and supervision.

The unit Rate for coated reinforcement shall be deemed to also include cost of all material, labour, tools and plant, royalty, transportation and expertise required to carry out the work. The rate shall also cover sampling, testing and supervision required for the work.

- 11.4.** The rate shall be for a unit of **One Kg**.

Item No. 29 :- Providing I.S.I. Mark T.M.T. bar Fe-500D reinforcement for R.C.C. work including bending, binding and placing in position complete upto floor two level. Extra for additional lift of reinforcing steel for all R.C.C. work above floor two level.

The work shall be executed as per specification of **Item No. 27** except for the item is work of **providing I.S.I. Mark T.M.T. bar Fe-500D reinforcement for R.C.C. work including bending, binding and placing in position complete upto floor two level. Extra for additional lift of reinforcing steel for all R.C.C. work above floor two level.**

Measurement shall be taken and paid on Kg. basis.

Item No. 30 :- Providing and fixing M.S. Fan clamps type 1 to 16mm dia. M.S. bar bent to shape with hooked ends to R.C.C. slabs curing, laying including painting the exposed portion of loops, all as per standard design complete

1.0. Materials

1.1. M.S. bar shall conform to M-18.

2.0. Workmanship

2.1. The shape and size of M.S. clamp shall be directed.

2.2. The fixing M.S. fan clamp type 1 to 16mm dia M.S. bar as per design given by Engineer in charge in existing R.C.C. slab a chase of size 150 mm. x 75 mm. shall be cut from the ceiling so as to expose the reinforcement and up to 25 mm. clear round the reinforcement bar. This shall be done without any damage to adjoining portion of ceiling. The two arms of the ends of the clamp shall be passed through the space over reinforcement bar from the bottom of the slab. Then the two arms shall be bent down about 16 mm. by means of crow bar. The clamp shall be held in position and the chase in ceiling filled with cement concrete 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm. nominal size). The ceiling shall be then finished to match the existing surface and properly cured.

3.0. Mode of measurements and payment

3.1. The rate includes cost of all materials and labour required for satisfactory completion of this item as described above.

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

Item No. 31 :- Providing & fixing 40 mm thick Single shutter flush door solid core finished with both side 1 mm thick lamination both side like 'NOVAPAN 'or equivalent of natural wood grain shade as approved by this office having telephone black granite 18 mm thick frame with double stone as per the instruction of Engineer in charge with necessary SS hinges and fixtures etc. complete.

1.0. Materials

Wood in frames shall conform to M-29. 2. Glass shall conform to M-38. 3. S.S. hinges shall conform to M-43.
4. Granite frame shall confirm to M-52.

1.1. The ready mixed paint for brushing priming for enamels wood shall conform to I.S. 106-1962.

2.0. Workmanship

2.1. The item covers the 40 mm thick Single shutter flush door solid core finished with both side 1 mm thick lamination both side like 'NOVAPAN 'or equivalent, of natural wood grain shade as approved by this office having telephone black granite 18 mm thick frame with double stone as per the instruction of Engineer in charge with necessary SS hinges and fixtures etc. complete.

2.2. Preparation of surfaces :

2.2.1. All wood work shall be dry and free from any foreign matter incidental to building operations. Nails shall be punched well below the surface to provide a film key for stopping. Mouldings shall be carefully smoothened with abrasive paper and projecting fibers shall be removed. Flat portions shall be smoothened off with abrasive paper used across the grain prior to painting prior to painting and with the grain prior to staining or if the wood is to be left in its natural colour, wood work which is to be stained may be smoothened by scraping instead of by glass papering if so required.

2.2.2. Any knots, resinous, streaks or bluefish sap wood that are not large enough to justify cutting out shall be treated with two coats of pure shellac knotting applied thinly and extended about 35 mm. beyond the actual area requiring treatment.

2.3. Application of primer :

2.3.1. After the preparation of the surface, the priming coat shall be applied immediately. The brushing operations are to be adjusted to the spreading capacity advised by the manufacturer of the particular primer. The paint shall be applied evenly and smoothly by means of crossing and laying off. The crossing and laying off consists of covering the area over with paint, brushing alternately in opposite directions, 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. The full process of crossing and laying off wall constitute one coat.

2.3.2. During painting, every time, after the priming coat has been worked out of the brush bristles or after the brush has been unloaded, the bristles of the brush shall be opened up by striking the brush against portion of the unpainted surface with the end of the bristles, held at right angles to the surface, so that bristles thereafter will collect the correct amount of paint when dipped again in to a paint container The prima/y coat shall be allowed to dry completely before painting is started.

2.3.3. No hair marks from the brush or clogging at pain puddles in the corner of panels angles of molding etc. shall be left on the work

2.3.4. Special care shall be taken while painting over bolts, nuts, rivets, overlaps etc.

2.3.5. The container when not in use shall be kept close and free from air so that paint does not thickness and also shall be kept guarded from dust.

2.3.6. In painting doors and windows, the putty, round the glass panes also be painted but care shall be taken to see that no paint, stain etc. are left on the glass. Top of shutters and surfaces in similar hidden locations shall not be left out in painting.

3.0. Shutters:

3.1.1. Paneled shutters shall be constructed in the form of timber frame work of styles and rails with panel inserted of type as specified in the detailed drawings. Panel shall be fixed by providing grooves in the style and rails. The styles and rails shall be joined to each other by mortise and tenon joints at right angles.

3.1.2. All members of the shutters shall be straight without any warp or bow and shall have smooth, well planed faces at right angles to each other.

3.1.3. The size of styles and rails shall be as per drawings or as directed. Styles and rails of shutters shall be made of one piece only.

4.0. Timber paneling:

4.0.1. Thickness of the panel shall be as specified in the item as shown in the drawing or as directed. If the panel is made from more than one piece the pieces shall be finished as shown in the detailed drawings and shall be joined with continuous groove with specified size. The end pieces of the panel and the top and bottom of the panel shall be provided with continuous tongue to frame into groove of the frame shutter. An air space of 1.5 mm. shall be left in the groove of frame of shutter while framing the panels in it.

- 4.0.2. The faces of the panel as well as various pieces of the panel shall be- closely fitted to the sizes of the grooves.
- 4.0.3. Finishing of the corners of raised panel edges shall be done as shown in drawings or as directed.
- 4.0.4. The thickness specified shall be finished thickness and no tolerance will be permitted.
- 5.5. **Fixtures and Fastenings:**
- 5.5.1. The rate shall include S.S. hinges including fixing with iron screws. The size and number of hinges shall be as per table given in Annexure-1.
- 5.3. **Tolerance:**
- Unless specially mentioned otherwise tolerance of +1.5 mm shall be allowed for each wrought face.
- 5.4. The tenons shall be closely fitting into the mortises and suitably pinned with wood dowels not less than 10 mm. dia. meter. The depth of rebates for housing the shutter shall be as shown in the detailed drawing or as directed.
- 5.5. The concrete surface of tenon and mortise shall be treated before putting together with an adhesive of approved make.
- 5.6. Minimum number of three hold-fasts shall be fixed on each side of door and windows frames, one at the center point and the other two at 30 mm. from the top and bottom of the frames. In case of windows and ventilators frames. The size of each hold-fast shall be 300 x 25 x 6 mm. and of mild-steel with split end. The hold fasts shall be fixed with screws to frames.
- 5.7. Mild steel hold fasts shall be protected with a coating of coal asphalt tar. The surface of frame abutting the masonry or concrete faces shall be properly treated by applying a coat of approved coating.
- 6.0. **Mode of Measurements and payment**
- 6.1. The linear dimensions shall be measured correct upto 1 cm. The quantity shall be worked out correct to places of decimals of cum.
- 6.2. The new wood and wood based surface shall be measured under this item.
- 6.3. All the work shall be measured net in the decimal system, as executed subject to the following limits unless otherwise stated hereinafter.
- (a) Dimensions shall be measured to the nearest 0.01 meter.
- (b) Areas shall be worked out to the nearest 0.01 sq. meter.
- 6.4. No deductions shall be made for openings not exceeding 0.5 sq. mt. each and no addition shall be made for painting to beddings, moldings, edges, jambs, soffits, sills etc. of such opening.
- 6.5. In case of fabricated structural steel and iron work, priming coat of paint shall be included with fabrication. In case of trusses if measured in sq.m. compound girders, stanchions, lattices, grader and similar work, actual area shall be measured in sq.m and no extra shall be paid for painting on bolts heads, nuts, washers etc. No addition shall be made to the weight calculated for the purpose of measurements of steel and iron works for paint applied on shop or at site.
- 6.6. The different surfaces shall be grouped into one general item, areas of uneven surfaces being converted into equivalent plain areas in accordance with the table given as per Annexure-II for payment.
- 6.7 The rate includes all materials, labours, tools, plants, equipments and any other expensive required for satisfactorily completion of item as specified with all lead and lift.
- 6.8. The payment will be made on square meter basis of the finished work.
- 6.9. The rate shall be for a unit of **one square meter**.

Item No. 32 :- Providing & fixing 35 mm thick Single shutter flush door solid core finished with both side 1 mm thick lamination both side like 'NOVAPAN 'or equivalent, of natural wood grain shade as approved by this office having telephone black granite 18 mm thick frame with double stone including fixed ventilation above lintel level as per drawing and as per the instruction of Engineer in charge with necessary SS hinges and fixtures etc. complete.

1.0 Materials

Wood in frames shall conform to M-29. 2. S.S. hinges shall conform to M-43. 3. 1.00mm thick laminate sheet shall confirm to M-40. 4. Glass shall conform to M-38.

2.0 Workmanship

2.1. The item covers the requirement of preparation of shutters for doors, windows, clerestory windows, their supply and fixing.

The item covers the standard 35 mm thick Single shutter flush door solid core finished with both side 1 mm thick lamination both side like 'NOVAPAN 'or equivalent, of natural wood grain shade as approved by this office having telephone black granite 18 mm thick frame with double stone including fixed ventilation above lintel level as per drawing and as per the instruction of Engineer in charge with necessary SS hinges and fixtures etc. complete.

2.2. Preparation of surfaces :

2.2.1. All wood work shall be dry and free from any foreign matter incidental to building operations. Nails shall be punched well below the surface to provide a film key for stopping. Moldings shall be carefully smoothed with abrasive paper and projecting fibers shall be removed. Flat portions shall be smoothed off with abrasive paper used across the grain prior to painting prior to painting and with the grain prior to staining or if the wood is to be left in its natural colour, wood work which is to be stained may be smoothed by scraping instead of by glass papering if so required.

2.2.2. Any knots, resinous, streaks or bluefish sap wood that are not large enough to justify cutting out shall be treated with two coats of pure shellac knotting applied thinly and extended about 35 mm. beyond the actual area requiring treatment.

2.3. Application of primer :

2.3.1. After the preparation of the surface, the priming coat shall be applied immediately. The brushing operations are to be adjusted to the spreading capacity advised by the manufacturer of the particular primer. The paint shall be applied evenly and smoothly by means of crossing and laying off. The crossing and laying off consists of covering the area over with paint, brushing alternately in opposite directions, 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. The full process of crossing and laying off wall constitute one coat.

2.3.2. During painting, every time, after the priming coat has been worked out of the brush bristles or after the brush has been unloaded, the bristles of the brush shall be opened up by striking the brush against portion of the unpainted surface with the end of the bristles, held at right angles to the surface, so that bristles thereafter will collect the correct amount of paint when dipped again in to a paint container The prima/y coat shall be allowed to dry completely before painting is started.

2.3.3. No hair marks from the brush or clogging at pain puddles in the corner of panels angles of molding etc. shall be left on the work

2.3.4. Special care shall be taken while painting over bolts, nuts, rivets, overlaps etc.

2.3.5. The container when not in use shall be kept close and free from air so that paint does not thickness and also shall be kept guarded from dust.

2.3.6. In painting doors and windows, the putty, round the glass panes also be painted but care shall be taken to see that no paint, stain etc. are left on the glass. Top of shutters and surfaces in similar hidden locations shall not be left out in painting.

3.0 Shutters:

3.1.1. Paneled shutters shall be constructed in the form of timber frame work of styles and rails with panel inserted of type as specified in the detailed drawings.

3.1.2. All members of the shutters shall be straight without any warp or bow and shall have smooth, well planed faces at right angles to each other.

3.1.3. The size of styles and rails shall be as per drawings or as directed. Styles and rails of shutters shall be made of one piece only.

4.0 Timber paneling:

4.0.1. Thickness of the panel shall be as specified in the item as shown in the drawing or as directed. If the panel is made from more than one piece the pieces shall be finished as shown in the detailed drawings and shall be joined with continuous groove with specified size. The end pieces of the panel and the top and bottom of the

panel shall be provided with continuous tongue to frame into groove of the frame shutter. An air space of 1.5 mm. shall be left in the groove of frame of shutter while framing the panels in it.

4.0.2. Finishing of the corners of raised panel edges shall be done as shown in drawings or as directed.

4.0.3. The thickness specified shall be finished thickness and no tolerance will be permitted.

5.5. Fixtures and Fastenings:

5.5.1. The rate shall include S.S. hinges including fixing with iron screws. The size and number of hinges shall be as per table given in Annexure-1.

5.2. Frames:

5.2.1. All members of frames shall be exactly at right angles. The right angle shall be checked from inside surfaces of the-frames of the respective members.

5.2.2. All members of frames shall be straight without any warp of bow and shall have smooth surfaces well planed on the three sides exposed at right angles to each other. The surfaces touching the wall may not be planed unless it is required in order to straighten up the member or to obtain the overall sizes within the tolerances as specified.

5.2.3. Frame shall have dovetail joints. When clerestory windows in included, it shall be provided by having full length one piece post for door or windows and clerestory window extending the frame on top at the head to the required extent. Horns shall not be provided in the head of the frame. When no sills are provided, the vertical posts of the frame in the ground floor shall be embedded in the sill masonry for 10 cm. on upper floors, the vertical posts shall be fixed in the floor or masonry by forming notches 10 mm. deep. Slight adjustment of spacing as necessary shall be done to have the hold fasts in the joints of masonry; course. The frame shall be erected in position and held plumb with strong support form north sides and built in masonry as it is being built. The transom shall be through tenoned into the mortises of the jamb post to the full width of the jamb post and the thickness of the tenon shall be not less than 35 mm.

5.3. Tolerance:

Unless specially mentioned otherwise tolerance of +1.5 mm shall be allowed for each wrought face.

5.4. The tenons shall be closely fitting into the mortises and suitably pinned with wood dowels not less than 10 mm. dia. meter. The depth of rebates for housing the shutter shall be as shown in the detailed drawing or as directed.

5.5. The concrete surface of tenon and mortise shall be treated before putting together with an adhesive of approved make.

5.6. Minimum number of three hold-fasts shall be fixed on each side of door and windows frames, one at the center point and the other two at 30 mm. from the top and bottom of the frames. In case of windows and ventilators frames. The size of each hold-fast shall be 300 x 25 x 6 mm. and of mild-steel with split end. The hold fasts shall be fixed with screws to frames.

5.7. Mild steel hold fasts shall be protected with a coating of coal asphalt tar. The surface of frame abutting the masonry or concrete faces shall be properly treated by applying a coat of approved coating.

6.0. Mode of Measurements and payment

6.1. The linear dimensions shall be measured correct upto 1 cm. The quantity shall be worked out correct to places of decimals of cum.

6.2. The new wood and wood based surface shall be measured under this item.

6.3. All the work shall be measured net in the decimal system, as executed subject to the following limits unless otherwise stated hereinafter.

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

(b) Areas shall be worked out to the nearest 0.01 sq. meter.

6.4. No deductions shall be made for openings not exceeding 0.5 sq. mt. each and no addition shall be made for painting to beddings, moldings, edges, jambs, soffits, sills etc. of such opening.

6.5. In case of fabricated structural steel and iron work, priming coat of paint shall be included with fabrication. In case of trusses if measured in sq.m. compound girders, stanchions, lattices, grader and similar work, actual area shall be measured in sq.m and no extra shall be paid for painting on bolts heads, nuts, washers etc. No addition shall be made to the weight calculated for the purpose of measurements of steel and iron works for paint applied on shop or at site.

6.6. The different surfaces shall be grouped into one general item, areas of uneven surfaces being converted into equivalent plain areas in accordance with the table given as per Annexure-II for payment.

6.7 The rate includes all materials, labours, tools, plants, equipments and any other expensive required for satisfactorily completion of item as specified with all lead and lift.

6.8. The payment will be made on square meter basis of the finished work.

6.9. The rate shall be for a unit of **one square meter.**

Item No. 33 :- Providing and fixing window having extruded aluminum colour anodized section frame main outer size 95mm x 24mm x 1.17mm (@ Wt. 0.738 Kg/mt), horizontal three track member size 92mm x 31.75mm x 1.30mm (@ Wt. 1.07 Kg/mt), vertical member of size 92mm 31.75mm x 1.50mm (@ Wt. 1.06 Kg/mt) with sliding shutters of horizontal member size 40mm x 18mm x 1.29mm (@ Wt. of 0.456 Kg/mt), vertical member of size 40mm x 18mm x 1.29 mm (@ Wt. of 0.456 kg / mt) with 5 mm thick transparent bronze colour tinted float glass with powder coated aluminum fittings and fixtures and transparent silicon sealant glass fixing including granite frame as per details etc. complete.

1.0 MATERIAL

1.1 Aluminum standard section

1.1.1 Window having extruded alluminium colour anodized section

Aluminum alloy used in the manufacture of 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.

The works included standard window having extruded aluminum colour anodized section frame main outer size 95mm x 24mm x 1.17mm (@ wt. of 0.738 kg/mt), horizontal three track member size 92mm x 31.75mm x 1.30mm (@ wt. of 1.07 Kg/mt), vertical member of size 92mm x 31.75mm x 1.50mm (@ wt. of 1.06 Kg/mt) with sliding shutters of horizontal member size 40mm x 18mm x 1.29mm (@ wt. of 0.456 Kg/mt), vertical member of size 40mm x 18mm x 1.29mm (@ wt. of 0.456 Kg/mt) as directed by Engineer in charge.

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 Glass : The transparent bronze colour tinted float glass shall be of approved make having thickness of **5mm**. The glass shall be clear and free from scratches and cracks. The glass shall be provided on wall panel and fixed with transparent silicon gasket

1.2 Glazing clips: Glazing clips (structural glass) shall be of size as directed by the Engineer in charge around the glass allover shall be free from any scratches or holes or any damage of on surface all section shall have finished luster surface on all sides.

1.3 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.

1.4 Fixtures

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.

1.5 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.

1.6 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.

1.7 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.

Product is from reputed company having ISO 9001-2000 certificate and with three years performance guarantee.

2.0 WORKMANSHIP

The work of window having extruded aluminium colour anodized section frame 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 window having extruded aluminium colour anodized section frame shall include the cost of all materials, cost of anodizing, cost of all necessary fixtures and fastenings, labour charges for fixing frames, shutters 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 frame and shutter of specified size 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 making walls good by plaster patch colour etc as required.

3.2. The Window shall be measured for its improvising and fixing window having extruded aluminium colour anodized section frame having heavy handle, heavy lock, bracket, stoppers, **5mm** thick transparent glass panel of approved make with S.S. 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 aluminum joints special runner etc. complete.

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

Item No. 34 :- Providing and fixing louvered type ventilators with powder coated aluminum fittings and fixtures and Blur glass fixing to adjustable louvers and black granite frame as per details and executed as per directed by Engineer in charge.

1.0 MATERIALS

- 1.1 Standard extruded anodized Alluminium section ventilation allows used in the manufacture of extruded section shall confirm to I.S. designation HEA - WP of IS 733 - 1975 and also designation WVG - WP of IS 1285 - 1975 section shall be as specified in the drawing a design or as directed by Engineer-in-charge. All section shall be free from scratches holes or any damages on surface. All section shall have finished plaster surface on all sides.
- 1.1.1. The work includes standard louvered type ventilators with powder coated aluminum fittings and fixtures and Blur glass fixing to adjustable louvers and black granite frame as per details and executed as directed by Engineer in charge.
- 1.2 Glass :** The blur glass of louvers fixed to alluminium strip blade shall be of approved make having thickness of **5mm**. The glass shall be clear and free from scratches and cracks. The glass shall be provided on wall panel and fixed with tinted silicon gasket.
- 1.2.1 The glass shall be of the brief quality, free from specks, bubbles, smoken veins, air holes distress and other defects. The kind of glass to be used shall be as mentioned in the item or as shown in detailed drawing or as directed by Engineer-in-charge.
- 1.3. **Glazing clips:** Glazing clips shall be colour marble jambs all around the ventilator shall be free from any scratches or holes or any damage of on surface all section shall have finished luster surface on all sides.
- 1.4 **Rubber Gasket :** Rubber gasket shall be approved make shall be free from any scratches or holes or any damage on surface and shall have finished luster surface on all sides.
- 1.5. **Fixtures**
- 1.5.1. Hinges shall be of approved make shall be free from any scratches or holes or any damage on surface and shall have finished luster surface on all sides.

WORKMANSHIP

The work of standard louvered type ventilators shall be done with extreme finishing. The inclined blades shall be fixed as directed by Engineer-in-charge. 5 mm thick blur glass shall be fixed on blades.

MODE OF MEASUREMENT & PAYMENT

The unit rate of standard louvered type ventilators shall include the cost of all labours, materials, anodizing charges, tools, plants, cost of necessary fixtures & fastenings.

The rate shall be for a unit of one square meter.

Item No. 35 :- Providing and fixing M.S. hollow section box grills of required pattern to frames of windows or opening etc. with M.S. section of 2.5" x 2.5" square of Tata of jindal section having finish with G.I. coated finish by zinc oxide and oil paint including all labour and material as per directed by engineer incharge.

This item shall be consist of providing and fixing M.S. hollow section box grills of required pattern to frames of windows or opening etc. with M.S. section of 2.5" x 2.5" square of Tata of jindal section having finish with G.I. coated finish by zinc oxide and oil paint including all labour and material as per directed by Engineer-in-charge etc. complete.

The relevant specification of **Item No. 36** except the item is for fabrication of square hollow pipe.

The item includes all the cost of labour & materials to complete the work. The payment shall be made on **Sq.m.** basis.

