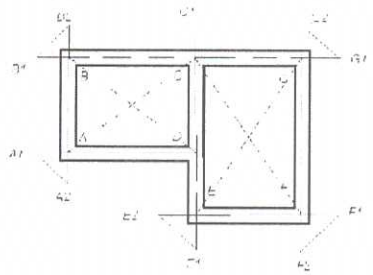
25!

Scoring Indicators

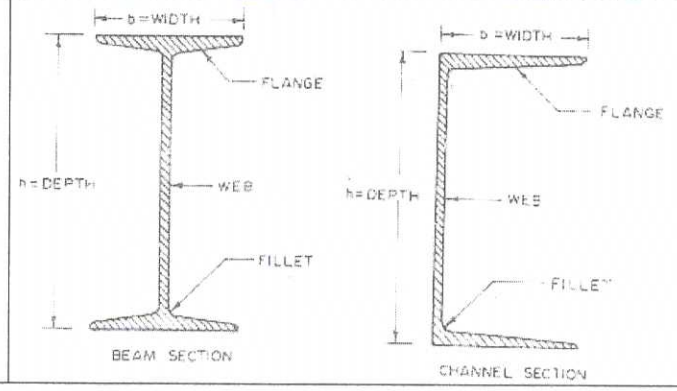
COURSE NAME: BUILDING CONSTRUCTION & CONSTRUCTION MATERIALS

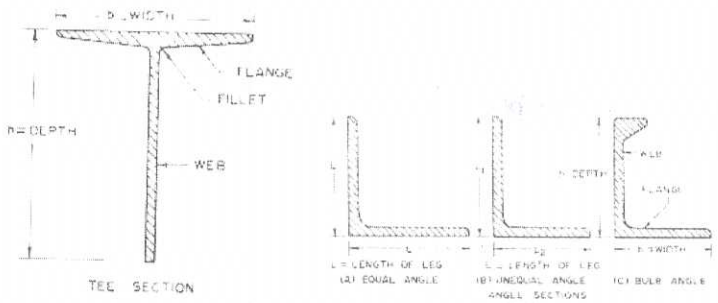
COURSE CODE: 3013 **QID: 2110220095**

Q No	Scoring Indicators	Split score	Sub Total	Total score
	PART A			**9**
I. 1	Exogenous trees	1	1	
I. 2	First class bricks, Second class bricks, Third class bricks, Fourth class bricks.	0.25 each	1	
I. 3	Bagasse is used for making mineral admixture in concrete and mortar. Bagasse ash is also used for making bagasse bricks.	Any 1 use	1	
I. 4	Aluminium, Copper, Lead, Zinc	Any 2 – 0.5 each	1	
I. 5	• when columns are closely spaced. • when dimensions of one side is restricted	0.5 each	1	
I. 6	• Structure between ground and floor • Prevents entry of rain water in to the building • Transmit load of super structure to foundation • Plinth provide a level surface • Plinth supports walls	Any 2 – 0.5 each	1	
I. 7	IS 13920	1	1	
I. 8	Method of arranging bricks in masonry so that they overlap properly and are tied to act as a single unit is called bond.	1	1	
I. 9	Staircase, lifts, escalators	Any 2 - 0.5 each	1	
	PART B			24
II. 1	• Efflorescence test • Hardness test • Size, Shape and Colour test • Soundness test • Structure test	Any 3 points	3	
II. 2	• Geological – Igneous, sedimentary, metamorphic rocks • Physical – Unstratified, stratified, Foliated rocks • Chemical – Silicious, Argillaceous, Calcareous rocks	1 1 1	3	
II. 3	1. Knots 2. Shakes 3. Twisted fibre 4. Rind galls 5. Upsets 6. Burls 7. Chemical stains	Any 6	3	