Item No. 36 :- Providing and fixing M.S. grills of required pattern to wooden / Marble / Granite / Stone frames of windows 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) Ornamental Grill.

1.0 Materials

The structural steel shall conform to M-22.

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.

3.0 Mode of measurements and 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 include S.S. fixtures and fastenings including fixing with round headed bolts and nuts or by screws including cutting, welding and fabrications etc. complete as directed.

3.3. The rate shall be for a unit of **one kg.**

Item No. 37 :- Providing and laying Vitrified tiles 8 to 10 mm thick, 36" x 36" in flooring treads of steps and landing laid on a bed of 12mm thick cement mortar 1:3 (1-cement : 3-coarse sand) finishing with flush pointing in white cement. Light Shade.

1.0 Materials

Water shall conform to M-1. Cement mortar shall conform to M-11. **Vitrified tiles 8 to 10 mm thick, 36" x 36"** shall conform to relevant Indian standard. The size & colour of vitrified tiles shall be approved by Engineer in charge. Tiles shall be of light shade type as approved.

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 **vitrified flooring tiles** shall be laid on cement mortar bedding of 12 mm thick in C.M. 1:3 (1 cement : 3 coarse sand) finished with flush pointing in white cement. 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 20 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 two 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. The pattern shall be approved by Engineer in charge.

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. 38 :- Providing and laying 24" x 24" vitrified 8 mm thick tiles flooring over 20mm (average) base of cement mortar 1:6 (1 cement : 6 coarse sand) on new surface or fixing on existing flooring by adhesive material including dismantling of existing flooring and jointed with color cement slurry including finished with flush pointing & cleaning the surface etc. complete for anti skid.

1.0 Materials

Water shall conform to M-1. Cement mortar shall conform to M-11. **24" x 24" Vitrified tiles 8mm thick** shall conform to relevant Indian standard. The size & colour of vitrified tiles shall be approved by Engineer in charge. Tile shall be of antiskid type as approved.

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 **vitrified flooring tiles** shall be laid on cement mortar bedding of 20 mm. (avg.) thick in cement mortar 1:6 (1 cement : 6 coarse sand) on new surface or fixing on existing flooring by adhesive materials including dismantling of existing flooring and jointed with colour cement slurry. 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 20 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 two 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. The pattern shall be approved by Engineer in charge.

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. 39 :- Providing and laying Marbo Granite tiles 8 to 10 mm thick, 24" x 24" in skirting, risers of steps and dedo on 10mm 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. Marbo granite tiles 8 to 10 mm thick, 24" x 24" shall conform to ISO 13006. The size, thickness and shade & quality of marbo granite 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 plaster 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. 40 :- Providing and laying polished Kota stone slab flooring over 20mm (average) thick base of cement mortar 1:6 (1-cement : 6 coarse sand) or L.M. 1:1.5 (1-Lime putty :1.5 - coarse sand) laid over and jointed with grey cement slurry mixed with pigment to match the shade of slab including rubbing and polishing etc. complete. (A) 25mm thick

1.0. Materials

- 1.1. Water shall conform to M-1. Lime mortar shall conform to M-10. Cement mortar shall conform to M-11. 25mm thick polished kota stone slab shall conform to M-49.
- 1.1. Kota stone slab shall be hard even sound, and regular in shape and generally uniform in colour. The colour of the stone shall generally be green. Brown coloured shall not be allowed for use. They shall be without any soft veins cracks or flaws Kota stone slab shall be hard, even, and regular in shape and it should be without fault.
- 1.2. The size of the Kota stone slab to be used for flooring shall be of size 600 mm x 450 mm and or as approved by Engineer in charge or Architect. However smaller sizes will be allowed to be used to the extent of maintaining required pattern. Thickness shall be as specified.
- 1.3. Tolerance of minus 30 mm. on accounts of chisel dressing of edges shall be permitted for length as well as breadth. Tolerance in thickness shall be +3 mm.
- 1.4. The edges of Kota stone slab shall be truly chiseled and table rubbed with coarse sand before paving. All angles and edges of the stones shall be true, square and free chipping and surface shall be true and plain.
- 1.5. When machine cut edges are specified the exposed and the edges at joints shall be machine cut the thickness of the exposed machine cut edges shall be uniform.
- 1.6 The stones shall have machine polished surface. When brought on site, the stones shall be single polished or double polished depending upon its use. The stones for paving shall generally be single polished. The stones to be used for dado, skirting, sink, veneering, sills, steps etc. where machine polishing after the stones are fixed in situ is not possible shall be double polished.

2.0. Workmanship

- 2.1. Each slab shall be cut to the required size and shape and fine chisel dressed at all the edges. The sides thus dressed shall have a full contact if a straight edge is laid along. The sides shall be table rubbed with coarse sand before paving. All angles and edges of the slabs shall be true square and free from chippings and giving a plane surface. The thickness shall be 20 mm. (Average) as specified in the item but not less than 25 mm. at any place of the slab.
- 2.2. Bedding for the polished kota stone slabs shall be of cement mortar 1:6 (1 cement : 6 coarse sand) or L.M. 1:1.5 of average thickness 20 mm given in the description of the item. Sub grade shall be cleaned wetted and mopped mortar of the specified mix and thickness shall then be spread on an area sufficient to receive one blue kota stone slab. The slab shall be washed clean before laying. It shall be laid on top, pressed, tapped gently to bring it in level with the other slabs. It shall then be lifted and laid aside. Top surface of the mortar shall then be corrected by adding fresh mortar at hollows or depressions. The mortar shall then be allowed to harden bit. Over this surface, cement slurry of honey-like consistency shall be applied. The slab shall then be gently placed in position and tapped with wooden mallet till it is properly padded in level with and close to the adjoining

slab. The joint shall be as fine as possible. The slabs fixed in the floor adjoining, the walls shall enter not less than 10 mm. under the plaster, skirting or dedo. The junction between the wall and floor shall be finished neatly. The finished surface shall be true to levels and slopes as directed.

2.3. The floor shall be kept wet for a minimum period of 7 days so that bedding and joints set properly

2.4. Polishing shall be normally commenced after 14 days of laying the stone slab. First polishing shall be done with carborundum stones of 120 grade grit fitted in the heavy machine and then second polishing shall be done with carborundum stone of 220 to 350 grade grit fitted in heavy machine. Water shall be properly used during polishing. The stone shall then be washed clean with water when directed by the Engineer-in-charge, wax polish of approved quality shall be applied on the surface with the help of soft cloth over a clean and dry surface. Then the polishing machine fitted with bobs shall be run over it.

2.5. The holes required for Nahni traps, pipes and any other fittings shall be made, without any extra cost.

3.0. Measurement & payment

3.1. The rate shall include the cost of all materials and labour involved in all the operations described above. The kota stone flooring shall be measured in square meters correct to two places decimal, length and breadth shall be measured correct to a centimeter and between the finished face of skirting dedo plaster and no deduction shall be made nor extra paid for any opening in floor of areas upto 0.1 sq.

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

Item No. 41 :- Providing and laying 18 mm thick machine cut, free edges, machine polished Black Granite tread and risers in single piece with 1 cm nosing and necessary grooves on treads etc. complete.

General

This work shall consist of providing and fixing 18 mm thick machine cut, free edges, machine polished Black Granite tread and risers in single piece with 1 cm nosing and necessary grooves on treads as per design of the shape and dimensions shown on the drawings and conforming to these specifications or as approved by the Engineer in charge.

1.0 MATERIAL

Water shall confirm to M-1. Cement Mortar shall confirm to M-11. Granite slab shall confirm to M-52. Sand shall conform to M-6.

1.0 GRANITE SLAB

1.1. Granite slab shall be hard even sound, and regular in shape and generally uniform in colour. The colour of the stone shall generally be green. Only approved coloured shall not be allowed for use. They shall be without any soft veins cranks of flaws Granite slab shall be hard, even, and regular in shape and it should without fault.

1.2. The size of the Granite slab to be used as approved by Engineer in charge or Architect. However smaller sizes will be allowed to be used to the extent of maintaining required pattern. Thickness shall be as specified. For tread and risers the Granite slab shall be in single piece.

1.3. Tolerance of minus 30 mm. on accounts of chisel dressing of edges shall be permitted for length as well as breadth. Tolerance in thickness shall be +3 mm.

1.4. The edges of Granite slab shall be truly chiseled and table rubbed with coarse sand before paving. All angles and edges of the stones of shall be true, square and free chipping and surface shall be true and plain.

1.5. The Granite slab shall have machine cut free edges with half round pipe moulding mirror polished surface. When brought on site. The stones to be used for flooring dedo, skirting, sink, veneering, sills, steps, etc.

2.0 WORKMANSHIP

2.1 Granite slab shall be of approved quality shall be laid evenly to level and slope as directed by Engineer in charge over a bed of a base layer consisting of cement mortar 1:6 (1 cement: 6 coarse sand by volume) or Lime Mortar 1:1.5 (1 lime : 1.5 lime putty by volume).

2.2 Granite slab shall be laid evenly as per detailed drawing or as directed by Engineer in charge. Width, length and shape of stone shall be as per pattern shown in detailed drawing.

2.3. Cement and sand for base layer shall be mixed in proportions of 1:6 (1 cement : 6 coarse sand by volume). Cement and sand shall be proportioned by volume after making due allowance for bulking. The require quantity of water shall then be added and the mortar mixed to produce workable consistency before mixing platform shall be thoroughly cleaned before changing from one type of cement to another.

- 2.4. The mixing for base layer shall be done intimately. The operation shall be carried out on clean water tight platform, and cement sand shall be first mixed dry in the required proportion to obtain uniform colour and then the mortar shall be mixed for at least two minutes after addition of water. In case of cement mortar, that has suffered because of evaporation of water the same shall be re-tempered by adding water as frequently as needed to restore the requisite consistency but its re-tempering shall be permitted only within thirty minute from the time of addition to water at the time of initial mixing.
- 2.5. Cement and sand for base layer shall be mixed in proportion as specified in the item, Cement and sand shall be proportioned by volume after making due allowance for bulking. The required quantity of water shall then be added and the mortar mixed to produce workable consistency.
- 2.6. Curing shall be started as soon as the mortar used for finished has hardened sufficiently so as to be damaged when watered. It shall be kept wet for a period of at least 7 days. During this period, it shall be suitably protected from all damages;
- 2.7. During hot weather, all finished or partly finished work shall be covered or wetted in such manner as will prevent rapid drying of the flooring work.
- 2.8. Joints of Granite slab flooring shall be through and continuous throughout the building as directed by Engineer in charge.
- 2.9. Joints shall be filled with a stiff mixture of gray cement slurry.
- 2.10. The Granite slab flooring work shall be finished by rubbing and mirror polishing after the work of flooring is set properly.

3.0 MODE OF MEASUREMENT & PAYMENT :

- 3.1. The unit rate Granite stone slab 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 & placing stones in position, finishing, curing etc. flooring all over the length of walls and corners and sill of doors etc. and all other incidental expenses for producing flooring work 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. The rate includes cost of mirror polishing of flooring and dado work.
- 3.2. The rate shall include the cost of all materials and labours involved in all the operations described above. The granite stone slab flooring shall be measured in Square meter correct to 2 places of decimal. Length and breadth shall be measured to correct to a centimeter and between the finished the finished face of the skirting, dado or wall plaster and no deduction shall be made nor extra paid for any opening in floors or areas up to 0.1 square meter.
- 3.3. The rate shall be for a unit of **one Square meter**.

Item No. 42 :- Providing and 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 to plain or slope and to be tempered to bring mortar creme out upto surface using white cement including rounding off junctions and extending them upto 15 cm along the wall, clearing with water and oxalic acid etc. 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 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 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 charge 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, hard, 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.

1.5 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 broken pieces of glazed tiles shall be of 12 mm to 20 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 12 mm to 20 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** 40mm thick Cement concrete flooring 1:2:4 (1 part of cement and 2 part of coarse sand and 4 part graded stone aggregate 20mm nominal size) admixed with water proofing compound of approved make in specified proportion) of specified thickness shall be laid (Specification of C.C. 1:2:4 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** The entire surface shall be finished with 20 mm thick C.M. 1:3 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 glazed tiles flooring shall be followed for the execution of this item).
- D** Finishing the surface with 20 mm thick C.M. 1:3 and China mosaic tilling and finally finishing the surface with trowel with white cement slurry.
- E** 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 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.
- 7.3** The payment will be made on **Square Meter** basis of the finished work.

FORM OF GUARANTEE BOND

(For water proofing work)

Name of Work :-

Agreement No. :-

I _____ hereby guarantee that work will remain unaffected and will not be in anyway damaged by water leakages or any other similar type of defect surface will remain good for the period of five years after completion of the work of water proof as per the terms and conditions of the contract and the contractor that might be caused on account of bad materials or workmanship and or the similar type of cause and hereby guarantee to make good any loss or damage suffered by the Govt. of Gujarat and further guarantee to redo the effective work without claiming any extra cost.

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

The deposit at the rate of **15%** of the cost of this executed item from the running or the final bills as taken of guarantee for work shall be recovered and shall be released after the first three years after completion of the work for 1/3 of deposit and as half 1/3 amount shall be released for the fourth years after date of final balance of guarantee period, if no leakage is found.

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 not 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 of work & measurement shall be paid on unit of Sq.m. of finished work.

Item No. 43 :- Providing and laying BBCC of 75mm thick layer in C.M. (1:3) including spraying two coat of water proofing chemical with selected brand by Engineer in charge i.e. Perma or other with leveling complete for ready base of china mosaic treatment.

1.0. Material

Water proofing chemical approved shall be of approved quality and make. The proportion of the rain water pipe, S.W. pipe shall be of specified proportion as specified.

2.0 Workmanship

The BBCC of 75 mm thick layer in C.M. (1:3) including spraying two coat of water proofing chemical with selected brand by Engineer in charge i.e. perma or other with leveling complete for ready base of china mosaic treatment as directed by the Engineer in charge.

3.0 MODE OF MEASUREMENT & PAYMENT :

- 3.1.** The unit rate of water proofing treatment shall include the cost of all materials, tools and plant chemicals and rain water pipe, S.W. pipe required for water proofing. Applying the same to specified surface as per drawings, finishing, painting with two coats, etc. and all other incidental expenses for producing water proofing work 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.

The rate of water proofing shall include the cost of all labour, materials chemicals and rain water pipe, S.W. pipe tools and plant scaffolding and all incidental expenses as described herein above.

- 3.2.** The water proofing 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 Number basis.
- 3.3.** The payment will be made on **Sq.mt.** basis of the finished work.

Item No. 44:- Providing cement vata (10cm x 10cm size) quarter round in cement mortar 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. 45 :- Providing 15mm thick cement plaster in single coat on rough (similar) side of single or half brick walls for interior plastering upto floor two level and finished even and smooth in cement mortar 1:4 (1 cement : 4 sand).

1.0. Materials

1.1. Water shall conform to M-1. The cement mortar of proportion 1:4 shall conform to M-13.

2.0. Workmanship

2.1. Scaffolding:

Wooden bullies, bamboos, planks, trestles 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 toughened by wire brushing if it is not hard and by hacking if it is hard. In case of concrete surface, if a chemical retarded 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 readers if left on the surface. Trimming of projections on brick/concrete surfaces 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 peasting 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 supports of the ceiling resting on the wall of the floor have been removed. Ceiling plaster shall be completed before starting plaster to walls.

2:3. Application of plaster :

2.3.1. The plaster about 15x15 cms. shall be first applied horizontally and vertically at not more than 2 meters 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 movements at a time. Finally, the surface shall be finished off true with a trowel or wooden float according as a smooth or a smooth or a sandy granular texture is required Excessive troweling or

overworking the float shall be avoided. All corners, arises, angles and junctions shall be truly vertical or horizontal as the case may be and shall be carefully finished. Hounding or chamfering, corners, arises junctions etc. shall be carried out with proper templates to be size required.

- 2.3.2. Cement plaster shall be used within half an hour after addition of water and 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 arises. It shall not be closed on the body of features such as plaster bands and cornices not at the corners or arises. 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 matting or gunny bags oh the outside of the plaster and keeping them wet.
- 2.3.5. The plastering work shall be in single coat on rough (similar) side of single or half brick walls for interior plastering up to floor two level, finished even and smooth **in C.M. 1:4** complete.
- 2.3.6 The coat of cement and fine sand mortar of proportion 1:1 (15 mm thick about) shall be applied to the plastered surface with a trowel to provide uniform texture while the base coat is still plastic.
- 2.3.7. In any continuous face of wall the finishing treatment should be carried out continuously and day lo day breaks made to coincide with architectural breaks in order to avoid unsightly Junctions
- 2.3.8. **Curing** : All the plaster work shall be kept damp continuously for a period 7 days.
- 2.3.9. Providing necessary grooves between structural members as directed by Engineer in charge.
- 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 meters unless otherwise specified. Length breadth or height shall be measured correct to a centimeter.

- 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 **15 mm** at any point on this surface.
- 3.4. This item includes plastering for all floors.
- 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, following soffits shall be measured separately.
- 3.7. For jambs, soffits, sills etc. for openings not exceeding 0.5 sq. met each in area for ends of joints 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 manners.
- (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 openings, 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 areas of plaster and / or pointing as the case may be.
- 3.8. For openings having door frames equal to or 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 openings but jambs, soffits and sills shall be measured.
- 3.10 The payment shall be made for a unit of 1.0 sq.mt of work done over and above the finishing of work of base coat.
- 4.0. The rate shall be for a unit of **One sq. meter**.

Item No. 46 :- Providing 15mm thick cement plaster in single coat on rough (similar) side of single or half brick walls for interior plastering upto floor two level and finished even and smooth in cement mortar 1:4 (1 cement : 4 sand) including galvanised iron chicken mesh complete. (Ceiling plaster)

The work shall be executed as per specification of **Item No. 45** except for the item is work of providing 15mm thick cement plaster in single coat on brick/concrete walls for interior plastering upto floor two level and finished even and smooth in cement mortar 1:4 (1-cement : 4 sand) for ceiling.

Measurement shall be taken and paid on Sq.m. basis.

Item No. 47 :- Providing 20mm thick sand faced cement plaster on walls upto height 10 metres above ground level consisting of 12mm thick backing coat of C.M. 1:3 (1-cement : 3-sand) and 8mm thick finishing coat of C.M. 1:1 (1-cement : 1-sand) etc. complete.

1.0. Materials

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

2.0. Workmanship

2.1. The work shall be carried out in the coats. The backing coat (base coat) shall be 12 mm. thick in C.M. 1:3.

2.2. Scaffolding:

Wooden bullies, bamboos, planks, trestles 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.

2.3. Preparation of back ground :

2.3.1. 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 toughened by wire brushing if it is not hard and by hacking if it is hard. In case of concrete surface, if a chemical retarded 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 readers is left on the surface. Trimming of projections on brick/concrete surfaces where necessary shall be carried out to get an even surface.

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

2.3.3. 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.

2.3.4. 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 supports of the ceiling resting on the wall of the floor have been removed. Ceiling plaster shall be completed before starting plaster to walls.

2.4. Application of plaster :

2.4.1. The plaster about 15x15 cms. shall be first applied horizontally and vertically at not more than 2 meters 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 movements at a time. Finally, the surface shall be finished off true with a trowel or wooden float according as a smooth or a smooth or a sandy granular texture is required Excessive troweling or overworking the

float shall be avoided. All corners, arises, angles and junctions shall be truly vertical or horizontal as the case may be and shall be carefully finished.

Hounding or chamfering, corners, arises junctions etc. shall be carried out with proper templates to be size required.

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

2.4.3. 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 arises. It shall not be closed on the body of features such as plaster bands and cornices not at the corners or arises. 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.

2.4.4. 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 matting or gunny bags oh the outside of the plaster and keeping them wet.

2.4.5. Before the first coat hardens its surface shall be beaten up by edges of wooden tapers and close dents shall be made on the surface. The subsequent coat shall be applied after this coat has been allowed to set for 3 to 5 days, depending upon the weather conditions. The surface shall not be allowed to dry during this period.

2.4.6. The second coat shall be completed to 8 mm. thickness in C.M. 1:1 as described above, including raising sand facing by bushing. The sample of sand face shall be got approved before the work is started. The whole work shall be carried out uniformly as per sample approved.

2.4.5. The plastering work shall be in single coat on rough side of half brick wall for interior plastering up to floor two level, finished even and smooth in C.M. 1:3.

2.4.6 Curing :

The curing shall be started overnight after finishing of plaster. The plaster shall be kept wet for a period of 7 days. During this period, it shall be protected from all damages.

2.4.7. The finishing shall be gutkha finishing with 1 cm x 1 cm grooves shall be done as directed.

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 meters unless otherwise specified. Length breadth or height shall be measured correct to a centimeter.
- 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 20 mm at any point on this surface. This item includes plastering up to floor two level including making necessary cornices as directed.
- 3.4. 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.
- 3.5. Soffits of stairs shall be measured as plastering on ceilings, following soffits shall be measured separately.
- 3.6. For jambs, soffits, sills etc. for openings not exceeding 0.5 sq. met each in area for ends of joints 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 manners.
- (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 openings, 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 areas of plaster and / or pointing as the case may be.
- 3.7. For openings having door frames equal to or projecting beyond the thickness of wall, full deduction for opening shall be made from each plastered face of the wall.
- 3.8. In case of openings of area above 3 sq. mt. each, deduction shall be made for openings but jambs, soffits and sills shall be measured.
- 3.9. The rate shall be for a unit of **One Sq. meter. No extra payment for making necessary cornices shall be made.**

Item No. 48 :- Providing throating or plaster drip and moulding to R.C.C. Chhajja.

1.0 Materials

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.** The work shall be carried out as directed. The proportion of mix for finishing shall be in C.M. 1:2 by volume. Curing shall be done for not less than 7 days. The work shall be carried out in best workman like manner. The throating or plaster drip and mounding shall be one centimeter in thickness.

3.0 Mode of Measurement & Payment :

- 3.1.** The payment will be made on running meter basis of the finished work.
- 3.2.** All necessary labour, materials equipment etc. shall be provided by the Contractor.
- 3.3** The unit rate plaster drip molding shall include the cost of all materials, tools and plant required for molding and finishing as per direction of the Engineer-in-charge, curing and all other incidental expenses for producing plaster drip molding of specified size to complete the item 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 centering and forms required for the work.
- 3.4** The throttling or plaster drip shall be measured for its length, limiting dimensions to those specified on plan or as directed.
- 3.5** The rate shall be for a unit of one running meter.

Item No. 49 :- Applying two coats of 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 other foreign matter and sand papered smooth. (For Interior wall)

1.0 Materials

Water shall be conform M-1. The acrylic emulsion paint shall conform to I.S.: 5411-1969 (Part-I).

2.0 Workmanship

The painting work shall be of putty and two coats of primer of approved brand & manufactures on new wall surface to give an even shade.

2.1. Scaffolding : Wherever scaffolding is necessary it shall be erected in such a way that as far as possible on part of scaffolding shall rest against the surface to be white or colour washed. A properly secured strong and well tied suspended platform (Zoola) may be used for white washing. Where ladders are used pieces of old gunny bags shall be tied at top and bottom to prevent scratches to the floors and walls. For white washing of ceilings, proper stage scaffolding shall be erected where necessary.

2.2. Preparation of surface : The undecorated surface to be distempered shall be thoroughly brushed from dust, dirt, grease, mortar dropping and other foreign matter and sand papered smooth. New plaster surface shall be allowed to dry for at least 2 months before applications of distemper.

2.2.1. All unnecessary nails shall be removed. Pitting in plaster shall be made good with plaster again with a fine grade sand paper and made smooth. A coat of distemper shall be applied over the patches. The surface shall be allowed to dry thoroughly before the regular coat of distemper is allowed. The surface affected by moulds, moss, fungi, algae lichens, efflorescence etc. shall be treated in accordance with I.S; 2395 (Part 01) 1966. Before applying distempering, any unevenness shall be made good by applying putty made of plaster of paris mixed with water on entire surface including filling up the undulation and then sand papering the same after it is dry.

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 measures : The surface of doors, windows, floors, articles, of furniture etc. and such other parts of the building not to be white washed shall be protected from being splashed upon. Such surfaces shall be cleaned of white wash splashed if any.

3.0 Mode of measurements and 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 item 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 openings not exceeding 0.5 sq.mt. each in area, for ends of joists, posts, beams, girders, steps etc. not exceeding 0.5 sq.mt. each in area and for openings exceeding 0.5 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 joists, 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 not for finish around ends of joints, beams, posts etc.

- 3.3. No deductions for openings exceeding 0.5 sq.mt. but not exceeding 3 sq.mt. each shall be made as follows and no addition will be made for reveals, jambs, soffits etc. of these openings :
- (a) When both the faces of walls are provided with finish, deduction shall be made for one face only. 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.
- (b) 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 to be made for reveals, jambs, soffits, sills etc.
- 3..4 In case of area of openings exceeding 3 sq. mt. each, deductions shall be made for openings but jambs, soffits, sills shall be measured.
- 3.5. No deductions 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 sheets) 10%
- (e) Naintial 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 Extra payment shall be done on ceiling and sloping roofs.
- 3.9. The rate shall include the cost of ail materials, labour, scaffolding, protective measures etc. involved in all the operations described above.
- 4.0 The rate shall be for a unit of **One sq.** meter.
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Item No. 50 :- Applying two coats of 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 other foreign matter and sand papered smooth. (Ceiling Putty)

The relevant specifications of **Item No. 49** shall be followed for the work of **Applying two coats of 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 other foreign matter and sand papered smooth. (Ceiling Putty)**

Item No. 51 :- Wall painting two coats with plastic emulsion paint of approved brand and manufacture on wall surfaces to give an even shade including 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 paint shall conform to I.S.: 5411-1969 (Part-I).

2.0 Workmanship

The painting work shall be for subsequent coat of plastic emulsion paint of approved brand & manufactures on wall surfaces to give an even shade as directed.

2.1. Scaffolding : Wherever scaffolding is necessary it shall be erected in such a way that as far as possible on part of scaffolding shall rest against the surface to be white or colour washed. A properly secured strong and well tied suspended platform (Zoola) may be used for white washing. Where ladders are used pieces of old gunny bags shall be tied at top and bottom to prevent scratches to the floors and walls. For white washing of ceilings, proper stage scaffolding shall be erected where necessary.

2.2. Preparation of surface : The undecorated surface to be distempered shall be thoroughly brushed from dust, dirt, grease, mortar dropping and other foreign matter and sand papered smooth. New plaster surface shall be allowed to dry for at least 2 months before applications of distemper.

2.2.1. All unnecessary nails shall be removed. Pitting in plaster shall be made good with plaster again with a fine grade sand paper and made smooth. A coat of distemper shall be applied over the patches. The surface shall be allowed to dry thoroughly before the regular coat of distemper is allowed. The surface affected by moulds, moss, fungi, algae lichens, efflorescence etc. shall be treated in accordance with I.S; 2395 (Part 01) 1966. Before applying distempering, any unevenness shall be made good by applying putty made of plaster of paris mixed with water on entire surface including filling up the undulation and then sand papering the same after it is dry.

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 measures : The surface of doors, windows, floors, articles, of furniture etc. and such other parts of the building not to be white washed shall be protected from being splashed upon. Such surfaces shall be cleaned of white wash splashed if any.

3.0 Mode of measurements and 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 item 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 openings not exceeding 0.5 sq.mt. each in area, for ends of joists, posts, beams, girders, steps etc. not exceeding 0.5 sq.mt. each in area and for openings exceeding 0.5 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 joists, 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 not for finish around ends of joints, beams, posts etc.

- 3.3.** No deductions for openings exceeding 0.5 sq.mt. but not exceeding 3 sq.mt. each shall be made as follows and no addition will be made for reveals, jambs, soffits etc. of these openings :
- (a) When both the faces of 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 otherside. 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 to be made for reveals, jambs, soffits, sills etc.
- 3.4** In case of area of openings exceeding 3 sq. mt. each, deductions shall be made for openings but jambs, soffits, sills shall be measured.
- 3.5.** No deductions 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 sheets) 10%
- (e) Naintial 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** Extra payment shall be done on ceiling and sloping roofs.
- 3.9.** The rate shall include the cost of ail materials, labour, scaffolding, protective measures etc. involved in all the operations described above.
- 4.0** The rate shall be for a unit of **One sq.** meter.

Item No. 52 :- Finishing wall with weather proof exterior emulsion paint on wall surface (two coats) to give an required shape even shade after thoroughly brushing surface to remove all dirt, dust and remains of loose powdered materials etc. complete.

General

This work shall consist of painting the walls with weather proof exterior emulsion paint on exterior wall surfaces of the shape and dimensions shown on the drawings and conforming to these specifications or as approved by the Engineer in charge.

MATERIALS

1.0 Exterior emulsion paint

Exterior emulsion paint shall be of specified colour as approved by Engineer in charge the ready mixed exterior emulsion paint shall not be allowed, If however ready mix emulsion paint of specified shade or tint is not available white ready mixed paint with approved Steiner will be allowed in such case the contractor shall ensure that the shade of the paint so allowed shall be uniform exterior emulsion paint shall meet with the following general requirements

1. Exterior emulsion paint shall not show excessive setting in freshly opened full can and shall easily be redepressed with a paddle to a smooth homogeneous state. The exterior emulsion paint shall show no curding, livering cracking or colour separation and shall be free from lumps and skins.
2. The exterior emulsion paint as received shall brush easily possess good leveling properties and show no running or sagging tendencies.
3. The exterior emulsion paint shall not skin within 48 hours in a three quarters filled closed container.
4. The exterior emulsion paint shall dry to a smooth uniform finish free from roughness grit unevenness and other imperfections.
5. Ready mix exterior emulsion paint if allowed for specified shade, shall be used exactly as received from the manufacturers and generally according to their instruction and without any admixtures whatsoever.

2.0 WORKMAN SHIP

2.1 Scaffolding :

Where scaffolding is required, it shall be erected in such a way that as far as possible no part of scaffolding shall rest against the surface to be distempered. A properly secured strong and well tied suspended platform (joola) may be used for distempering. Where ladders are used, pieces of old gunny bags.

3.0 Application coat :

The exterior emulsion paint on exterior wall surfaces shall be diluted with water or any other prescribed thinner in a manner recommended by the manufacturer only. Sufficient quantity of distemper required for a day's work shall be prepared.

- 3.1 For undecorated surfaces, after the primer coat is dried for at least 48 hours, the surface shall be lightly sand papered to make it smooth for receiving the exterior emulsion paint, taking care not to rub out the priming coat. All loose particles shall be dusted off after rubbing. Minimum two coats of the exterior emulsion paint shall be applied with brushes in horizontal strokes followed immediately by vertical strokes which together shall constitute one coat. The subsequent coats shall be applied after a time interval of at least 24 hours between consecutive coats to permit proper drying of the preceding coat. The finished surface shall be even and uniform without patches, brush marks, distemper drops etc.
- 3.2 Sufficient quantity of the exterior emulsion paint shall be mixed to finish one room at a time.
- 3.0 **MODE OF MEASUREMENT & PAYMENT :**
- 3.1. The unit rate wall painting with exterior emulsion paint and including a primary coat with alkali resistance primer of approved brand shall include the cost of all materials, tools and plant required for mixing, cleaning brushing sand papering & painting with all required specials and Lapi compound, finishing as per direction of the Engineer-in-charge, and all other incidental expenses for producing pipe line 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 rate of wall painting with exterior emulsion paint shall include the cost of all labour, materials tools and plant scaffolding and all incidental expenses as described herein above.
- 3.3. The wall painting with exterior emulsion paint shall be measured for its length and height limiting dimensions to those specified on plan or as directed. The rate shall be for a unit of one square meter.
- 3.4. The payment will be made on **square meter** basis of the finished work.

Item No. 53 :- Wall painting two coats with plastic emulsion paint of approved brand and manufacture on wall surfaces to give an even shade including thoroughly brushing the surface free from mortar droppings and other foreign matter and sand papered smooth on ceiling.

The work shall be executed as per specification of **Item No. 51** except the work is for **Wall painting two coats with plastic emulsion paint of approved brand and manufacture on wall surfaces to give an even shade including thoroughly brushing the surface free from mortar droppings and other foreign matter and sand papered smooth on ceiling.**

Item No. 54 :- Providing, laying and jointing in true line and level I.S.I. mark 40mm dia. U.P.V.C pipe (Sch-40) for cold water including fitting as approved by Engineer in charge. Pipe shall be fixed on the wall with held of clamp at every two meter c/c or shall be concealed as directed including necessary fitting etc. including testing of pipe and joints and fixing the same with adhesive solvent including cost of all materials.

1.0. Materials

- 1.1. The pipes shall be standard I.S.I. mark U.P.V.C. pipe (SCH-40) of specified dia.
- 1.2. The fittings, clamps etc. required for specified dia. bore pipes shall be of best quality and makes as approved by the Engineer-in-charge. Necessary accessories with inner/ outer brass thread shall be used as required and instruction by Engineer in charge.

2.0. Workmanship

2.1. Cutting, Laying & Jointing

- 2.1.1. When the tubes are to be cut or rethreaded, the ends shall be carefully filed out so that no obstruction to bore in offered. The ends of the tubes shall then be threaded conforming to the requirements of I.S. 554-1955 with pipe dies and taps carefully in such a manner that it will not result in slackness of joints when the two pieces are screwed together.
- 2.1.2. The taps and dies shall be used only for straightening screw threads which have becoming bent or damaged and shall not be used for turning of the threads so as to make them slack as the latter procedure may not result in the water tight joint. The screw threads for tube and fitting shall be protected from edge until they are fitted.
- 2.1.3. In jointing the tubes, the inside of the socket and the screwed end of the tubes shall be oiled and smeared with white or red lead and wrapping around with a few turns of fine spun yarn round the screwed end of the tube. The end shall then be tightly screwed in the socket, tees, etc. with a pipe wrench. Care shall be taken that all times free from dust and dirt during fixing. But from the joints shall be removed after screwing. After laying the open ends of the pipes shall be temperately plugged to prevent access of water, soil, or any other foreign matter. Jointing shall be carried out with proper chemical adhesive material and allow to dry.
- 2.1.4. Any threads exposed after jointing shall be painted or in the case of underground piping thickly coated with approved anti-corrosive paint to prevent corrosion.

2.2. Fixing concealed to wall, ceiling & floors.

- 2.2.1. In case of fixing concealed cement point to walls or ceilings, these shall run on the surface of the wall, or ceiling (not in chase) unless otherwise specified. The fixing shall be done by means of standard pattern, holder clamps keeping the pipes about 15 mm. clear of the wall. When it is found necessary to pattern, holder clamps keeping the pipes about 15 mm. clear of the wall. When it is found necessary to conceal the pipes and when specified so, chasing may be adopted or pipe fixed

inducts or recesses etc. provided that there is sufficient space to work on the pipe with usual tools. The pipe shall not ordinarily be buried in walls or solid floors, where unavoidable, pipe may be buried for short distances provided that adequate protection is given against damage and where so required joints are not buried. Where required M.S. tube sleeve shall be fixed at a place a pipe is peasant through a wall or floor for expansion and contraction and other movements. In case the pipe is embedded in walls or floors, it should be painted with anti-corrosive bitumastic paint of approved quality. The pipe should not come in contact with lime mortar or lime concrete as the pipe is affected by lime. Under the floors, the pipe shall be laid in layer of sand filling.

- 2.2.2.** All pipes and fittings shall be fixed truly vertical and horizontal unless unavoidable. The pipes shall be fixed to walls with standard pattern clamps of required size and shape, one end of which shall be properly plugged or cemented into walls with cement mortar 1:3 (1 cement : 3 coarse sand) and the other tightened round the pipes to hold it securely. These clamps shall be spaced at regular intervals in straight lengths at 2 MC/C interval in horizontal run and 2.5 m. interval in vertical run. For pipe of 15 mm. dia. up to 25 mm. dia the holes in the walls and floors shall be made by drilling with chisel or jumper and not by dismantling the brick work or concrete. However for bigger diameter pipes the holes shall be carefully made (1 cement : 3 coarse sand), and properly finished to match the adjacent surface.

2.3. Testing of joints :

- 2.3.1.** After laying and jointing, the pipes and fillings shall be inspected under working conditions of pressure and flow. Any joints found liken shall be redone, and ail leaking pipes removed and replaced without extra cost.
- 2.3.2.** The pipes and fittings after they are laid shall be tested to hydraulic pressure of 6 Kg./Sq cm. The pipe shall be slowly and carefully charged with water allowing all air to escape and avoiding all shocks and water hammer. The draw off takes and stop cock shall then be closed and specified hydraulic pressure shall be applied gradually. The pressure gauge must be accurate. The pipes and fittings shall be tested in sections as the work laying proceeds, keeping, the joints exposed for inspection during the testing.

3.0. Mode of measurements and payment

- 3.1.** The description of the item shall, unless otherwise stated be held to include where necessary conveyance and delivery, handling, unloading, storing fabrication, hoisting, all labour for finishing to required shape and size, setting, fitting in position straight, cutting and waste return of packing etc.

- 3.2. The length shall be measured on running meter basis of finished work. The length shall be taken along the centre line of the pipe and fittings. The pipes fixed to wall, ceiling, floors etc shall be measured and paid under this item.
- 3.3. All the work shall be measured in decimal system as fixed in its place, subject to tolerance given below unless otherwise stated.
- (i) Dimension shall be measured to the nearest 0.01 meter.
- (ii) Area shall be worked out to the nearest 0.01 sq. meter.
- 3.4. All measurements of cutting shall unless otherwise stated be held to include the consequent waste.
- 3.5. In case of fitting of unequal bore, the target bore shall be measured for the test.
- 3.6. Testing of pipe lines fittings, and joints include for providing all plant appliances necessary for obtaining access to the work to be tested and carrying out the tests.
- 3.7. The rate includes U.P.V.C. pipe (SCH-40) with screwed socket joints to gather with all fittings (such as bends, sockets, springs, elbows, tees, crosses, short pieces, clamps and plugs, unions etc.) and fixing complete with clamping wall hooks, wooden plug etc. and also curing, screwing and waste and for making forged (or hand made) bends on piping as required. Connector shall be inserted where required or directed. The rate also includes cutting through walls, floors etc. and their making good and painting exposed threads with anti-corrosive paint as above and testing where tubes are to be fixed to wall, ceiling and flooring, the rates shall not include painting of pipes, providing sleeves and sand filling under floor for which separate payment shall be made.
- 3.8. The rate shall be for a unit of one running meter.

Item No. 55 :- Providing, laying and jointing in true line and level I.S.I. mark 32mm dia. U.P.V.C pipe (Sch-40) for cold water including fitting as approved by Engineer in charge. Pipe shall be fixed on the wall with held of clamp at every two meter c/c or shall be concealed as directed including necessary fitting etc. including testing of pipe and joints and fixing the same with adhesive solvent including cost of all materials.

The work shall be executed as per specification of **Item No. 54** except for the item is work of providing, laying and jointing in true line and level I.S.I. mark 32mm dia. U.P.V.C pipe (Sch-40) for cold water including fitting as approved by Engineer in charge. Pipe shall be fixed on the wall with held of clamp at every two meter c/c or shall be concealed as directed including necessary fitting etc. including testing of pipe and joints and fixing the same with adhesive solvent including cost of all materials.

Measurement shall be taken and paid on Rmt. basis.

Item No. 56 :- Providing, laying and jointing in true line and level I.S.I. mark 15mm dia. U.P.V.C pipe (Sch-40) for cold water including fitting as approved by Engineer in charge. Pipe shall be fixed on the wall with held of clamp at every two meter c/c or shall be concealed as directed including necessary fitting etc. including testing of pipe and joints and fixing the same with adhesive solvent including cost of all materials.

The work shall be executed as per specification of **Item No. 54** except for the item is work of providing, laying and jointing in true line and level I.S.I. mark 15mm dia. U.P.V.C pipe (Sch-40) for cold water including fitting as approved by Engineer in charge. Pipe shall be fixed on the wall with held of clamp at every two meter c/c or shall be concealed as directed including necessary fitting etc. including testing of pipe and joints and fixing the same with adhesive solvent including cost of all materials.

Measurement shall be taken and paid on Rmt. basis.

Item No. 57 :- Providing and fixing concealed center point to wall, ceiling and floor I.S.I. mark C.P.V.C. (SDR 13.5) PIPE having National Sanitation Foundation (NSF) seal for potable water of following dia. nominal bore tube fittings and clamps including making good the wall, ceiling and floor etc. complete. (F) 50 mm dia.

1.0. Materials

- 1.1. The pipes shall be standard C.P.V.C. (SDR 13.5) pipe having National Sanitation Foundation (NSF) seal for potable water of specified dia.
- 1.2. The fittings, clamps etc. required for specified dia. bore pipes shall be of best quality and makes as approved by the Engineer-in-charge.

2.0. Workmanship

2.1. Cutting, Laying & Jointing

- 2.1.1. When the tubes are to be cut or rethreaded, the ends shall be carefully filed out so that no obstruction to bore in offered. The ends of the tubes shall then be threaded conforming to the requirements of I.S. 554-1955 with pipe dies and taps carefully in such a manner that it will not result in slackness of joints when the two pieces are screwed together.
- 2.1.2. The taps and dies shall be used only for straightening screw threads which have becoming bent or damaged and shall not be used for turning of the threads so as to make them slack as the latter procedure may not result in the water tight joint. The screw threads for tube and fitting shall be protected from edge until they are fitted.
- 2.1.3. In jointing the tubes, the inside of the socket and the screwed end of the tubes shall be oiled and smeared with white or red lead and wrapping around with a few turns of fine spun yarn round the screwed end of the tube. The end shall then be tightly screwed in the socket, tees, etc. with a pipe wrench. Care shall be taken that all times free from dust and dirt during fixing. But from the joints shall be removed after screwing. After laying the open ends of the pipes shall be temperately plugged to prevent access of water, soil, or any other foreign matter.
- 2.1.4. Any threads exposed after jointing shall be painted or in the case of underground piping thickly coated with approved anti-corrosive paint to prevent corrosion.
- 2.2. **Fixing of tube fittings to wall, ceiling & floors.**
 - 2.2.1. In case of fixing of tubes and fittings concealed center point to the walls or ceilings, these shall run on the surface of the wall, or ceiling (not in chase) unless otherwise specified. The fixing shall be done by means of standard pattern, holder clamps keeping the pipes about 15 mm. clear of the wall. When it is found necessary to pattern, holder clamps keeping the pipes about 15 mm. clear of the wall. When it is found necessary to conceal the pipes and when specified so, chasing may be adopted or pipe fixed in ducts or recesses etc. provided that there is sufficient space to work on the pipe with usual tools. The pipe shall not ordinarily be buried in walls

or solid floors, where unavoidable, pipe may be buried for short distances provided that adequate protection is given against damage and where so required joints are not buried. Where required M.S. tube sleeve shall be fixed at a place a pipe is peasant through a wall or floor for expansion and contraction and other movements. In case the pipe is embedded in walls or floors, it should be painted with anti-corrosive bitumastic paint of approved quality. The pipe should not come in contact with lime mortar or lime concrete as the pipe is affected by lime. Under the floors, the pipe shall be laid in layer of sand filling.

- 2.2.2.** All pipes and fittings shall be fixed truly vertical and horizontal unless unavoidable. The pipes shall be fixed to walls with standard pattern clamps of required size and shape, one end of which shall be properly plugged or cemented into walls with cement mortar 1:3 (1 cement : 3 coarse sand) and the other tightened round the pipes to hold it securely. These clamps shall be spaced at regular intervals in straight lengths at 2 MC/C interval in horizontal run and 2.5 m. interval in vertical run. For pipe of 15 mm. dia. up to 25 mm. dia the holes in the walls and floors shall be made by drilling with chisel or jumper and not by dismantling the brick work or concrete. However for bigger diameter pipes the holes shall be carefully made (1 cement : 3 coarse sand), and properly finished to match the adjacent surface.

2.3. Testing of joints :

- 2.3.1.** After laying and jointing, the pipes and fillings shall be inspected under working conditions of pressure and flow. Any joints found liken shall be redone, and ail leaking pipes removed and replaced without extra cost.
- 2.3.2.** The pipes and fittings after they are laid shall be tested to hydraulic pressure of 6 Kg./Sq cm. The pipe shall be slowly and carefully charged with water allowing all air to escape and avoiding all shocks and water hammer. The draw off takes and stop cock shall then be closed and specified hydraulic pressure shall be applied gradually. The pressure gauge must be accurate. The pipes and fittings shall be tested in sections as the work laying proceeds, keeping, the joints exposed for inspection during the testing.

3.0. Mode of measurements and payment

- 3.1.** The description of the item shall, unless otherwise stated be held to include where necessary conveyance and delivery, handling, unloading, storing fabrication, hoisting, all labour for finishing to required shape and size, setting, fitting in position straight, cutting and waste return of packing etc.
- 3.2.** The length shall be measured on running meter basis of finished work. The length shall be taken along the centre line of the pipe and fittings. The pipes fixed concealed center point to wall, ceiling. floors etc shall be measured and paid under this item.

- 3.3. All the work shall be measured in decimal system as fixed in its place, subject to tolerance given below unless otherwise stated.
- (i) Dimension shall be measured to the nearest 0.01 meter.
- (ii) Area shall be worked out to the nearest 0.01 sq. meter.
- 3.4. All measurements of cutting shall unless otherwise stated be held to include the consequent waste.
- 3.5. In case of fitting of unequal bore, the target bore shall be measured for the test. Testing of pipe line fittings, and joints include for providing all plant appliances necessary for obtaining access to the work to be tested and carrying out the tests.
- 3.6. The rate includes C.P.V.C. (SDR 13.5) pipe having National Sanitation Foundation (NSF) seal for potable water with screwed socket joints to gather with all fittings (such as bends, sockets, springs, elbows, test, crosses, short pieces, clamps and plugs, unions etc.) and fixing complete with clamping wall hooks, wooden plug etc. and also curing, screwing and waste and for making forged (or hand made) bends on piping as required. Connector shall be inserted where required or directed. The rate also includes cutting through walls, floors etc. and their making good and painting exposed threads with anti-corrosive paint as above and testing where tubes are to be fixed to wall, ceiling and flooring, the rates shall not include painting of pipes, providing sleeves and sand filling under floor for which separate payment shall be made.
- 3.7. The rate shall be for a unit of one running meter.

Item No. 58 :- Providing and fixing concealed center point to wall, ceiling and floor I.S.I. mark C.P.V.C. (SDR 13.5) PIPE having National Sanitation Foundation (NSF) seal for potable water of following dia. nominal bore tube fittings and clamps including making good the wall, ceiling and floor etc. complete. (B) 25 mm dia.

The work shall be executed as per specification of **Item No. 57** except for the item is work of providing and fixing concealed center point to wall, ceiling and floor I.S.I. mark C.P.V.C. (SDR 13.5) PIPE having National Sanitation Foundation (NSF) seal for potable water of following dia. nominal bore tube fittings and clamps including making good the wall, ceiling and floor etc. complete. (B) 25 mm dia.

Measurement shall be taken and paid on Rmt. basis.

Item No. 59 :- Providing, laying and jointing in true line and level I.S.I. mark 110mm diameter U.P.V.C. SWR Type B pipe conforming to IS 13592 -1992 with one end plain and other end socketed with rubbering & fitting conforming to ISI 14735-1999 of approved make for drainage system pipe line, pipe shall be jointed with each other with rubber lubricant, pipe shall be fixed on wall using of PVC clamp of the size 110mm diameter x 149mm length x 145mm high at every 2000mm center to center or shall be concealed in wall as directed including necessary fitting such as bends, shoes etc. including testing of pipe and joints and jointed with adhesive solvent cement including cost of all materials.

1.0. Materials

- 1.1.** The specified dia. of **U.P.V.C. SWR Type B pipe conforming to IS 13592-1992 (I.S.I.)** shall conform M-68.

2.0. Workmanship

- 2.1.** Asbestos cement rain water pipes and fittings shall be of the diameter, size and type specified in the item. The pipe shall be full lengths of 2 meter as far as possible. All the pipes shall be fixed on wall face at locations indicated on drawings or as ordered by the Engineer-in-charge. Pipe shall be secured to face of wall below all joints by M.S. clamps with wooden gut ties.
- 2.2.** The spigot of the upper pipe shall be properly fitted into the socket of the lower pipe such that there is uniform annular space for fitting with the jointing materials. One third depth of annular space between the item. The pipe shall be full lengths of 2 meter as far as possible. All the pipes shall be fixed on wall face at locations indicated on drawings or as ordered by the Engineer-in-charge. Pipe shall be secured to face of wall below all joints by M.S. clamps with wooden gut ties.
- 2.2.** The spigot of the upper pipe shall be properly fitted into the socket of the lower pipe such that there is uniform annular space for fitting with the jointing materials. One third depth of annular space between the socket and the spigot shall be filled with spun-yarn soaked in bitumatic jointing compound and shall be pressed home by means of caulking tool. The remaining 2/3 depth of the joints shall be filled in with stiff cement mortar 1:2 and shall be pressed with caulking tool and finished smooth at top at an angle of 45 sloping up.
- 2.3** The joints shall be filled with cement mortar 1:2 (1 cement : 2 sand) span spun yarn. The joints shall be filled with cement mortar 1.2 (1 cement : 2 sand) and spurn yarn. The pipes without care shall be fixed to wall with M.S. clamps The pipes will earns shall be secured with 40 mm before steel or iron barrel distance pieces or boils and stout galvanised iron nails 10 cms long into hand wool plug fixed in walls. Access doors to fittings shall be provided with 3 mm. rubber insertion packing and secured without screws to made air and water tight
- 2.4.** All soil pipes shall be earned up above the roof and shall have a wire ball on guarded or a cowl.
- 2.5.** The ventilating pipe or shaft shall be carried out to a height of at least one meter above the outer covering of the roof of the building or in the case of windows in a gable wall or a dormer windows, it shall carried up to a ridge of the roof or at least tow meters above the top of the windows. In case of flat roof to which access for use is provided, it

shall be carried out up to a height of at least one meter above the parapet or two meters measured vertically from the top of any windows or opening which any exist up to a horizontal distance of five meters from the vent pipe into such building and in no case shall be carried out to a height less than three meters.

2.6. Where ventilating pipes are carried in pipe shafts, the shaft shall be of a minimum size of one meter. If the shafts are also used to give light and air to rooms, the ventilating pipes must be carried out to a horizontal distance at roof level not less than five meters from the site of the shaft.

2.7. The sand cast iron pipes above parapet shall be fixed with M.S. clamps and stays. The clamps shall be made from 1.5 mm. thick MS flat or 3 mm. width band to the required shape and size to fit tightly on the sockets when tightened with screw bolts. It shall be formed of two semi circular pieces with flanged ends on both sides, with holes to fit in the screw bolts and nuts 40 mm. dia.

M.S. Bars, One end of the stay shall be bent to form a hook to be fixed with clamps by means of bolts and the other end shall be bent for embedding in wall in cement concrete block of size 200 mm. x 100 mm. x 100 mm. in 1:2:4 mix. The concrete shall be finished to match the surrounding surfaces.

2.8. The connection between the main pipe and branch pipes shall be made by using branches and bends with access doors for cleaning

2.9. The waste from lavatories, kitchens basins, sinks, baths and other floor traps shall be separately connected to respective stacks of upper floor. The waste stack of lavatories shall be connected directly to main hole while the waste stack of other shall be separately discharged over gulley trap.

3.0. Mode of measurements and payment

3.1. The length of pipe shall be measured including all fittings along its length in running meters correct to a centimeter. No allowance shall be made for the portion of pipe length entered in the sockets of the adjacent pipe or fittings.

3.2. The rate includes all labour and materials, tools and plant etc. required for satisfactory completion of this item.

3.3. The rate shall be for a unit of One running meter.

Item No. 60 :- Providing and fixing screw down bib taps of following size (A) Brass chromium plated screw down bib tap (i) 15mm dia. as approved by Engineer in charge for all floors.

General

This work shall consist of providing and fixing screw down quarter turn bib taps of the shape and dimensions shown on the drawings and conforming to these specifications or as approved by the Engineer in charge.

1.0 MATERIAL

1.0 Bib Cock

1.1. Bib cock of specified 15 mm diameter nominal bore shall conform to I.S. 781-1977. The Bib Cock shall be best Indian make and quality.

1.2 Bib cock shall be brass chromium plated screw down of best quality.

1.3 A Bib cock is a draw off tap with a horizontal inlet and free outlet. A stop cock is a valve with a suitable means of connection of insertion in a pipe line for controlling or stopping the flow.

1.4 They shall be screw down type and or brass chromium plated screw down and of diameter as specified in the description of the item. They shall conform to I.S 781-1977 and they shall be of best Indian make. They shall be chromium plated.

1.5 The minimum finished weight of bib cock and stop cock shall be as given below

Diameter	Bib cock	Stop Cock	Diameter	Bib cock	Stop cock
8 mm	0.25 kg.	0.25 kg.	15 mm	0.40 kg.	0.40 kg.
10 mm	0.30 kg.	0.35 kg.	20 mm	0.75 kg.	0.75 kg.

1.6. The Necessary galvanized fittings like Nipple, Casing etc, of best quality and makes as approved by the Engineer-in-charge required for specified dia. bore Bib cock shall be used for fitting Bib cock as necessary.

2.0. WORKMANSHIP

Curing, Laying & Jointing

2.1. When the Bib cock is to be fitted, the ends shall be carefully filed out so that no obstruction to bore is offered. The Bib cock shall be fitted with pipes carefully in such a manner as will not result in slackness of joints when the two pieces are screwed together.

2.2 In jointing the Bib cock the inside of the socket and the screwed end of the Bib cock shall be oiled and smeared with the white or red lead and wrapping around with a few turns of fine spun yarn round the screwed end of the Bib cock. The end shall then be tightly screwed in the socket, Tees etc with a pipe wrench Care shall be taken that all items are free from dust, dirt and rust during fixing Burr from the joints shall be removed after screwing After laying the open

ends of the Bib cock shall be temporarily plugged to prevent excess of water soil or any other foreign matter.

2.3. Any threads exposed after jointing shall be painted or in the case of underground piping thickly coated with approved anti corrosive paint to prevent corrosion

TESTING OF JOINTS

After fitting, the Bib cocks shall be inspected under working conditions of pressure and flow. Any joints found leaky shall be redone, and all leaking Bib cocks shall be removed and replaced without extra cost.

The Bib cocks after they are fitted shall be tested to hydraulic pressure of 6 kg / sq. cm. The Bib cock shall be slowly and carefully charged with water allowing all air to escape and avoiding all shock and water hammer. The draw off takes and stop cock shall then be closed and specified hydraulic pressure shall be applied gradually. The Bib cocks shall be tested in sections as the work laying proceeds, keeping the joints exposed for inspection during the testing.

3.0 MODE OF MEASUREMENT & PAYMENT :

3.1. The unit rate of quarter turn bib cock 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 Bib cock 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 bib cocks 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 including testing.

3.2. The bib cock 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. 61 :- Providing and fixing screw down bib taps of following size (A) Brass screw down bib tap polished bright (ii) 20mm dia. as approved by Engineer in charge for all floors.

General

This work shall consist of providing and fixing screw down bib taps of the shape and dimensions shown on the drawings and conforming to these Specifications or as approved by the Engineer in charge.

1.0 MATERIAL

1.0 Bib Cock

1.1. Bib cock of specified 20 mm diameter nominal bore shall conform to I.S. 781-1977. The Bib Cock shall be best Indian make and quality.

1.2 Bib cock shall be brass polished bright of best quality.

1.3 A Bib cock is a draw off tap with a horizontal inlet and free outlet. A stop cock is a valve with a suitable means of connection of insertion in a pipe line for controlling or stopping the flow.

1.4 They shall be screw down type and or brass polished bright and of diameter as specified in the description of the item. They shall conform to I.S 781-1977 and they shall be of best Indian make. They shall be polished bright.

1.5 The minimum finished weight of bib cock and stop cock shall be as given below

Diameter	Bib cock	Stop Cock	Diameter	Bib cock	Stop cock
8 mm	0.25 kg.	0.25 kg.	15 mm	0.40 kg.	0.40 kg.
10 mm	0.30 kg.	0.35 kg.	20 mm	0.75 kg.	0.75 kg.

1.6. The Necessary galvanized fittings like Nipple, Casing etc, of best quality and makes as approved by the Engineer-in-charge required for specified dia. bore Bib cock shall be used for fitting Bib cock as necessary.

2.0. WORKMANSHIP

Curing, Laying & Jointing

2.1. When the Bib cock is to be fitted, the ends shall be carefully filed out so that no obstruction to bore in offered. The Bib cock shall be fitted with pipes carefully in such a manner as will not result in slackness of joints when the two pieces are screwed together.

2.2 In jointing the Bib cock the inside of the socket and the screwed end of the Bib cock shall be oiled and smeared with the white or red lead and wrapping around with a few turns of fine spun yarn round the screwed end of the Bib cock. The end shall then be tightly screwed in the socket, Tees etc with a pipe wrench Care shall be taken that all items are free from dust, dirt and rust during fixing Burr from the joints shall be removed after screwing After laying the open

ends of the Bib cock shall be temporarily plugged to prevent excess of water soil or any other foreign matter.

2.3. Any threads exposed after jointing shall be painted or in the case of underground piping thickly coated with approved anti corrosive paint to prevent corrosion

TESTING OF JOINTS

After fitting, the Bib cocks shall be inspected under working conditions of pressure and flow. Any joints found leaky shall be redone, and all leaking Bib cocks shall be removed and replaced without extra cost.

The Bib cocks after they are fitted shall be tested to hydraulic pressure of 6 kg / sq. cm. The Bib cock shall be slowly and carefully charged with water allowing all air to escape and avoiding all shock and water hammer. The draw off takes and stop cock shall then be closed and specified hydraulic pressure shall be applied gradually. The Bib cocks shall be tested in sections as the work laying proceeds, keeping the joints exposed for inspection during the testing.

3.0 MODE OF MEASUREMENT & PAYMENT :

3.1. The unit rate of bib cock 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 Bib cock 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 bib cocks 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 including testing.

3.2. The bib cock 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. 62 :- Providing and fixing pillar tap, capstan head screw down high pressure with screw, shanks and back nuts (B) 20mm dia. as directed by Engineer in charge.

1.0 Materials : The capstan head, pillar tap of specified dia. of C.P. brass shall be best quality and shall conform to I.S. : 1975 - 1961. The pillar taps shall be tested quality & as approved by Engineer in charge.

2.0 Workmanship

2.1. The capstan head pillar tap of specified dia. shall be fixed as directed with required washers of selected leather or rubber asbestos composition or of plastic as directed. The cock shall be fixed with pipe line white Zink end spun yarn, to make joint water tight. The work shall be carried out in best workman like manner.

3.0 Mode of measurements and payment

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

Item No. 63 :- Providing and fixing chromium plated brass half turn flush cock of approved quality including fixing in pipe line etc. complete. (ii) 25mm dia. as directed by Engineer in charge.

1.0 Materials : Chromium plated brass half turn flush cock shall conform to M-67.

2.0 Workmanship

The chromium plated brass half turn flush cock of specified diameter shall be fixed as directed. The flush cock shall be fixed in G.I. pipe line with necessary fittings. The joints shall be made leak proof by using spun yarn and white Zink.

2.1 All pipes and fittings shall be fixed truly vertical and horizontal unless unavoidable. The pipes shall be fixed to walls with standard pattern clamps of required size and shape, one end of which shall be properly plugged or cemented into walls with cement mortar 1:3 (1 cement : 3 coarse sand) and the other tightened round the pipes to hold it securely. These clamps shall be spaced at regular intervals in straight lengths at 2 MC/C interval in horizontal run and 2.5 m. interval in vertical run. For pipe of 15 mm. dia. up to 25 mm. dia. the holes in the walls and floors shall be made by drilling with chisel or jumper and not by dismantling the brick work or concrete. However for bigger diameter pipes the holes shall be carefully made cement : 3 coarse sand), and properly finished to match the adjacent surface.

2.2. Testing of joints :

2.2.1. After laying and jointing, the pipes and fillings shall be inspected under working conditions of pressure and flow. Any joints found liken shall be redone, and ail leaking pipes removed and replaced without extra cost.

2.3.2. The pipes and fittings after they are laid shall be tested to hydraulic pressure of 6 Kg./Sq cm. The pipe shall be slowly and carefully charged with water allowing all air to escape and avoiding all shocks and water hammer. The draw off takes and stop cock shall then be closed and specified hydraulic pressure shall be applied gradually. The pressure gauge must be accurate. The pipes and fittings shall be tested in sections as the work laying proceeds, keeping, the joints exposed for inspection during the testing.

3.0 Mode of measurements and payment

3.1. The rate includes cost of all materials and labour required for satisfactory completion of this item including fittings.

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

Item No. 64:- Providing and fixing Gun metal check or non-return fullway wheel valve. (E) 40mm dia.

1.0 Materials :

The gun metal check or non return full way wheel valve or specified dia. shall conform to I.S. : 778-1964. The non-return valve shall be of tested quality and approved by Engineer in charge.

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 shall be done by means of bolts nuts and 3 mm. rubber insertions with flaps of spigot and socketed tail pieces, drilled to the same specifications as in case of socket and spigot flanges in case of flanged pipes. The joining shall be done leak proof. All necessary testing should be carried out.

3.0 Mode of measurements and 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. 65 :- Providing and fixing Gun metal check or non-return fullway wheel valve. (C) 25mm dia.

The relevant specifications of **Item No. 64** shall be followed accept for the work of providing and fixing Gun metal check or non-return fullway wheel valve. (C) 25mm dia.

Item No. 66 :- Providing and fixing Kitchen sink with C.I. or M.S. brackets, painted white including cutting holes in walls and making good the same but excluding fittings. (C) Vitreous China Sink (i) 600mm x 450mm x 150mm size.

1.0. Materials

- 1.1.** Kitchen sink of Vitreous china sink having size 600mm x 450mm x 150mm size shall conform to M-63.

2.0. Workmanship

- 2.1.** The Kitchen sink of approved brand and standard as directed by the Engineer in charge. The kitchen sink shall be supported on a pair of M.S. or C.I. brackets fixed in cement mortar 1:3 (1 cement : 3 coarse sand). The M.S. or C.I. brackets shall conform to I.S. 775-1962. The wall plaster on the rear shall be cut to rest over the top edge of the sink. After fixing the sink, plaster shall be made good and the surface finished to match with the existing one.
- 2.2.** The C.P. brass trap and union shall be connected to 32 mm. nominal bore galvanized mild steel waste pipe which shall be suitably bent towards the wall and which shall discharge into an open drain leading to gully-trap or direct into the gully-trap on the ground on 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 surface drain or a floor trap is placed directly under the sink and the waste is discharged to it vertically.
- 2.3.** The height of front edge of the wash basin from the floor level shall be 80 cms.
- 3.0. Mode of measurements & payment**
- 3.1.** The rate includes cost of all labour, materials, tools and plant and other equipment required for satisfactory completion of this item as described in workmanship.
- 3.2.** The rate shall be for a unit of One number.

Item No. 67 :- Providing and fixing washbasin with single hole for pillar tap with C.I. or M.S. brackets painted white including cutting holes and making good the same but excluding fittings. (A) Vitreous china (ii) Flat Back washbasin 550 mm x 400mm size. (i) In white colour.

1.0. Materials

- 1.1. The Vitreous China flat back wash basin shall be 500 mm x 400mm of 1st quality and make as approved by the Engineer-in-charge. The wash basin shall conform to M-59.

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.P. 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 the 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 measurements & payment

- 3.1. The rate includes cost of 32mm dia. C.P. brass waste, 32mm dia. M.I. fisher union, 15 mm brass screw down stop cock, 15mm pillar cock with all labour, materials, tools and plant etc. required for satisfactory completion of this item as specified in workmanship.
- 3.2. The rate shall be for a unit of One number.

Item No. 68 :- Providing and fixing C.P. brass towel rail complete with C.P. brass brackets fixed to wooden plugs with C.P. brass screws. (B) 600 mm x 20 mm size.

1.0. Materials

- 1.1.** The C.P. brass towel rail shall be 600 mm x 20 mm. of best quality as approved by the Engineer-in-charge. The brackets shall be of C.P. brass. The rail shall conform to I.S. 1068-1958.

2.0. Workmanship

- 2.1.** The brackets of the towel rail shall be fixed by means of C.P. brass screws to wooden firmly embedded in the wall with C.M. 1:3 (1 cement : 3 coarse sand). The towel rail shall be fixed as and where directed. All necessary testing should be carried out.

3.0. Mode of measurements and payment

- 3.1.** The rate includes cost of all labour and 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. 69 :- Providing and fixing C.P. brass shower rose with 15mm or 20mm inlet. (A) 100mm dia. each.

1.0. Materials

- 1.1.** C.P. brass overhead shower with arm shall confirm to I S. 2556-1972 Part - XI and of best quality and makes as approved by Engineer-in-charge. The inlet of shower shall be 15 mm dia. as directed.

2.0. Workmanship

- 2.1.** The C.P. brass overhead shower with arm shall be fixed as directed with 15 mm. dia. G.I. inlet pipe as the case may be.

3.0. Mode of measurements and payment

- 3.1.** The rate includes all labours and materials, tools and plant etc. required for satisfactory completion of this item
- 3.2.** The rate shall be for a one number.

Item No. 70 :- Providing and fixing 600mm x 450mm bevelled edge mirror of superior glass mounted on 6mm thick A.C. sheet or plywood sheet and fixing to wooden plug with C.P. brass screws and washers.

1.0. Materials

1.1. The 600 mm. x 450 mm. size mirror shall be of superior glass with edge rounded offer beveled as specified. It shall be free from flaws specks, or bubbles and its thickness shall not be less than 6 mm. The glass for the mirror shall be uniformly silver plated at the back and shall be free from silvering defects Silvering shall have a protective uniform covering of red lead paint. The 6 mm thick ply wood shall conform to M-37. The 6 mm. thick A.C. sheets shall conform to M-24. The 6 mm. thickness of glass shall conform to M-38.

2.0. Workmanship

2.1. The mirror of 600 mm. x 450 mm. size mounted on A.C. Sheet or plywood 6 mm thick with C.P. brass clips shall be fixed as directed, by fixing wooden plugs in wall and C.P. brass screws and washers. The work shall be carried out in best workman like manner.

3.0. Mode of measurements & payment

3.1. The rate includes cost of all labour and 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. 71 :- Providing and laying wash down water closet (European type Wall hung W.C. pan) Florentine series FLS-WHT 0111B including providing and fixing metropole flush cock seat cover, jet wash etc. complete unit of jaquar branch (or equivalent) including installing and fitting as per manufacturers standards by skilled trained plumber including testing etc. complete quality and brand as approved by Engineer in charge.

1.0 Materials

Wash down water closet (European type Wall Hung WC pan) Florentine series FLS-WHT 0111B shall conform to M-60. Cement mortar shall conform to M-11.

2.0 Workmanship

- 2.1.** The closet shall be fixed to the floor by means of 75 mm. long 6.5 mm. diameter counter sunk bolts and nuts embedded in the floor concrete using rubber or before washers so as not to allow any lateral displacement. The joint between the trap with integral 'P' or 'S' trap including Metropole Flush cock seat cover, jet wash etc complete unit of Jaquar Brand (or equivalent) including installing and fitting as per manufacturers standards by skilled trained plumber including testing etc. complete - quality and brand as approved by Engineer in charge.

3.0 Mode of measurements and payment

- 3.1.** The rate shall include the cost of all materials and labour involved in all the operations described under workmanship including testing.
- 3.2.** The rate includes cost of all labour for fixing pans and seat and cover, inlet, connections etc. complete including testing the same. The payment of seat and cover shall be made separately.
- 3.3.** The rate shall be for a unit of One number.

Item No. 72 :- Providing, laying and jointing in true line and level I.S.I. mark 160mm diameter U.P.V.C. (Type B) confirming to IS 13592 -1992 with one end plain and other end socketed with rubbering & fitting confirming to ISI 14735-1999 of approved make for drainage system pipe line, pipe shall be jointed with each other with rubber lubricant, pipe shall be fixed on wall using of PVC clamp of the size 160mm diameter x 210mm length x 196mm high at every 2000mm center to center or shall be concealed in wall as directed including necessary fitting such as bends, shoes etc. including testing of pipe and joints and jointed with adhesive solvent cement including cost of all materials.

The work shall be executed as per specification of **Item No. 59** except for the work of providing, laying and jointing in true line and level I.S.I. mark 160mm diameter U.P.V.C. (Type B) confirming to IS 13592 -1992 with one end plain and other end socketed with rubbering & fitting confirming to ISI 14735-1999 of approved make for drainage system pipe line, pipe shall be jointed with each other with rubber lubricant, pipe shall be fixed on wall using of PVC clamp of the size 160mm diameter x 210mm length x 196mm high at every 2000mm center to center or shall be concealed in wall as directed including necessary fitting such as bends, shoes etc. including testing of pipe and joints and jointed with adhesive solvent cement including cost of all materials.

Measurement shall be taken and paid on Rmt. basis.

Item No. 73 :- Providing and fixing PVC SWR Nahni Trap IS 14735 for drain with jali of the following nominal diameter of self cleansing design with C.I. screwed down of hinged grating including the cost of cutting and making good the walls. (i) 100mm dia.

1.0. Materials

1.1. The PVC SWR Nahni Trap IS 14735 for drain with jali shall conform to M-69. The C.I. hinged or screwed down cover shall be of best quality and approved by Engineer in charge.

2.0. Workmanship

2.1. The PVC SWR Nahni Trap with 100 mm. dia inlet and 50 mm. dia. outlet shall be fixed as per drawing or as directed.

2.2. The PVC SWR Nahni Trap shall be jointed with C.I. pipe, 100 mm. dia. with lead joints. The lead joints shall be done in conformation with I.S. 782-1976.

3.0. Mode of measurements and payment

3.1. The rate includes cost of RCC slab hole, 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. 74 :- Providing and fixing S.W. gully trap with C.I. grating brick masonry chamber and water tight C.I. cover with frame of 300mm x 300 mm size (inside) with standard weight (i) square mouth traps (A) 100 mm x 100 mm size P type.

1.0 Materials : (1) Water shall conform to M-1. (2) Cement mortar of proportion 1:5 shall conform to M-11. (3) Burnt brick shall conform to M-15. (4} The S.W. Gully trap of 150 mm. x 100 mm. size shall confirm to M-70.

2.0 Workmanship

Excavation for gulley 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 specifications of **Item No. 1** of earth work.

Fixing:

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 square and 100 mm. thick. The depth of top of concrete below the ground level shall be 675 mm. The jointing of gulley outlet to the branch drain shall be done similar to jointing of S.W. pipe as described in item as under.

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 a 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 gask in or yarn soaked in neat cement slurry shall first be placed around the spigot to 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 caulked home so as to fill not more than 1/4th of the total depth or (13 mm. in depth) of the socket.

2.3.2. The remainder of the sockets shall be filled with stiff mixture of cement mortar in proportion of one part of cement and one part of sharp sand. When the socket is fillet, a filled shall be formed round the joints with a trowel, forming an angle of 450 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 or "badger". The newly made joints shall be protected, until set, from the sun, dry winds, rain or frost, sacking or other suitable materials which shall be used for the purpose. The mortar shall be cured for 10 days.

2.4. Testing of Joints:

2.4.1. If any leakage is visible the defective part of the work shall be made good at no extra cost. The pipe line shall be tested as directed.

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. Brick masonry chamber : After fixing and testing gulley and branch drain, a brick masonry 300 x 300 mm. inside with bricks in CM 1:5 (1 cement : 5 sand) shall be built with a 100 mm. brick work round off gulley trap from the top of bed concrete up to 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 off so as to slope towards the grating.

3.1. C.I. cover with frame 300 mm x 300 mm. (inside) size shall then be fixed on the top of the brick masonry with C.C. 1:2:4 (1 cement : 2 coarse sand : 4 graded 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 gulley trap.

4.0 Mode of measurements & payment

4.1. The rate includes cost of all labour, materials, tools and plant etc. required for satisfactory completion of this item as described above.

4.2. The rate shall be for a unit of one number basis.

Item No. 75 :- Providing and laying (two level or slopes) and jointing with stiff mixture of cement mortar in proportion 1:1 salt glazed stone ware pipes following nominal internal diameter including testing of pipes and joints etc. complete. 150 mm dia.

1.0 Materials

(1) Water shall conform to M-1 (2) Cement mortar of proportion 1:1 shall conform to M-11. (3) 150 mm. dia. glazed stoneware pipe shall conform to M-71.

2.0 Workmanship

2.1. The width and depth of the trenches for different diameters of the tubes shall be as under, for 15 to 80 mm. dia tube width of trenches shall be 30 cms. and depth of trenches 60 cms,

2.2. All joints, the trench width, shall be widened where necessary. The work of excavation and refilling shall be done true to line, and gradient in accordance with general specifications of earth work in trenches

2.3. The pipes shall be painted with two coats of anti-corrosive bitumastic paint of approved quality. The pipe shall be laid on a layer of 75 mm. sand filled upto 150 mm. above the pipe of so specified. The remaining portion of trench shall be then filled with excavated earth. The surplus shall be disposed off as directed.

2.4. When the excavation is done in rock the bottom shall be cut deep enough to permit the pipe to be laid and cushion of sand 75 mm. in case of bigger diameter of tube where the pressure is very high thrust block of cement concrete 1:2:4 (1 cement : 2 coarse sand : 4 grade stone aggregates of 20 mm nominal size) shall be constructed on all bends to transmit the hydraulic thrust without impairing the ground and spreading it over a sufficient area if so specified.

2.5. Cutting, Laying & Jointing

2.5.1. When the tubes are to be cut or rethreaded, the ends shall be carefully filed out so that no obstruction to bore is offered. The ends of the tubes shall then be threaded conforming to the requirements of I.S. 554-1955 with pipe dies and taps carefully in such a manner that it will not result in slackness of joints when the two pieces are screwed together.

2.5.2. The taps and dies shall be used only for straightening screw threads which have becoming bent or damaged and shall not be used for turning of the threads so as to make them slack as the latter procedure may not result in the watertight joint. The screw threads for tube and fitting shall be protected from edge until they are fitted.

2.5.3. In jointing the tubes, the inside of the socket and the screwed end of the tubes shall be oiled and smeared with white or red lead and wrapping around with a few turns of fine spun yarn round the screwed end of the tube. The end shall then be tightly screwed in the socket, tees, etc. with a pipe wrench. Care shall be taken that all times free

from dust, and dirt during fixing. Buy from the joints shall be removed after screwing. After laying the open ends of the pipes shall be temperately plugged to prevent access of water, soil, or any other foreign matter.

- 2.5.4.** Any threads exposed after jointing shall be painted or in the case of underground piping thickly coated with approved anti-corrosive paint to prevent corrosion.

2.6. Laying :

- 2.6.1.** 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 a even level bed grips being made or left on the bed to receive the sockets of the pipes.

2.7. Jointing:

- 2.7.1.** Tarred gask in or yarn soaked in neat cement slurry shall first be placed around the spigot to 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 caulked home so as to fill not more than 1/4th of the total depth or (13 mm. in depth) of the socket.
- 2.7.2.** The remainder of the sockets shall be filled with stiff mixture of cement mortar in proportion of one part of cement and one part of sharp sand. When the socket is fillet, a filled shall be formed round the joints with a trowel, forming an angle of 45° with the barrel of the pipe.
- 2.7.3.** The mortar shall be mixed as necessary for immediate use.
- 2.7.4.** After the joint is made, any extraneous materials shall be removed form the inside of the joints with a suitable scraper or "badger". The newly made joints shall be protected, until set, from the sun, dry winds, rain or frost, sacking or other suitable materials which shall be used for the purpose.
- 2.7.5.** The mortar shall be cured for 10 days.

2.8. Testing of Joints:

- 2.8.1.** If nay leakage is visible the defective part of the work shall be made good at no extra cost. The pipe line shall be tested as directed.
- 2.8.2.** 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 and payment

- 3.1.** Pounding or buttering of the fit trenches bed to the lower part of the pipe and "Grips" dug 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 meter.

Item No. 76 :- Constructing brick masonry chamber for under ground C.I. Inspection chamber and bends with bricks having crushing strength not less than 35 Kg/cm² in C.M. 1:5 C.I. cover with frame (light duty) 455 mm x 610 mm. internal dimensions, total weight of cover with frame to be not less than 38 Kgs. weight of cover 23 Kg. and wt. of frame 15 Kg) R.C.C. top slab with 1:2:4 mix (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm. size) foundation concrete 1:5:10 inside plaster 15 mm. thick with cement mortar 1:3 finished smooth with a floating coat of neat cement on walls & a bed concrete etc. complete. (i) inside dimension 455mm x 610 mm and 450mm deep for single pipe line.

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 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 felt 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 level shown in one the plans or as directed.

2.3. Bed concrete shall be 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 waifs shall be 7.5 cms.

2.4. Wetting of bricks:

2.4.1. 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.

2.5. Laying:

2.5.1. 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.

2.5.2. 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.

2.5.3. 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.

2.5.4. The brick shall be laid with frog up wards. A set of tools comprising of wooden straight edges, man son'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.

2.5.5. 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.

2.5.6. 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

2.6. Joints:

2.6.1. 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.

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

2.7. Curing:

2.7.1. 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.

2.8. Preparation of foundation bed:

2.8.1. If the foundation is to be laid directly on the excavated bed, the 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.

2.9. The walls and the bed concrete of chamber shall be plastered inside with 12 mm. thick cement plaster 1 : 3 (1 cement : 3 coarse sand) finished smooth.

2.10. The gully grating cover shall be hinged to frame to facilitate its opening for cleaning and repairs. The frames of the gully grating g shall be fixed on the top of masonry wall of the chamber in 15 cms. thick C.C. 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm. nominal size) laid over the full thickness of walls..

2.11. The chamber shall have connection pipe, the length of which in meter between the road gully chamber and the manhole of the drain shall not be less than 1/40 times the nominal diameter of the pipe in MM. i.e. for 150 mm connection pipe the length shall not be cement plaster on the bed concrete.

2.12. The cover slab of R.C.C. 1:2:4 (1 cement: 2 coarse sand: 4 graded stone aggregate 20 mm. nominal size) 15 cms. thick reinforced with 10 mm. bars at 15 cms. C/C both ways, surface and edges finished fair. Full bearing equal to the width to the width of wall shall be given to the slab on all sides. The frame of manhole cover shall be

embedded firmly in R.C.C. slab so that the top of the frame remains flush with the top of R.C.C. slab.

2.13. Testing:

2.13.1 Manhole shall be tested by filling with water to a depth not exceeding 1.2 M. as directed.

2.13.2 After completion of work, manhole cover shall be sealed by means of thick grease.

3.0. Mode of measurements and 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. 77 :- Constructing Manhole with R.C.C. top slab in 1:2:4 mix (1-cement :2-coarse sand : 4-graded stone aggregate 20mm nominal size) foundation concrete 1:3:6 mix (1-cement : 3- coarse sand :6-Brick bats 40 + 50mm size) inside plastering 15mm thick with Cement Mortar 1:5 (1-Cement : 5-coarse sand) finished with a floating coat of neat cement and making channels in cement concrete 1:2:4 mix (1-Cement : 2-Coarse sand :4-stone aggregate 20mm nominal size) finished smooth complete including curing and fasting (i) Inside size 900mm x 1200mm and 1.5M. deep including C.I. cover with frame size 560mm diameter total weight of cover and frame to be not less than 128 kgs. (Wt. of cover 64 Kg. and Wt. of frame 64 Kg.) (A) With 230mm thick walls of brick masonry using brick having crushing strength not less than 35Kg. / Sq.cm. in Cement Mortar 1:5 (1- Cement : 5 Coarse sand) (1) A type depth 0.90 Metre for 150mm diameter sewer.

- | | | | |
|------|--------------|----------------|---------------|
| i. | A type depth | 0.90 meter for | 150 mm. sewer |
| ii. | B type depth | 1.50 meter for | 150 mm. sewer |
| iii. | C type depth | 2.25 meter for | 150 mm. sewer |
| iv. | D type depth | 3.15 meter for | 150 mm. sewer |

1.0 Materials : Water shall conform to M-1. Cement shall conform to M-6. Burnt bricks shall conform to M-15.

Brick bats of 40 to 50 mm. size shall conform to M-14. Stone coarse aggregate of 20 mm. nominal size shall conform to M-12.

Grit shall conform to M-8. Cement mortar of specified proportion shall conform to M-11.

The cast iron manhole cover of 560 mm. dia. with frame shall conform to I.S. 1726-1966.

2.0 Workmanship

2.1. The manholes of different types and sizes as specified shall be constructed in sewer line at such places and to such levels and dimension as shown in drawings of as directed.

2.2. The manholes shall be built on a bed of cement concrete 1:3:6 (1 cement : 3 coarse sand : 6 brick bats) (40 to 50 mm. nominal size) to the thickness of the bed concrete shall be 15 cms. for manhole up to 1.0 M. depth and 20 cms. for manholes over meter and up to over meter and up to 2 meters, depth and 30 cms. for manholes greater depth.

Projection of bed concrete beyond the masonry wall shall be 15 cms.

2.3. Walls

2.3.1. The walls of manhole shall be carried out with burnt bricks using having bricks. crushing strength not less than 35 Kg/Cms in C.M. 2 in C.M. 1:5 (1 cement : 5 coarse sand). The thickness of brick masonry wall shall be 230 mm. The jointing face of such

.brick shall be well buttered with cement mortar before laying so as to ensure a full joints.

2.4. Plaster

- 2.4.1.** The inside of waits shall be plastered 15 mm. thick with C.M. 1:5 (1 cement : 5 coarse sand) and finished with floating coat of neat cement. All angles shall be rounded to 7.50 cms. radius and all rendered internal surfaces shall have hard impervious finish obtained by using a steel trowel. The external joints of masonry shall be finished smooth.

2.5. Channels & Benching :

- 2.5.1.** Channels shall be semicircular in the bottom half and of diameter equal to the sewer. Above the horizontal diameter, the sides shall be extended vertically to the same level as the crown of the out going pipe and the top edge shall be suitably rounded off. The branch channels shall also be similarly constructed with respect to the benching but at their junction with the main channel an appropriate fall suitably rounded off in the direction of flow the main channel shall be given.
- 2.5.2.** The channel and benching shall be done in C.C. 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm. nominal size) rising at a slope in line from edges of channel. The channels of the bottom of the chamber shall be plastered with C.M. 1:2 (1 cement : 2 coarse sand) and steel troweled smooth.

2.6. Cover slab:

- 2.6.1.** The cover slab of R.C.C. 1:2:4 (1 cement: 2 coarse sand: 4 graded stone aggregate 20 mm. nominal size) 15 cms. thick reinforced with 10 mm. bars at 15 cms. C/C both ways, surface and edges finished fair. Full bearing equal to the width to the width of wall shall be given to the slab on all sides. The frame of manhole cover shall be embedded firmly in R.C.C. slab so that the top of the frame remains flush with the top of R.C.C. slab.

2.7. Testing:

- 2.7.1.** Manhole shall be tested by filling with water to a depth not exceeding 1.2 M. as directed.
- 2.7.2.** After completion of work, manhole cover shall be sealed by means of thick grease.

3.0. Mode of measurements and payment

- 3.1.** The depth of manholes shall be distance between the top of the manhole cover and the invert level of the main drain. The rate includes all labours, materials, tools, and plant etc. required for satisfactory completion of this item as directed above.
- 3.2.** The rate shall be for a unit of the **One number**.

Item No. 78 :- Providing erecting and fixing double coated Syntex or equivalent PVC (I.S.I.) mark water tank of required capacity each with all necessary fittings & connection etc. comp on terrace.

General

This work shall consist of furnishing and placing providing and fixing I.S.I. mark PVC water tank with necessary G.I. fittings of the shape and dimensions shown on the drawings and conforming to these specifications or as approved by the Engineer in charge.

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 equivalent to syntax product.

Net capacity shall be net volume of water stored between the lowest level of overflow and lowest specified level.

1.2 NIPPLE

Galvanize pipe nipple shall be of approved make and of best quality. Relevant specification given in Booklet of Building specification shall be applied for the execution of this item.

1.3 BALL VALVE

Ball valve shall be of approved make and of best quality. Relevant specification given in Booklet of Building specification shall be applied for the execution of this item.

1.4 CONNECTIONS

Connection shall be of approved make and of best quality. Relevant specification given in Booklet of Building specification shall be applied for the execution of this item.

2.0 **WORKMANSHIP**

- 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 AND PAYMENT**

- 3.1 The unit rate of **PVC Water tank** shall include the cost of all materials, tools and plant required for lifting to required height with all lead and lift, placing and 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.

The rate of PVC Water tank shall include the cost of all labour, materials, tools and plant scaffolding and all incidental expenses as described herein above.

- 3.2 The **PVC water tank** work shall be measured for its volume to specified capacity to those specified on plan or as directed. The rate shall be for a unit of one liter basis.
- 3.3 The payment will be made on **liter** basis of the finished work.

Item No. 79 :- Providing and fixing ball cock of approved quality as directed.
(A) Copper metal (i) 25 mm dia.

1.0 Materials :

The ball cock of 25 mm diameter of approved quality (copper) shall conform to M-75.

2.0 Workmanship

The ball cock of 25 mm diameter shall be fixed as directed. The ball cock shall be fixed in position by means of Jam nut and socket. The ball cock shall be fixed near the inlet of the water meter or as directed. The joints shall be done with white zinc and spun yarn. The joint shall be tested for leak proofing.

3.0 Mode of measurement & payment

- 3.1.** The rate includes cost of all materials and labour involved for carrying out satisfactory work.
- 3.2.** The rate shall be for a unit of One number.

Item No. 80 :- Providing and fixing 90 cm high Stainless steel railing made from anticorrosive S.S. pipe of 50 mm dia (16 Gauge) as hand rail with S.S. 38 mm dia. (16 Gauge) as a vertical support fixed in RCC slab at 1.2m c/c including three horizontal S.S. pipes of 25 mm dia. (16 gauge) at equal distance fixed by 18.75 mm dia (16 gauge) S.S. pipe including accessories as per detailed drawing as directed etc. complete.

General

This work shall consist of providing and fixing 90 cm high Stainless steel railing made from anticorrosive S.S. pipe of 50 mm dia (16 Gauge) as hand rail with S.S. 38 mm dia. (16 Gauge) as a vertical support fixed in RCC slab at 1.2m c/c including three horizontal S.S. pipes of 25 mm dia. (16 gauge) at equal distance fixed by 18.75 mm dia (16 gauge) S.S. pipe including accessories as per detailed drawing as directed by the Engineer in charge.

1.0 MATERIAL

1.1 50 mm diameter hollow stainless steel pipe for railing

Hollow stainless steel pipe conform to I.S. 226-1985: The Hollow stainless steel pipe shall be free from the defects mentioned in I.S 226-1975 and shall have a smooth finish. The material shall be free from loose mill scale, rust pits or other defects affecting the strength and durability. River bars shall conform to I.S. 1148-1973.

When the stainless steel pipe is supplied by the Contractor test certificate of the manufacturers shall be obtained according to I.S. 226-1975 and other relevant Indian Standards.

Hollow stainless steel Pipe for railing shall be of 50 mm diameter and confirming general Indian standards. Hollow pipe shall be free from the defects and shall have smooth finish. Vertical support shall be fixed in RCC slab at 1.2 m C/C incl. 3 horizontal S.S. pipe of 25mm dia. of 16 gauge at equal distance fixed by 18.75 mm S.S. pipe with balastrode including accessories.

2.0. Workmanship

- 2.1.** Vertical / Horizontal supports of to get 90 cm height of railing shall be fixed as directed and round hollow pipe shall be fixed by welding in true line and level and slope the railing shall be powder coated finish as per standards

2.0 Mode of Measurement & Payment :

- 2.1** The payment will be made on running meter basis of the finished work.
- 2.3** All necessary labour materials, equipments, tools and plant, conveyance including loading and unloading etc. shall be provided by the Contractors directed by the Engineer in charge.
- 2.4** The S.S. railing shall be measured for its length, limiting dimensions to those specified on plan or as directed and shall be measured in running meters.
- 2.5** The rate shall be for a unit of **one Running meter**.

Item No. 81 :- Painting lines, dashes, arrows, letters etc on roads, air fields, on walls and like in two coats with road marking paint, brushing including cleaning the surface of all dirt, dust and other foreign matter. (i) Upto 10cm in width.

Materials

The Road marking paint shall be confirm to IS 164-1951.

Workmanship

The painting of lines dashes arrows and letters on roads, air fields and like shall be carried out with road marking paint in two coats over 10 cm. width.

Mode of Measurement and Payment

Letters figures and similar items etc. stops, commas, hyphens and like shall be deemed to be include in the item the rate per cm. height / width shall hold good irrespective of width of letter, figures or the thickness of lettering.

The Rate shall be for a unit of one Square meter basis.

Item No. 82 :- Providing and laying sandwich type kitchen platform of size 2.10 x 0.76 x 0.76 m and respected length with dhar polish or moulding having base 4" and support & base with marble or kota as per site requirement also loft and base finish with glaze tile and top with selected shed of marble or granite with gas pipe provision and sink including all fittings, material and labour as per directed by Engineer incharge.

MATERIALS :

Water shall confirm to M-1. Cement shall confirm to M-3. Sand shall confirm to M-6, burnt brick shall confirm to M-15. Polished kota stone shall confirm to M-49. Rough kota stone shall confirm to M-48. Granite shall to M-52.

Workmanship :

Item No. 40 comprises of 25 mm thick polished kotah stone and 18 mm thick polished black granite of approved quality.

The sandwich type kitchen platform of size 2.10 x 0.76 x 0.76 m and respected length shall be erected with 2 Nos. on three places of polished 25 mm thick kotah stone with a height of 75 cm. and 0.75 width and with horizontal shelves of 60 cm x 75 cm. making groove of at least 50 mm in existing wall and vertical polished kotah stone shall be inserted on to the groove and 60 cm. shall be clear from the wall surface shall be visible. The height of polished kotah shall be 80 cm. from the floor surface. Each stone shall be erected at a distance of at least 25 mm. and shall be filled it with cement mortar of 1:3 (1: cement, 3 : coarse sand). The rough kotah stone shall be laid horizontally over the vertical post. The bedding of cement mortar of 1:3 (1: cement, 3 : coarse sand) shall be laid on top of at least 30 mm in thickness. After laying of bedding the 18 mm thick polished stone shall be laid in line and level so as to drain of the water easily on to the kitchen sink. The space for the sink shall be cut to the size of sink with the help of cutting machine. The edges of the Kitchen platform shall be covered with

10 cm. thick strip and shall be fixed with glue i.e. by epoxy type materials i.e. resin and hardener (Araldite type materials) and kept the same for curing up to 12 hours. The edges of the vertical strip shall be made half round by grinding machine and the grinded surface shall be polished as good as top surface. The polished kotah stone and granite stone shall be of approved quality as per the instruction of Engineer-in-charge.

The measurements and payment shall be made on **Square meter** basis.

Item No. 83 : Clearing and grubbing road land including uprooting rank vegetation grass bushes, shrubs, sapling and trees girth up to 300 mm removal of stumps of trees cut earlier and disposal of unserviceable materials (A) By manual means in area of light jungle.

201. CLEARING AND GRUBING

201.1. Scope

This work shall consist of cutting, removing and disposing of all materials such as trees, bushes, shrubs, stumps, roots, grass, weeds, top organic soil not exceeding 300 mm in thickness, rubbish etc., which in the opinion of the Engineer are unsuitable for incorporation in the works, from, the area of road land containing road embankment, drains, cross-drainage structures and such other areas as may be specified on the drawings or by the Engineer. It shall include necessary excavation, backfilling of pits resulting from uprooting of trees and stumps to required compaction, handling, salvaging, and disposal of cleared materials. Clearing and grubbing shall be performed in advance of earthwork operations and in accordance with the requirements of these specifications.

201.2. Preservation of Property/Amenities

Roadside trees, shrubs, any other plants, pole lines, fences, signs, monuments, buildings, pipelines, sewers and all highway facilities within or adjacent to the highway which are not to be disturbed shall be protected from injury or damage. The Contractor shall provide and install at his own expense, suitable safeguards approved by the Engineer for this purpose.

During clearing and grubbing, the Contractor shall take all adequate precautions against soil erosion, water pollution, etc., and where required, undertake additional works to that effect vide Clause 306. Before start of operations, the Contractor shall submit to the Engineer for approval, his work plan including the procedure to be followed for disposal of waste materials, etc. and the schedules for carrying out temporary and permanent erosion control works as stipulated in Clause 306.3.

201.3. Methods, Tools and Equipments

Only such methods, tools and equipment as are approved by the Engineer and which will not affect the property to be preserved shall be adopted for the Work. If the area has thick vegetation/roots/trees, a crawler or pneumatic tyred dozer of adequate capacity may be used for clearance purposes. The dozer shall have ripper attachments for removal of tree stumps. All trees, stumps, etc., failing within excavation and fill lines shall be cut to such depth below ground level that in no case these fall within 500 mm of the subgrade. Also, all vegetation such as roots, under-growth, grass and other deleterious matter unsuitable for

incorporation in the embankment/subgrade shall be removed between fill lines to the satisfaction of the Engineer. On areas beyond these limits, trees and stumps required to be removed as directed by the Engineer shall be cut down to 1 m below ground level so that these do not present an unsightly appearance.

All branches of trees extending above the roadway shall be trimmed as directed by the Engineer.

All excavations below the general ground level arising out of the removal of trees, stumps, etc., shall be filled with suitable material and compacted thoroughly so as to make the surface at these points conform to the surrounding area.

Ant-hills both above and below the ground, as are liable to collapse and obstruct free subsoil water flow shall be removed and their workings, which may extend to several metres shall be suitably treated.

201.4. Disposal of Materials

All materials arising from clearing and grubbing operations shall be the property of Government and shall be disposed of by the Contractor as hereinafter provided or directed by the Engineer.

Trunks, branches and stumps of trees shall be cleaned of limbs and roots and stacked. Also boulders, stones and other materials usable in road construction shall be neatly stacked as directed by the Engineer. Stacking stumps, boulders, stones etc., shall be done at specified spots with all lifts and upto a lead of 1000 m.

All products of clearing and grubbing which, in the opinion of the Engineer, cannot be used or auctioned shall be cleared away from the roadside in a manner as directed by the Engineer. Care shall be taken to see that unsuitable waste materials are disposed of in such a manner that there is no likelihood of these getting mixed up with the materials meant for embankment, subgrade and road construction.

201.5 Measurements for Payment

Clearing and grubbing for road embankment, drains and cross-drainage structures shall be measured on area basis in terms of **Hectare**. Clearing and grubbing of borrow areas shall be deemed to be a part of works preparatory to embankment construction and shall be deemed to have been included in the rates quoted for the embankment construction item and no separate payment shall be made for the same. Cutting of trees upto 300 mm in girth including removal of stumps and roots, and trimming of branches of trees extending above the roadway shall be considered incidental to the clearing and grubbing operations. Removal of

stumps left over after trees have been cut by any other agency shall also be considered incidental to the clearing and grubbing operations.

Cutting, including removal of stumps and roots of trees of girth above 300 mm and backfilling to required compaction shall be measured in terms of number according to the sizes given below:-

- i) Above 300 mm to 600 mm
- ii) Above 600 mm to 900 mm
- iii) Above 900 mm to 1800 mm
- iv) Above 1800 mm

For this purpose, the girth shall be measured at a height of 1 metre above ground or at the top of the stump if the height of the stump is less than one metre from the ground.

201.6. Rates

206.6.1 The Contract unit rates for the various items of clearing and grubbing shall be payment in full for carrying out the required operations including full compensation for all labour, materials, tools, equipment and incidentals necessary to complete the work. These will also include removal of stumps of trees less than 300 mm in girth as well as stumps left over after cutting of trees carried out by another agency, excavation and back-filling to required density, where necessary and handling, salvaging, piling and disposing of the cleared materials with all lifts and upto a lead of 1000 m.

201.6.2 The Contract unit rate for cutting (including removal of stumps and roots) of trees of girth above 300 mm shall include excavation and backfilling to required compaction, handling, salvaging piling and disposing of the cleared materials with all lifts and upto a lead of 1000 m.

201.6.3. Where a Contract does not include separate items of clearing and grubbing, the same shall be considered incidental to the earth work items and the Contract unit prices for the same shall be considered including clearing and grubbing operations.

Item No. 84 :- Providing & fixing Co2 type portable ABC Dry Powder type ABS Fire extinguisher capacity 4.5 Kg. discharge range 3mt. timing 60 to 180 sec. standard approved IS code No. 2878:2004.

General

This work shall consist of supplying and installing of **Co2 type portable ABC Dry Powder Type ABS Fire Extinguisher capacity 4.5 Kg.** of the shape and dimensions shown on the drawings and conforming to these specifications or as approved by Engineer in charge.

1.0 Material

1.0 ABC type 4.5 kg. Fire Extinguisher

- 1.1 **ABC type 4.5 kg. Fire Extinguisher** nominal bore shall conform to I.S. 15683. The **ABC type 4.5 kg. Fire Extinguisher** shall be best Indian make and quality.
- 1.2 **ABC type 4.5 kg. Fire Extinguisher** shall be chromium polished of best quality and shall be ISI marked.
- 1.3 It shall be as per standard specification of Fire Safety work.

2.0 Mode of Measurement & Payment

- 2.1 The unit rate of **ABC type 4.5 kg. Fire Extinguisher** 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 **ABC type 4.5 kg. Fire Extinguisher** 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 **ABC type 4.5 kg. Fire Extinguisher** 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.

- 4.2 The **ABC type 4.5 kg. Fire Extinguisher** 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 **no.**
- 4.3 The payment shall be made on **No.** basis of the finished work.

Item No. 85 :- Providing and fixing M.S. grill entrance gate of predetermine design including all material like hinges, roller, stopper, rail head, handle etc having coat of red lead and painting with selected colour guide by engineer incharge.

General

This work shall consist of **providing and fixing M.S. grill entrance gate of predetermine design** in specified size of the shape and dimensions shown on the drawings and conforming to these Specifications or as approved by the Engineer in charge.

1.0 MATERIAL

1.0. STRUCTURAL STEEL

- 1.1. M. S. hollow section pipe C Channel & M.S. plate**

All structural steel shall conform I S 226 – 1985. The steel shall be free from the defects mentioned in IS 226-1975 and shall have a smooth finish. The material shall be free from loose mill scale rust pits or other defects affecting the strength and durability.

2.0. OIL PAINTS

2.1. Oil paint shall be of specified colour and as approved by the Engineer in charge. The ready mix paints shall only be used however, if ready mixed paint of specified shade or tint is not available white ready mixed paint with approved strainer will be allowed in such a case the contractor shall ensure that the shade of the paint so allowed shall be uniform.

2.2. All paints shall meet with the following general requirements

2.3. The paint shall not show excessive setting in a freshly opened full can and shall easily be redistricted with a paddle to a smooth homogeneous shade.

2.4. The paint shall show no curdling, levering, caking or colour separation and shall be free from lumps and skins.

2.5. The paint shall not skin within 48 hours in a three quarters filled closed container.

2.6. The paint shall dry to a smooth uniform finish free from roughness, grit, unevenness and other imperfections.

2.7. Ready mixed paint shall be used exactly as received from the manufacturers and other imperfections.

2.8. Enamel paints shall satisfy in general requirements in specification of oil paints. Enamel paint shall conform to I S 2933-1975.

3.0. WORKMAN SHIP

3.1. The structure shall be so welded that welding spots do not appear on the surface. All welding spots shall be grinded by a machine grinder to give a smooth surface.

3.2. The structure shall be fabricated in true shape and angles meeting the shape of the location where it is to be fitted

3.3. When structure are supplied by the contractor test certificate of the manufacturers shall be obtained according to IS 226-1975 and other relevant Indian standards

3.4. When structure are supplied by the contractors its weight shall be recorded by weighing it on a standard weigh bridge in presence of engineer in charge and contractor before it is fitted in specified location

4.0. PAINTING WITH COLOUR

4.1. Material required for work of painting work shall be obtained directly from approved manufacturers or approved dealer and brought to the site in maker's drums. Kegs etc. in sealed and unbroken condition.

4.2. All materials not in actual use shall be kept properly protected lids of containers shall be kept in closed and surface of the paint in open or partially open containers covered with a thin layer of turpentine to prevent formation of skin.

4.3. The material which have become state or flat due to improper and long storage shall not be used

4.4. The paint shall be stirred thoroughly in its container before pouring into small containers

4.5. While applying also the paint shall be continuously stirred in smaller container,

4.6. No left over paint shall be put back into stock tins when not in use the container shall be kept properly closed

4.7. If for any reason this is necessary the brand of thinner recommended by the manufacture shall be used

4.8. The surface to be painted shall be thoroughly cleaned and dusted All rust dirt and grease shall be thoroughly removed before painting is started. No painting on exterior or other exposed part of the work shall be carried out in wet damp or otherwise unfavorable weather and all the surfaces shall be thoroughly dry before painting work is started.

4.9. Application of paint

4.9.1. Brushing operations are to be adjusted to the spreading capacity advised by the manufacturers of particular paint. The paint shall be applied evenly and smoothly by means of crossing and laying off. The crossing and laying off consists of covering the area over with paint, brushing the surface hard for the first time over and then brushing alternatively in apposite 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 The full process of crossing and laying off will constitute one coat.

4.9.2. Each coat shall be allowed to dry completely and lightly rubbed with very fine grade of sand paper and loose particles brushed off before next coat is applied Each coat shall very slightly in shade and shall be got approved from Engineer in charge before next coat is started.

- 4.9.3.** Each coat shall be lightly rubbed down with sand paper of fine pumice stone and cleaned of dust before the next coat is applied No hair marks from the brush of clogging of paint puddles in the corners of panels, angles of moldings etc.
- 4.9.4.** Special care shall be taken while painting over bolts nuts rivets overlaps etc. approved best quality brushes shall be used for painting work.

1.0 MODE OF MEASUREMENT & PAYMENT :

- 1.1.** The unit rate of M.S. grill entrance gate of predetermine design shall include the cost of all materials, tools and plant required for fabrication, fitting the same to specified position as per drawings, finishing, painting with three coats including priming coat etc. and all other incidental expenses for producing M.S. structure work 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.

The rate of M.S. grill entrance gate of predetermine design shall include the cost of all labour, materials tools and plant scaffolding and all incidental expenses as described herein above.

- 1.2.** The work shall be measured for its weight, limiting dimensions to those specified on plan or as directed. The rate shall be for a unit of one sq.m.
- 1.3.** The payment will be made on **Sq.m.** basis of the finished work.

Item No. 86 :- Providing and fixing precast Rubber dye / steel dye inter locking concrete block 60mm thick with grade of concrete M-300 pneumatic compressed / vibrated mechanically and as per approved design confirming to IS 15658 : 2006 including 35 mm sand layer for levelling and filling the joint with sand in proper line and level as per guidelines of IRC : SP 63-2018 etc. complete.

General

This work shall consist of providing and laying precast Rubber dye / steel dye inter locking concrete block **60 mm thick** with grade of concrete M-300 as per approved design over a base layer of 35 mm thick layer of sand of the shape and dimensions shown on the drawings and conforming to these specifications or as approved by the Engineer in charge.

1.0 MATERIAL

Water shall conform to M-1. Cement shall conform to M-3.

1.0 Precast Rubber dye / steel dye inter locking concrete block

Precast Rubber dye / steel dye inter locking concrete block shall be of approved size brand and make as approved by Engineer in charge.

- 1.1** The size shape and design of precast Rubber dye / steel dye inter locking concrete block shall generally be as per manufacturers product or as directed by the Engineer in charge and Architect.
- 1.2** The precast Rubber dye / steel dye inter locking concrete block shall satisfy the tests as regards compress strength transverse strength resistance to wear and water absorption.
- 1.3** The colour size shape and design of the precast Rubber dye / steel dye inter locking concrete block shall be directed by Engineer or Architect.
- 1.4** The precast rubber dye / steel dye inter locking concrete block shall be of best quality as approved by the Engineer In charge. They shall be flat and true to shape. They shall be free from cracks, crazing spots, chipped edges and corners. The glazing shall be of uniform shade.

2.0 SAND

- 2.1** Sand shall be natural sand, clean well graded, hard strong durable and gritty particular free from immures amounts of dust, clay, kankar modules.
- 2.2.** For masonry works sand shall confirm to the requirements of IS: 2116.
- 2.3.** 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.
- 2.4.** Sand fine aggregates for structural concrete shall conform to the following grading requirements as shown in the table below.
- 2.5 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

- **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

3.0 WORKMANSHIP

- 3.1** The precast Rubber dye / steel dye inter locking concrete block shall be laid on a layer 35 mm thick layer of coarse sand. The slope in the floors shall be provided in the sub grade. The base layer shall be properly watered, rammed and consolidated. Before laying the pavers blocks, it shall be moisture. Plinth masonry offset shall be depressed so as to allow the sub grade concrete to rest on it.
- 3.2** Precast Rubber dye / steel dye inter locking concrete block of approved quality shape and design and shall be laid evenly to level and slope as directed by Engineer in charge over a bed of a base layer consisting of 35mm thick sand layer.
- 3.3 Laying:** The precast Rubber dye / steel dye inter locking concrete block shall be laid in plain, diagonal or other pattern as directed. The cement concrete blocks shall be laid properly and set home by gentle tapping.
- 3.4** End portion of pavement shall be finished with C.M. 1:3 as per detailed drawing etc. complete.

4.0 MODE OF MEASUREMENT AND PAYMENT

- 4.1** The unit rate precast Rubber dye / steel dye inter locking concrete block flooring shall include the cost of all materials, tools and plant required for supplying and laying material like brick bats sand pavers blocks, laying of base layer in true level and slope as required applying & placing pavers blocks in position, compacting, finishing, curing.
- 4.2** The length and breadth shall be measured correct to a Square meter correct to 2 places of decimal. Length and breadth shall be measured to correct to a centimeter and between the finished the finished face of the skirting, dedo or wall plaster and no deduction shall be made nor extra paid for any opening in floors or areas up to 0.1 square meter.
- 4.3** The rate shall be for a unit of **one Square meter**.

Item No. 87 :- Providing and fixing precast Rubber dye / steel dye inter locking concrete block 60mm thick with grade of concrete M-300 pneumatic compressed / vibrated mechanically and as per approved design confirming to IS 15658 : 2006 including 35 mm sand layer for levelling and filling the joint with sand in proper line and level as per guidelines of IRC : SP 63-2018 etc. complete.

Same as item No. 86

Item No. 88 :- Drilling of 215mm dia. bore in over burden strata (0-30) including lowering and fixing of 175 mm nominal dia UPVC pipe/175 mm dia ERW pipe upto required depth and further drilling of 165mm dia bore hole in rocky strata by DTH rig.

GENERAL

The work shall consist of Drilling of 215 mm diameter bore hole for 175 mm diameter ERW/UPVC pipe up to required depth in over burden strata (maximum up to 30 meters or up to the depth and further drilling of 200mm diameter bore hole in remaining rocky or sandstone strata up to 100 mtr. Depth or as suggested by Geologist / Hydrologist

Only trained personnel shall be employed for construction and supervision.

1.0 DRILLING

1.1 Drilling of 215mm diameter bore hole for 175 mm diameter ERW/UPVC pipe up to required depth in over burden strata (maximum up to 30 meters or up to the depth as suggested by Engineer in Charge or Geologist / Hydrologist) and further drilling of 165 mm diameter bore hole in remaining rocky or sandstone strata up to 100 meter Depth or suggested by Geologist / Hydrologist. The drilling shall be done by the down the hole hammer type drilling Rig & lowering 175/200 mm diameter ERW/UPVC Pipes, Bore cap shall have to be provided by the Contractor free of Cost. The carting of pipes and other materials etc. shall be carried out by contractor with all lead and lift to the site of work at his own cost.

1.0. Drilling work shall be carried out at the sites directed by the Engineer in Charge. The diameter of the hole shall be 215 mm in over burden strata and 165mm diameter in Rocky & Sandstone strata up to over all specified depth of 100 meters or as per suggested by Engineer in Charge or Geologist / Hydrologist. The Drilling shall be carried out in over burden strata up to maximum 30 Meters or up to the depth as suggested by Engineer in Charge or Geologist / Hydrologist. If further drilling can not be done due to overburden up to 30 meters, or in rocky & Hard or Sandstone strata due to Mechanical failure up to specified depth the drilling shall have to be stopped in consultation with Engineer-in- charge and no payment shall be made for such drilling carried out by the Contractor.

1.1. The 175mm diameter ERW / UPVC pipes should be lowered by the contractor in over burden strata. Contractor as desired by the Engineer in charge will carry out the jointing of pipes. Necessary jointing materials, steel bended plates etc. should be provided by the Contractor at his own cost.

2.0 DRILLING OPERATION

2.1. The Drilling operation for drilling of Bores should be carried out by suitable rig to satisfy following.

2.2. For Drilling Through overburden:

1. The diameter of the bore in the over burden shall be sufficient for insertion of 175/200mm diameter ERW/UPVC casing pipes with the joints and leaving sufficient annular space for grouting the casing pipe with sticky clay or local soil etc. Annular space between bore hole and casing pipe should be filled up with sticky clay or local materials etc
2. After completion of overburden strata, the bore should be drilled up to 0.15 meters. In rocky Hard/Sandstone strata So that casing pipes can be properly embedded in the Rocky Hard/Sandstone formation.

3. After the casing pipe is embedded in the rock, the same is to be ground with materials like sticky clay or local materials etc. so, as to avoid leaking of drain water in the bore.
4. Drilling of 215 mm diameter bore in over burden strata is compulsory up to 30 mtrs. Or as directed by Engineer in Charge or as suggested by geologist Hydrologist.
(A) For Drilling Through Rock :

- 2.3. Bore through rocks shall be of 165mm diameter and the total depth from the ground level of the bore shall up to 100 meters. or as per the recommendation of the Hydrologist /Jr. Geologist.

3.0. LOWERING OF CASING PIPES

- 3.1. Casing pipes shall be properly socketed welded & forewed so as to ensure a continuous length lowered through the over burden, so as to reach at least 0.15 meter. Inside the hard rock. The length of casing pipes should be kept such that at least 0.30 meters. remains projected above the Ground Level After completion of the work at site the top of the casing pipes shall have to be closed either by a screwed or by welded cap plug (if required for HP Installation) unless pump is fitted immediately after completion of the bore.
- 3.2. The casing pipe shall be lowered in such a manner so that it remains vertical so as to ensure installation of pump.
 1. After completion of the bore the Contractor shall have to arrange for testing the yield of the bore by "V" notch at his own cost in presence of the Engineer in charge or his authorized representative. No extra payment shall be made for such testing.
 2. The depth of bore to be drilled as per the recommendation of Jr. Geologist Hydrologist shall be less or more depth. If the bore required to be drilled beyond the specific depth 100 meters. The contractor shall be bound to carry out such work at the rate mentioned in "Schedule : B ".
 3. All the tools and tackles or plants and other suitable machinery required for work for drilling developing gauging etc. for the Tube well shall be provided by the Contractor at his own cost at the site of work.
 4. In case of any item not covered by the specifications stated herein the Contractor shall carry out such work strictly, according to written instructions of Engineer in charge, which will be binding to the contractor and shall have to carry out such work at Departmental Schedule. The rate shall be mutually agreed up on, however the decision of the Engineer in charge will be final.
 5. During the Drilling Operation, if the water bearing strata found at a depth lesser than estimated depth the Executive Engineer or his representative shall have authority to instruct the Contractor to stop the work for reduction in the quantity of the work, the Contractor shall not be eligible for any compensation.
 6. If the bore is required to be drilled above the specified depth the Contractor shall be bound to carry out such additional work including drilling providing and lowering of casing pipes as may be necessary. The relevant specification regarding drilling providing and lowering pipe, taking yield test and strata sample etc. shall also apply in case of such additional work. The rates for a additional work be paid as per the rate fixed.
 7. Lowering and fixing of housing and casing shall be carried out in workman like manner. The contractor shall be responsible for workman compensation in case of any accident. In case of dispute or overlooked items the decision of the concerned Executive Engineer shall be final and binding to the Contractor.
 8. No further drilling of bore wells is allowed, if more than two bores will remain untested at a time. This clause will be applicable without any prejudice (i.e. compensation for delay)

9. The contractor shall clear the site before of the work and after completion of the work and shall hand over the bore with final finishing of the work. As directed by the Engineer in charge which shall have to be done by the Contractor at his own cost.
10. The approach roads to site of work may be Kachha roads and contractor shall have to make his own arrangements for repairing of the road and maintain the same for transporting his materials and equipment at his cost which shall be utilized by the department for inspection etc. purpose.
11. The list of the locations, where bore well are to be drilled will be provided on finalization of Tender and Similarly, the actual site of work will be given to the contractor by the Geologist or Engineer-in – charge from the respective Mechanical division Sub Division.
12. If a well is rejected on account of faulty workmanship or negligence on the part of the Contractor as well as if the verticality is not within the permissible limit the bore shall be rejected and the Contractor shall have to drill a new bore including lowering pipes etc. at his own cost.
13. If, further drilling can not be carried out due to encountering the sticky clay or over burden beyond limits (i.e. beyond 30 meters.) or in rocky / sandstone up to specified / suggested depth in a such a case the decision of the Engineer in Charge or recommendation of Hydrologist will be binding to the Contractor as finalized by Engineer in Charge and or Geologist / Hydrologist.
14. The Contractor will have to make arrangement at his own cost for cleaning of bore hole, if filled up by clay, sand, dust & boulders etc.
15. If bore is not completed up to design/ recommended depth due to Mechanical failure or any other reason, no payment shall be made for such abandoned bore.
16. On completion of drilling work up to the required depth, the bore is to be developed and cleaned by suitable capacity air compressor up to the sand free discharge or for minimum one hour.
17. The Contractor will have to make arrangement at his own cost for
 - (A) Rig Vehicles, Machineries etc.
 - (B) Facilities for moving bulky materials.
 - (C) Realizing the Transporting Materials.
 - (D) Keeping in custody Department Materials until finally taken over by the office –in-charge of the work.
 - (E) Repairing to the damages caused in the process of the executing works.
 - (F) Approach road to the site.

4.0. MODE OF MEASUREMENT & PAYMENT :

- 4.1. Drilling work shall be measured in its depth for each class of strata, limited to the dimensions shown on the drawing or as directed by the Engineer-in-charge. drilling over increased diameter or depth shall be deemed as convenience for the contractor in executing the work and shall not be measured and paid for separately.
- 4.2. The contract under rate for the items of excavation for structures shall be paid in full for carrying out the required operations including:
- 4.3. Setting out and fixing bench marks and centre lines stones.
- 4.4. Removal of all logs, stumps, grubs and other deleterious matter and obstructions for placing the foundations including trimming of bottoms of excavations
- 4.5. Foundation sealing, dewatering including pumping,
- 4.6. All labour, materials, tools equipment, safeguards and incidentals necessary to complete the work to the specification.

4.7. Drilling work shall be for soil such as vegetation or organic soil, turf, sand, silt, loam, clay, mud, black cotton soil, soft shale or soft murrum, required drilling equipment

4.8. The drilling work shall be measured for its depth, limiting dimensions to those specified on plan or as directed. The rate shall be for a unit of one meter.

Item No. 89 :- Providing & supplying 175mm nominal dia. UPVC “CS” type pipe as per IS:12818 and as per detailed technical specification.

General

This work shall consist of furnishing and placing supplying of **175mm nominal dia. UPVC “CS” type pipe as per IS:12818** as directed by the Engineer in charge.

Supplying of UPVC “CS” type pipe 175 mm dia. shall be done using all required tools and plant including labour charges required for the same only skilled persons shall be applied for this work. Supplying shall be done at the risk and cost of the contractor in case of accidental dropping of the pump in bore hole the same shall be either pull out from the bore at the risk and cost of contractor or shall be replaced at the risk and cost of the contractor.

2.0 WORKMANSHIP

2.1. UPVC “CS” type pipe 175 mm dia. shall be lowered by contractor using only skilled persons and using most suitable tools and plant as directed by the Engineer in charge any damage or loss of material will be at the risk and cost of the contractor. Before joining with column pipe the treads of each pipe and coupling shall be checked carefully the pump shall be connected with electrical control panel board using suitable wire switches and other necessary electrical parts including testing with GEB's Test report.

3.0 MODE OF MEASUREMENT & PAYMENT :

2.3. The unit rate of supplying of UPVC “CS” type pipe 175 mm dia. 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 item of supplying of UPVC “CS” type pipe 175 mm dia. 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 supplying of UPVC “CS” type pipe 175 mm dia. shall include the cost of all labour, materials, tools and plant scaffolding and all incidental expenses as described herein above.

2.4. The supplying of UPVC “CS” type pipe 175 mm dia. shall be measured for its Length, limiting dimensions to those specified on plan or as directed.

2.5. The payment will be made on running meter basis of the finished work.

Item No. 90 :- Electric motor driven borewell submersible pump set conforming to I.S. 8034 and motor conforms to IS-9283 working at 3 phase 400/440 volt 50 C/S A.C. supply & 2900 R.P.M. discharge 240 LPM and 72 mtr Head, 7.5 hp Cat. 4.0.

General

This work shall consist of **electric motor driven borewell submersible pump set conforming to I.S. 8034 and motor confirms to IS:9283 working at 3 phase 400 / 440 volt 50 Hz AC** conforming to these specifications of an approved brand and make as approved by the Engineer in charge.

1.1. Submersible pump set

- 1.2. Submersible pump set of specified capacity and of I.S.I. mark of approved brand and make and quality shall be supplied.
- 1.3. Specification of item no 9.4.1 of Electrical S O R Item form specification booklet of Electrical work shall be followed for this item.

2.0 WORKMAN SHIP

- 2.1. Submersible pump set shall be approved quality and as per IS standard make. Material used in manufacturing tank shall be confirmed to relevant IS code.
- 2.2. The Submersible pump set shall be fitted and installed properly in a desired position and making all required necessary connection as specified and as directed by the Engineer in charge.

3.0 MODE OF MEASUREMENT & PAYMENT :

- 3.1. The unit rate of Submersible pump set 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 item of Submersible pump set 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 Submersible pump set shall include the cost of all labour, materials, tools and plant scaffolding and all incidental expenses as described herein above.

- 3.2. The Submersible pump set 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 set.
- 3.3. The payment will be made on **Set** basis of the finished work.

Item No. 91 :- SITC of D.O.L starter up to 7.5 H.P.

The D.O.L starter up to 7.5 H.P. shall be required size and design shall be got approved by Engineer in charge.

The D.O.L starter up to 7.5 H.P. suitable for local & remote pump control application consisting of MPCB, overload relay and contractors as per Type-II coordination as directed.

The rate includes all labour and material required for satisfactory completion of this item as described above.

The rate shall be for a unit of per **Set**.

Item No. 92 : Providing & supplying Flat PVC cable size 4.0 sq.mm as per IS 694 with BIS mark and as per detailed technical specification.

The flat P.V.C. cable for Submersible pump of size 4.0 sq.mm should be I.S.I. standard and approved quality.

The rate include cost of flat P.V.C. cable and erection of cable.

Payment shall be made on basis of Running meter.

Item No. 93 : Heavy duty, 50 mm dia. G.I. Column pipe both end threaded having length approximate 3 mtr. confirming to IS 1239 (Part-1) with coupling at one end.

Heavy duty, 50 mm dia. G.I. Column pipe shall confirm to I.S. 1239 (Part-1). The diameter of pipes shall be got approved by Engineer in charge. The minimum thickness shall be 50 mm. dia.

The measurement shall be on **meter** basis.

Item No. 94 : Providing, supplying and fitting ISI mark CI D/F Sluice Valves as per IS:14846 (Latest Edition) of following class and diameter including all taxes, insurance, transportation, freight charges, octroi, inspection charges, loading, unloading, conveyance to departmental stores, stacking etc. complete. PN-1 with hand wheel / cap operated (PD type short body) 50 mm

1. Sluice valve shall be double flanged and shall have disc. Manufactured in MEAHNITE or equal material under otherwise specified in data sheet. The seat and faces shall be of gun metal or bronze as specified in data sheet. Sluice valves of nominal size 300mm and above shall be provided with channel arrangement so that the gate shall be guided throughout its travel.
2. The driving and sealing shall be preferable of gland and stuffing box type. Stuffing box shall be easily accessible for adjustment and replacement of packing without disturbing any other part of valve or operator assembly. The depth of the stuffing box shall not be less than 50mm or diameter of shaft whichever is lower. As an alternative ring type sealing may be provided at the driving.
3. Valve shaft shall have a minimum shaft diameter extending through the valve bearing and in to the valve disc. As specified in AIS standards specifications.
4. Length of the extensions bonnets shall be selected as. Keep the height of the hand wheel about 1 meter above the floor, wherever necessary the extension bonnets shall be provided with suitable support brackets for supporting at the floor level.
5. Sluice valve shall be capable of withstanding the service condition i.e. flow, fluid, pressure, temperature under which they are required to be operated. Sluice valves shall be tested hydraulically as per relevant standards. Body test and seat test shall be carried out and check for water tightness.
6. Sluice valves shall be with hand wheel and suitable for installation with valve shaft in any position.
7. A shape coat of paint shall be applied to all steel and cast iron exposed surfaces as required to prevent corrosion, after release has given for painting and before dispatch. All parts shall be adequately protected for prevention, Grease shall not be used mechanized surfaces.
8. Bidder shall furnish along with his bid the following drawing
 - a. Dimensional outline drawings.
 - b. Cross section drawing.

MATERIAL OF CONSTRUCTION

Body	:-	Cast Iron – IS 210 Gr. FG 200
Bolted Bonnet	:-	Cast Iron – IS 210 Gr. FG 200
Ringed Stem	:-	High Tensile Brass/Bronze
Solid Wedge Disc	:-	Cast Iron – IS 210 Gr. FG 200
Triangle Body & Seat Ring	:-	Leaded Gunmetal or Bronze
Hand Wheel	:-	Malleable Iron ASTM
Bonnet Bolt	:-	ASTM A 307 Gr. B
Bonnet Nut	:-	ASTM A 307 Gr. B
Bonnet Gasket	:-	Compressed Asbestos

TECHNICAL SPECIFICATION

Hydro test Pressure of Body Class	:-	20 Ks/Cm IS/780 Class 14 Kg/Cm IS 2906 Class.
Hydro test Pressure of Seat Class	:-	10 Ks/Cm IS/780 Class 7 Kg/Cm

Mode of Measurement :-

The measurement shall be taken on Nos. basis for the complete Item & contract rate shall be for unit of **No.**

Item No. 95 : Providing, supplying & fitting ISI mark CI D/F Reflux Valves as per IS: 5312 (Latest Edition) of following class and diameter including all taxes, insurance, transportation, freight charges, octroi, inspection charges, loading, unloading, conveyance to departmental stores, stacking etc. complete. Reflux valves PN 1.0 IS 5312 with ISI mark 50 mm

Materials:

The Reflux Valves IS 5312 with ISI mark CI D/F Reflux Valves [Latest edition] shall be specified make and with IS specifications. All working parts shall be Non Return Valve shall be cast iron double flange with cast iron body.

Workmanship:

The Reflux Valves IS 5312 with ISI mark CI D/F Reflux Valves [Latest edition] should be installed between the flanges with correct alignment. Proper gasket & nut bolt to be used for the fixing as directed Engineer in charge.

Mode of Measurement and Payment:

Measurement shall be taken on **no.** basis of completed item. Rate shall be for a unit of one **No.**

Item No. 96 : Lowering of Submersible motor pump set complete with required nos. and size of column pipe erected by means of proper chain pulley block & pipe wrenches after checking of threads of each pipe with coupling to take the load of the pumpset and pipe assembly filled up with water with trail testing.

WORKMANSHIP

The item provide for labour for lowering / Lifting of 3 phase submersible pump set completed with required Nos. and size of column pipe erected by means of proper chain pulleys block and pipe trenches after checking of threaded of each pipe with coupling to take the load of pump set and pipe assembly filled up with water with trail testing as per required standard as per instruction and direction given by Engineer in charge.

MODE OF MEASUREMENT AND PAYMENT

The rate shall be made on **Job** base of one work done.

Item No. 97 :- Clamps made from MS plate with 3 holes on either side with nuts & bolts of standard make and suitable size 450 mm x 65 mm x 10 mm flat suitable to 50 mm dia. pipe.

MATERIALS

M.S. plate and angle of standard make is required.

WORKMANSHIP

The clamp made from M.S. plate of required gauge with three holes on either side with nuts and bolts of standard make and suitable size 450 mm x 65 mm x 10 mm flat suitable to 50mm dia. pipe and fixing as per direction of Engineer-in-charge.

MODE OF MEASUREMENTS & PAYMENT

The item shall be measured in unit of No. basis.

The unit of this item shall be measured for **No.** basis.

Item No. 98 :- Supply of TOP & BOTTOM accessories of 50 mm dia.

MATERIALS

All accessories like bend, top and bottom pipes base plate, clamps, reducers, couplings etc. as per requirement should be of best quality I.S. standard and make as approved by the Engineer in charge.

WORKMANSHIP

All installations of accessories should be as per requirement and should be tested with necessary test as required after installations and as per satisfaction of Engineer in charge.

MODE OF MEASUREMENTS AND PAYMENT

The rate includes cost of all labours, materials, tools and plant at site etc. required for satisfactory completion of this item.

The payment will be made on **No.** basis of the finished work.

Item No. 99 :- R&B Approved make ELCBs / RCCBs conforming to IS:12640 and having sensitivity of 30 mA and Short Circuit with stand capacity of 10 KA and suitable for operation on 3 phase and neutral 415V. having characteristic of quick action & tripping with all advance feature & do not incorporate any electronic component for following Max. rating erected as directed. 40 Amp. Cat.III

The item includes for R&B Approved make ELCBs / RCCBs conforming to IS:12640 and having sensitivity of 30 mA and Short Circuit with stand capacity of 10 KA and suitable for operation on 3 phase and neutral 415V, as directed / approved by Engineer in charge. It also including all labors tools as required. Sample to be approved by competent authority.

In general the work shall be carried out as per the standard specifications of R&B Department (GOG) / P.W.D. / C.P.W.D. relevant drawings and as per the instructions of Engineer in Charge. Work shall be carried out as per item description.

Mode of measurement and payment:

The rate includes cost of all materials, tools, plants and labour involved in satisfactory completion of work.

The rate shall be for unit of one **No.** as per actual work done

Item No. 100 :- Electrical wiring & fitting charges of electric meter, 40Amp fuse, control panel etc. including erection of the above items on wooden board, cost of material and all liasioning work for getting electric connection from concerned Vij Company.

The item includes Electrical wiring & fitting charges of electric meter, 40Amp fuse, control panel etc. including erection of the above items on wooden board, cost of material and all liasioning work for getting electric connection from concerned Vij Company, as directed by Engineer in charge. It also including all labors tools as required.

In general the work shall be carried out as per the standard specifications of R&B Department (GOG) / P.W.D. / C.P.W.D. relevant drawings and as per the instructions of Engineer in Charge. Work shall be carried out as per item description.

Mode of measurement and payment:

The rate includes cost of all materials, tools, plants and labour involved in satisfactory completion of work.

The rate shall be for unit of one **No.** as per actual work done

Item No. 101 : Pumping test of the tubewell by submersible pump of adequate capacity for 165 mm DTH bore.

Initial development should be carried out by means of submersible pump. Submersible pump to be used should be minimum capacity as stated in Schedule-B and drop line should be used for submersible pump.

(1) Submersible pump shall be carried out as per following procedure, contractor has to cart all the required materials, machinery and accessories like drop line, air line, required capacity submersible pump and accessories required to lower air line, drop line etc. at site or work at his own risk and cost. No carting charges shall be paid for handling such machinery, materials and accessories.

(2) Contractor has to carry out submersible pump test in each zone by lowering air line drop line lowered in each zone by keeping lower end of drop line in each zone till sand free discharge is obtained. Thus after cleaning of the first zone and has to carry out submersible pump test of this zone till sand free discharged is obtained by this way the contractor has to carry out cleaning and development of each separate zone sequentially.

(3) The entire work is to be carried out under strict supervision of concerned Geologist/Hydrologist and after completion of work, the contractor has to obtain the necessary certificate for satisfactory completion of work from him.

The payment shall be done on **Job** basis.

Item No. 102 :- Providing and fitting readymade prefabricated portable chemicalized ferro concrete mini panel having outer size 110 x 50 x 190 cm with necessary fitting for electric panel mounting complete as per detailed specification and drawing.

The item includes providing and fitting readymade prefabricated portable chemicalized ferro concrete mini panel having outer size 110 x 50 x 190 cm, as directed / approved by Engineer in charge. It also including all labors tools as required. Sample to be approved by competent authority.

In general the work shall be carried out as per the standard specifications of R&B Department (GOG) / P.W.D. / C.P.W.D. relevant drawings and as per the instructions of Engineer in Charge. Work shall be carried out as per item description.

Mode of measurement and payment:

The rate includes cost of all materials, tools, plants and labour involved in satisfactory completion of work.

The rate shall be for unit of one **Job** as per actual work done

Item No. 103 :- Three Phase GEB power charges.

The item includes Three Phase GEB power charges, as directed by Engineer in charge. It also including all labors tools as required.

In general the work shall be carried out as per the standard specifications of R&B Department (GOG) / P.W.D. / C.P.W.D. relevant drawings and as per the instructions of Engineer in Charge. Work shall be carried out as per item description.

Mode of measurement and payment:

The rate includes cost of all materials, tools, plants and labour involved in satisfactory completion of work.

The rate shall be for unit of one **Job** as per actual work don

Item No. 104 :- Excavation for foundation for depth from 3.0 m to 5.0 m including sorting out and stacking of useful materials and disposing off the excavated stuff upto 50 Meter lead (B) Dense or Hard soil.

➤ **All sorts of soil**

Any soil which generally require close application of picks or jumpers or scarifies to loosen it stiff clay, gravel and stone etc. fall under this category.

2.0 Workmanship

The relevant specifications of **Item No. 1** shall be followed except that the excavation work shall be carried out in dense or hard soil with lift from 3.0 m to 5.0 mt. depth.

3.0 Mode of measurements & payment

3.1. The relevant specifications of **item No. 1** shall be followed.

3.2. The excavation work of depth from 3.0 m to 5.0 mt. shall be measured under this item.

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

Item No. 105 :- Providing and laying controlled cement concrete M-150 for curing complete excluding cost of formwork and reinforcement for reinforced concrete work in (A) Foundations, footings, base of columns and mass concrete.

The work shall be executed as per specification of **Item No. 4** except for the item is work of **providing and laying controlled cement concrete M-150 for curing complete excluding cost of formwork and reinforcement for reinforced concrete work in (A) Foundations, footings, base of columns and mass concrete.**

Measurement shall be taken and paid on Cum. basis.

Item No. 116 :- Double half brick thick honey comb brick work with common burnt clay building bricks having crushing strength not less than 35 Kg/Sq.cm. (i) In cement mortar 1:4 (1 cement : 4 coarse sand)

1.0 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. 15** except that the brick work of Double half brick thick honey comb brick work 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 bars shall be embedded in cement mortar.

3.0 Mode of measurement and payment

- 3.1.** The Double half brick thick honey comb brick work in foundation and plinth 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. 15** shall be followed. The length shall be measured nearest to one cm.
- 3.3.** The rate shall be for a unit of one sq. meter.

Item No. 107 :- Providing and fixing C.I. Manhole cover 0.60 M. x 0.45M. size having weight not less than 35 Kg.

1.0 Materials

C. I. Manhole cover of 0.60 x 0.45 m. size shall be of best quality. The weight of C.I. cover and frame shall not be less than 35 Kg. The C.I. manhole cover shall be of light duty and conform relevant I.S. & as approved by Engineer in charge.

2.0 Testing:

2.0.1. Manhole shall be tested by filling with water to a depth not exceeding 1.2 M. as directed.

2.0.2. After completion of work, manhole cover shall be sealed by means of thick grease.

3.0 Mode of measurements and payment

3.1. The rate includes cost of all labour and materials required for satisfactory completion of this item.

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

Item No. 108 :- Providing, laying (to level or slopes) and jointing reinforced concrete light duty non-pressure pipes I.S. class NP-2 of the following internal diameter with collars and butt ends prepared for collar joints including testing of joints complete. (B) 150mm

1. This shall consist of furnishing and installing reinforced cement concrete pipe of the type diameter and length required at the location shown on the drawings or as ordered by the Engineer-in-charge.

2. Reinforced concrete pipe shall be of NP2 type conforming to the requirements of IS : 458 and shall be of dia. as specified in the item. Each consignment of cement concrete pipes shall be inspected, if necessary and approved by the Engineer-in-charge either at the place of manufacture or at the site before their incorporation in the works.

NP3, NP2 and NP1 pipes are used for R.C.C. Pipes. Where the testing of pipes will not be feasible the contractors will have to produce a certificate from the manufacturer on company's letter head in the given' hereinafter from.

Production of such certificate will not however relieve the Contractor from his responsibility of supplying pipes of required standard and will have to bear the loss or damage caused to the work on account of defects found subsequently during execution. It will also be necessary to purchase these pipes from manufacturer having standard equipments for carrying out various tests as per IS : 458 at his factory.

Form of Certificate for NP-3, NP-2, NP-1 Pipes

We _____

Manufacturer or R.C.C. Pipes produce R.C.C. pipes as per the requirement of IS : 458 and also carry out the required test at out place, We have acquired equipments for carrying out test and are prepared to carry out tests at our factory sites. We have experience of manufacturing of pipes of years. The pipes supplied by us to M/S._____.

Satisfy the requirement of IS:458.

Date:_____

Place:_____

Manufacturer's Sign _____

3. No pipes shall be placed in position until the foundations have been approved by the Engineer-in charge. Where two or more pipes are to be laid adjacent to each other, they shall be separated by a distance equal to at least half the diameter of the pipe subject to minimum of 150 mm. The laying of pipes on the prepared foundation shall start from the outlet and proceed towards the inlet and be completed to the specified lines and grades. The pipes shall be fitted and matched so that when laid in works they form a culvert with a smooth uniform invert. Any pipe found defective or damaged during laying shall be removed at there cost of Contractor.

4. The pipes shall be jointed either by collar joint or by flush joint in the former case the collars shall be of R.C.C. 150 to 200 mm. wide and having the same strength as the pipes to be jointed. Caulking space shall be between 13 and 20 mm. according to the diameter of the pipes caulking material shall be slightly wet mix of cement and sand in the ratio of 1:2 rammed with caulking irons. Before caulking the collar shall be so placed that its centre coincides with that of pipes and an even annular space is left between the collar and the pipes. Flush joint may be shaped to form a self centering joint with a joining space 13 mm wide. The joining space shall be filled with cement mortar 1:2 (1 cement : 2 sand) mixed sufficiently dry to remain in position when forced with a trowel or rammer. Care shall be taken to fill all voids and excess mortar shall be removed. All joints shall be made with care so that their interior surface is smooth and consistent with the interior surface of the pipes. After finishing, the joint shall be kept covered and damp for at least four days.
5. R. C. C. pipes shall be measured along their centre between their inlet and outlet ends in linear metres.
6. The rate for the pipes shall include the cost of pipe including loading, unloading, handling, storing laying in position and joining complete. The contract rate shall be for a unit of one running meter.
7. The unit rate shall be for a unit of running meter.

Item No. 109 :- Constructing brick masonry chamber for underground C.I. Inspection chamber and bends with bricks having crushing strength not less than 35 Kg/Cm² in C.M. 1:5 C.I. cover with frame (light duty) 455mm x 610mm internal dimensions total weight of cover with frame to be not less than 38Kg. (Wt. of cover 23 Kg.) and Wt. of frame 15Kg.) (R.C.C. top slab with 1:2:4 mix (1 cement : 2 coarse sand : 4 graded stone aggregate 20mm size) foundation concrete 1:5:10 inside plaster 15mm thick with cement mortar 1:3 finished smooth with a floating coat of neat cement on walls and bed concrete etc. complete. (iii) Inside dimensions 600mm x 850 mm and 450mm deep for pipe lines with three or more inlets.

The work shall be executed as per specification of **Item No. 76** except for the item is work of **Constructing brick masonry chamber for underground C.I. Inspection chamber and bends with bricks having crushing strength not less than 35 Kg/Cm² in C.M. 1:5 C.I. cover with frame (light duty) 455mm x 610mm internal dimensions total weight of cover with frame to be not less than 38Kg. (Wt. of cover 23 Kg.) and Wt. of frame 15Kg.) (R.C.C. top slab with 1:2:4 mix (1 cement : 2 coarse sand : 4 graded stone aggregate 20mm size) foundation concrete 1:5:10 inside plaster 15mm thick with cement mortar 1:3 finished smooth with a floating coat of neat cement on walls and bed concrete etc. complete. (iii) Inside dimensions 600mm x 850 mm and 450mm deep for pipe lines with three or more inlets.**

Measurement shall be taken and paid on No. basis.

Item No. 110 :- Providing, laying (to level or slopes) and jointing reinforced concrete light duty non-pressure pipes I.S. class NP2 of the following internal diameter with collars and butt ends prepared for collar joints including testing of joints complete. (C) 250mm

The work shall be executed as per specification of **Item No. 120** except for the item is work of providing, laying (to level or slopes) and jointing reinforced concrete light duty non-pressure pipes I.S. class NP2 of the following internal diameter with collars and butt ends prepared for collar joints including testing of joints complete. (C) 250mm

Measurement shall be taken and paid on Rmt. basis.

Item No. 111 :- Filling in foundation and plinth with brick bats, chhara in layers of 20cm. thickness including watering, ramming and consolidating etc. complete.

1.0 MATERIALS

- 1.1. **Bricks bats / chhara** shall be clean, of good binding quality and of approved quality obtained from approved pots / quarries of disintegrated rocks which contain silicon's material and natural mixture of clay of clarions origin. The P.I. value of selected soil used shall not be more than 6.0.

2.0 WORKMANSHIP

- 2.1 The **bricks bats / chhara** to be used for filling shall be free from salts, organic or other foreign matter all clots of **bricks bats / chhara** shall be broken.
- 2.2 As soon as the work in foundation has been completed and measured the site of foundation shall be cleared of all debris brick bats mortar dropping etc. and filled with **bricks bats / chhara** in layers not exceeding 20 cms. each layer shall be adequately watered, rammed and consolidated before the succeeding layer is laid. The **bricks bats / chhara** shall be rammed with iron rammers where feasible and with the but ends of crow-bars. Where rammer cannot be used.
- 2.3 The plinth shall be similarly filled with **bricks bats / chhara** in layers not exceeding 20 cms adequately watered and consolidated by ramming with iron or wooden rammers. When filling reaches finished level the surface shall be flooded with water for at least 24 hours and allowed to dry and then rammed and consolidated.
- 2.4 The finished level of filling shall be kept to shape intended to be given to floor.
- 2.5 In case off large heavy duty flooring like factory flooring, the consolidation may be done by power rollers, where so specified. The extent of consolidation required shall also be as specified.

3.0. MODE OF MEASUREMENTS & PAYMENT

- 3.1 The payment shall be made for filling in plinth and trenches no deduction shall be made for shrinkage or voids, if consolidated as instructed above.
- 3.2 The rate includes cost of collecting and carting brick bats / chhara with all lead and labour required filling in trenches and plinth.
- 3.3 The rate shall be for a unit of one Cum.

Item No. 112 :- Providing and fixing PVC SWR Nahni trap IS-14735 for drain - 75 mm diameter with jali of the following nominal diameter of self cleansing design with C.I screwed down or hinged grating including the cost of cutting and making good the walls.

1.0. Materials

1.1. The PVC SWR Nahni Trap IS 14735 for drain with jali shall conform to M-69. The C.I. hinged or screwed down cover shall be of best quality and approved by Engineer in charge.

2.0. Workmanship

2.1. The PVC SWR Nahni Trap with 75 mm. dia inlet and 50 mm. dia. outlet shall be fixed as per drawing or as directed.

2.2. The PVC SWR Nahni Trap shall be jointed with C.I. pipe, 75 mm. dia. with lead joints. The lead joints shall be done in conformation with I.S. 782-1976.

3.0. Mode of measurements and payment

3.1. The rate includes cost of RCC slab hole, 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. 113 :- Providing, fixing and erecting steel shed including 50mm dia. M.S. G.I. pipe (class-B), framing of structure with hollow section of size 25mm x 25mm x 1.5mm, 6mm thick gusset plate, painting with two coats of oil paint including priming coat. Rates including with necessary excavation, cement concrete 1:2:4, fabrication work including cutting, welding, making holes by drilling machine & fixing in line and level of all structure including cost of all laboures, fixtures, fastening and equipments etc. complete.

The item of work shall be carried out as described in item. The excavation work shall be carried out as per Item No. 1 above. Cement concrete work in proportion 1:2:4 (for pipe foundation) 1 cement : 2 coarse sand for graded B.T. chips 12mm to 20mm) with necessary scaffolding and form work shall be done. The column pipes shall confirm to standard galvanised mild steel medium grade tube of 50mm dia. The frame structure shall be of structural steel as specified. The structure shall be painted with primer coat and two coats of oil paint as specified in item of painting to steel work.

Item also includes for drilling holes in gusset plates, fixing & welding pipe to gusset plate including cutting, welding, making holes for nuts and bolts in structural steel & fixing components and fixing in line and level of all structure including cost of all labours, fixtures, fastening necessary equipments etc. comp.

The mode of measurement and payment shall be on **Sq.mt.** basis of work executed.

Item No. 114 :- Office Table :- 18mm thick three layer pre laminated particle board Work with PVC edge band 2mm thick wrapped around the top, decorative aluminium bidding in top and modesty including all necessary elements with necessary features and fastening finish all as per directed by Engineer in charge. 6 FT Office Table (Dimension :- 180 cm x 90cm x 75 cm) with suitable brand.

1.0. Materials

1.1. Plywood

- 1.1.1 Ply shall be MR grade IS 303 certified, Termite proof of brand specified in Annexure-A of approved brand list with 5 years guarantee against termite, borer, seepage etc.
- 1.1.2 Ply shall be of thickness & size as per detailed drawings.

1.2 Veneer

- 1.2.1 Veneer should be natural and of 4mm thickness of brand specified in Annexure-A of approved brand list.

1.3 Wood

- 1.3.1 Wood shall be as per building specification Item No. M-29.
- 1.3.2 Wood shall be of Burma or Indian Teak, dry & free from defects line knots, cracks, sap etc.

1.4 Melamine polish

- 1.4.1 The materials shall be of brand specified in Annexure-A of approved brand list for wood finish. The application has to be made using sprayer and as per manufacturer's specification.
- 1.4.2 All exposed edges shall be covered with 8 mm thick Teak wood beading Patti (M4) finished with melamine polish (M29).
- 1.5 As per description of item and relevant additional general specification item.

1.6 Laminate

- 1.6.1 Decorative Laminate shall be of 1.0 mm thick (M24) on outside portion & 0.8 mm thick liner laminate (M25) in inside as specified & approved by architect.
- 1.6.2 Laminate should be made as per standard IS:2046-1995.
- 1.6.3 Laminate should be free from any stain, scratch, crack etc.
- 1.6.4 Laminate should be of grade 1 & of approved brand.
- 1.6.5 Laminates used should be of 1mm thickness and inside 0.8mm thick liner laminate of approved brand, pattern and finish.

1.7 Solid surfaces

- 1.7.1 Solid surfaces shall be of 12mm thick & of brand specified in Annexure-A of approved brand list.
- 1.7.2 Solid surfaces should be bendable.
- 1.7.3 Solid surfaces should be free from any stain, scratch, crack etc.
- 1.7.4 Solid surfaces should be of grade 1 & of approved brand.

1.8 Hardware

- 1.8.1 Hardware used should be of brand specified in Annexure A of approved brand list. Decorative hardware fittings should be made of brass or SS 304 of design approved by an Architect.

2.0 Workmanship

- 2.1 As per description given above and to the satisfaction of the Engineer in charge.
- 2.2 As per best fair industries practice.
- 2.3 As per relevant specifications describe in Additional General furnishing specification.
- 2.4 Melamine polish : The surface to be used shall be sand papered using Emery Paper No.180 or any suitable grade along the grains. After brushing the surface free of loose dust, wood filler shall be applied. Excess filter shall be removed immediately. Allow a gap of 1 hour. If second coat is required. On drying of the filler, after 8 hrs. the surface is to be sand papered again with Emery paper no. 180/220 and the surface is brushed free of loose dust. Sealer coat as per manufactures specification is then applied in two coats and then sand papered with emery paper no. 240 & finally with emery paper no. 400 & clean thoroughly. Final finish coat is then applied on the finished surface after mixing the base and hardener in a container and allowing the mix to stand for 30 minutes and then applied.
- 2.5 Solid surfaces should be given mirror polish finish on all part including in carving portion made by CNC process.
- 2.6 Joining of wood, ply wood, laminate, veneer, glass, solid surface etc. should be done applying specified adhesive/ sealant, pressing for minimum time of 24 hours and ensuring zero gap fitting.

3.0 Mode of measurement & payment:

- 3.1 The rate shall be includes cost of all materials and labour required for satisfactory completion of this item as described above.
- 3.2 The work shall be measured for the finished work. For payment length and width of office table will be measured.
- 3.3. The rate shall be for a unit of **No.**

Item No. 115 :- Revolving Chair :- Full-Back Executive Office Chair upholstered in bonded leather and PVC, Padded seat and back for all-day comfort and support, Pneumatic seat-height adjustment; 360-degree swivel; smooth-rolling casters and having overall dimension 73.9D x 66.5W x 115.6H centimeters with Armrest (Brown) with selected brand.

1.0. Materials

- 1.1. The material shall be use as per general specifications attached here with.
- 1.0 The material shall be use as per description of item given above and as directed by the Engineer in charge.
- 1.1 As per relevant additional general specification item.

2.0 Workmanship

- 2.1 As per description given above and to the satisfaction of the Engineer in charge.
- 2.2 As per best fair industries practice.
- 2.3 As per relevant specifications describe in Additional General furnishing specification.
- 2.4 **Revolving chair :- Full-Back Office Chair upholstered in bonded leather and PVC, Padded seat and back for all-day comfort and support, pneumatic seat-height adjustment; 360-degree swivel; smooth-rolling casters and having overall dimension 73.9D x 66.5W x 115.6H Centimeters with Armrest (Brown) with selected brand as directed by the Architect and approved by the Engineer in charge.**

3.0 Mode of measurement & payment:

- 3.1 The rate shall be includes cost of all materials and labour required for satisfactory completion of this item as described above.
- 3.2 The work shall be measured for the finished work.
- 3.3. The rate shall be for a unit of **one No.**

Item No. 116 :- File Rack :- lack adjustable 5-Shelf Shelving Unit Storage Rack Utility Rack Garage Shelves Display Rack Steel Boltless Rivet Rack, 60 inches Height 1-Pack ({5 - SECTION } 5'[H] x 2'[L] x 1'[D]) with suitable brand.

1.0. Materials

- 1.1. The material shall be use as per general specifications attached here with.
- 1.2 The material shall be use as per description of item given above and as directed by the Engineer in charge.
- 1.3 As per relevant additional general specification item.

2.0 Workmanship

- 2.1 As per description given above and to the satisfaction of the Engineer in charge.
- 2.2 As per best fair industries practice.
- 2.3 As per relevant specifications describe in Additional General furnishing specification.
- 2.4 **File Rack :- lack adjustable 5-Shelf Shelving Unit Storage Rack Utility Rack Garage Shelves Display Rack Steel Boltless Rivet Rack, 60 inches Height 1-Pack ({5 - SECTION } 5'[H] x 2'[L] x 1'[D]) with suitable brand as directed by the Engineer in charge.**

3.0 Mode of measurement & payment:

- 3.1 The rate shall be includes cost of all materials and labour required for satisfactory completion of this item as described above.
- 3.2 The work shall be measured for the finished work.
- 3.3. The rate shall be for a unit of **one No.**

Item No. 117 :- Visiting Bench :- Chair Three Seater Waiting Area Chair Reception Chair 325-350 Kg Weight Handling Capacity. Durable Parts and support, Our Chairs have whole welded connections.

Product dimensions: Length (70 inches), Width (23 inches), Height (31 inches)

Color : Shining Silver, Material : Mild Steel (Iron), Finish: Chrome Finish, Style: Contemporary

1.0. Materials

- 1.1. The material shall be use as per general specifications attached here with.
- 1.2 The material shall be use as per description of item given above and as directed by the Engineer in charge.
- 1.3 As per relevant additional general specification item.

2.0 Workmanship

- 2.1 As per description given above and to the satisfaction of the Engineer in charge.
- 2.2 As per best fair industries practice.
- 2.3 As per relevant specifications describe in Additional General furnishing specification.

2.4 Visiting Bench :- Chair Three Seater Waiting Area Chair Reception Chair 325-350 Kg Weight Handling Capacity as directed by the Engineer in charge.

3.0 Mode of measurement & payment:

- 3.1 The rate shall be includes cost of all materials and labour required for satisfactory completion of this item as described above.
- 3.2 The work shall be measured for the finished work.
- 3.3. The rate shall be for a unit of **one No.**

Item No. 118:- Steel Stool :- Office Stainless Steel Stool having minimum overall dimension 35.6D x 35.6W x 76.2H Centimeters, made with S.S. leg and rubber pad / bushing with suitable brand which will select by engineer in charge.

1.0. Materials

- 1.1. The material shall be use as per general specifications attached here with.
- 1.2 The material shall be use as per description of item given above and as directed by the Engineer in charge.
- 1.3 As per relevant additional general specification item.

2.0 Workmanship

- 2.1 As per description given above and to the satisfaction of the Engineer in charge.
- 2.2 As per best fair industries practice.
- 2.3 As per relevant specifications describe in Additional General furnishing specification.
- 2.4 **Steel Stool :- Office Stainless Steel Stool having minimum overall dimension 35.6D x 35.6W x 76.2H Centimeters, made with S.S. leg and rubber pad / bushing with suitable brand which will select by engineer in charge.**

3.0 Mode of measurement & payment:

- 3.1 The rate shall be includes cost of all materials and labour required for satisfactory completion of this item as described above.
- 3.2 The work shall be measured for the finished work.
- 3.3. The rate shall be for a unit of **one No.**

Item No. 119 :- Chair :- S.S. Chair for Office having seat and back with selected cushion, Fabric, Pattern, PU with arm rest and minimum overall dimension 78.7D x 41.9W x 78.7H Centimeters with suitable brand which will select by engineer in charge.

1.0. Materials

- 1.1. The material shall be use as per general specifications attached here with.
- 1.2 The material shall be use as per description of item given above and as directed by the Engineer in charge.
- 1.3 As per relevant additional general specification item.

2.0 Workmanship

- 2.1 As per description given above and to the satisfaction of the Engineer in charge.
- 2.2 As per best fair industries practice.
- 2.3 As per relevant specifications describe in Additional General furnishing specification.
- 2.4 **Chair :- S.S. Chair for Office having seat and back with selected cushion, Fabric, Pattern, PU with arm rest and minimum overall dimension 78.7D x 41.9W x 78.7H Centimeters with suitable brand which will select by engineer in charge.**

3.0 Mode of measurement & payment:

- 3.1 The rate shall be includes cost of all materials and labour required for satisfactory completion of this item as described above.
- 3.2 The work shall be measured for the finished work.
- 3.3. The rate shall be for a unit of **one No.**

Item No. 120:- Stainless Steel Office Almira h : Supply and installing Portable Modern double Door steel almira h with nearer 30 kg wt having dimension 36 x 18 x 78.5 inch made from SS, Eco friendly and UV resistant in grey color having minimum 4 partition for file rack and other department as per selected and directed by Engineer incharge.

1.0. Materials

- 1.1. The material shall be use as per general specifications attached here with.
- 1.2 The material shall be use as per description of item given above and as directed by the Engineer in charge.
- 1.3 As per relevant additional general specification item.

2.0 Workmanship

- 2.1 As per description given above and to the satisfaction of the Engineer in charge.
- 2.2 As per best fair industries practice.
- 2.3 As per relevant specifications describe in Additional General furnishing specification.
- 2.4 **Supply and installing Portable Modern double Door steel almira h with nearer 30 kg wt having dimension 36 x 18 x 78.5 inch made from SS, Eco friendly and UV resistant in grey color having minimum 4 partition for file rack and other department as per selected and directed by Engineer incharge.**

3.0 Mode of measurement & payment:

- 3.1 The rate shall be includes cost of all materials and labour required for satisfactory completion of this item as described above.
- 3.2 The work shall be measured for the finished work.
- 3.3. The rate shall be for a unit of **one No.**

Item No. 121 :- Providing, supplying and fixing the A.C. of 1.5 tonne of standard company i.e. Blue star, Panasonic or equivalent as per manufacturer specification and select by Engineer in charge

1.0. Materials

- 1.1. The material shall be use as per general specifications attached here with.
- 1.2 The material shall be use as per description of item given above and as directed by the Engineer in charge.
- 1.3 As per relevant additional general specification item.

2.0 Workmanship

- 2.1 As per description given above and to the satisfaction of the Engineer in charge.
- 2.2 As per best fair industries practice.
- 2.3 As per relevant specifications describe in Additional General furnishing specification.
- 2.4 **The A.C. of 1.5 tonne of standard company i.e. Blue star, Panasonic or equivalent as per manufacturer specification and select by Engineer in charge**
- 3.0 Mode of measurement & payment:**
- 3.1 The rate shall be includes cost of all materials and labour required for satisfactory completion of this item as described above.
- 3.2 The work shall be measured for the finished work.
- 3.3.