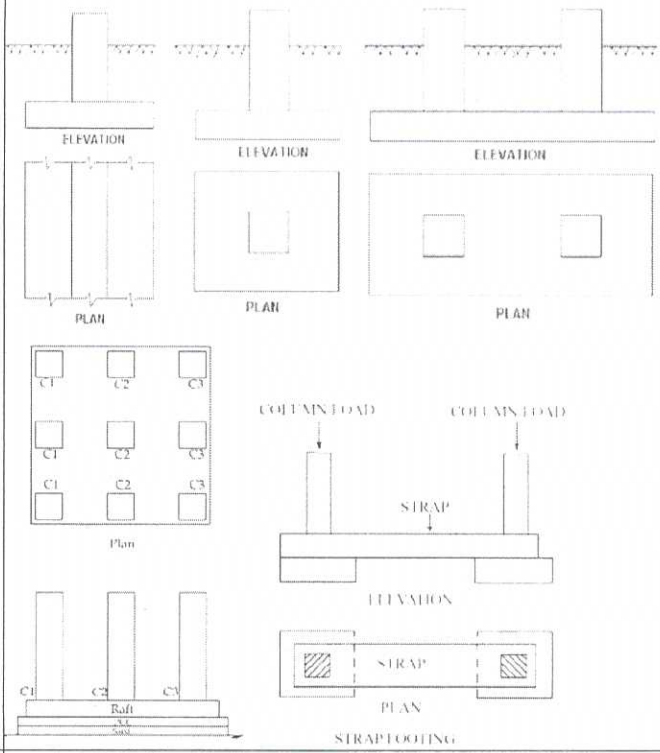
II. 4	1. Polyurethane 2. Cementitious Coating 3. EPDM Rubber 4. Rubberized Asphalt 5. Thermoplastic 6. Bituminous Membrane 7. PVC Waterproofing Membrane	Explain any 3	3	
II. 5	**Pig iron** • The impure iron which is extracted from iron ores is known as the pig – iron. **Cast iron** • By remelting pig iron in Cupola furnace • Composition – 2 to 4 percent of carbon, manganese, phosphorous, silicon and Sulphur. **Wrought iron** • It is almost pure iron. • Obtained by melting iron in such a way as to remove all the carbon and other impurities. **Steel** • This is an alloy of iron and carbon with traces of other elements (silicon, manganese, phosphorous, sulphur) present as impurities. • It is manufactured from pig iron or iron ores by Bessemer process or by open hearth process. • Depending upon the carbon content, the steel is designated as the mild steel or medium carbon steel or high carbon steel.	Any 2. 1.5 mark each	3	
II. 6	1. From the plan, the center lines of the walls are calculated. Then the center lines of the rooms are set out by setting perpendiculars in the ratio 3:4:5. The corner points are marked by pegs with nails on top. 2. The setting of the corner point is checked using diagonals.  3. During excavation, the center points A, B, C, D, E, F, G may be removed. Therefore the center lines are extended and the center points are marked about 2m away from the outer edge of excavation. Centre line are shown clearly by stretching thread or rope. 4. From the plan details, the width of excavation to be done is also marked by thread with pegs at appropriate	Fig – 1 Explanation - 2	3	

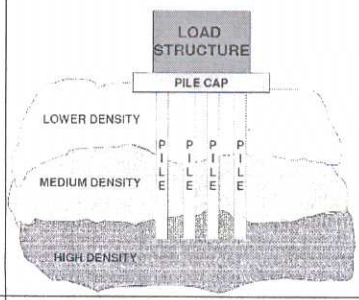
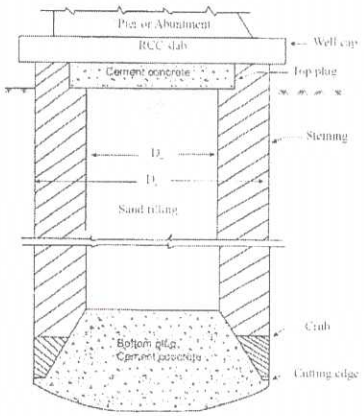
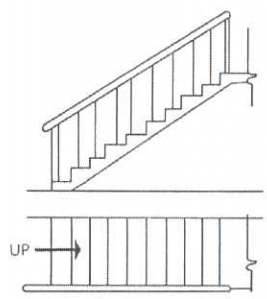
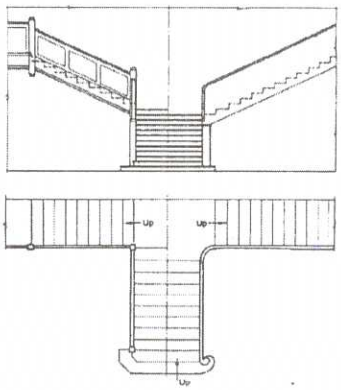
	positions. 5. The excavation width is then marked by lime or by furrow with spade.			
II. 7	**Functions of foundations:** • Most important part of building • Transmit load from superstructure to subsoil • For uniform distribution of load • To provide level surface for construction of superstructure • To reduce load intensity • To assure settlements are within permissible limits • To assure soil does not fail in shear • To prevent side wise movements	Any 3	3	
II. 8	Classification of buildings as per NBC is done on the basis of Occupancy. • A - Residential • B - Educational • C - Institutional • D - Assembly • E - Business • F - Mercantile (both retail and wholesale stores) • G - Industrial (low, moderate, and high fire hazards) • H - Storage • J - Hazardous	All 9 points	3	
II.9	1. Brick should conform to IS Specifications 2. Bricks should be immersed in water for a sufficient time to avoid them from absorbing water from the mortar 3. Brick should be laid on their beds with the frogs upward 4. Queen closers (Brickbats) should be used at a junction of a wall. Brick masonry must be in exact plumb, level, and all layers should be horizontal. 5. Brick bats should be avoided as far as possible 6. Maximum height of construction/day is 1.5 m 7. Joint thickness should be thin 8. Wall should be raised uniformly 9. Good quality mortar & proper bonding should be confirmed	Any 6 points	3	
II.10	• Underpinning is a method for repair and strengthening of building foundations. • The method of underpinning help to strengthen the foundation of an existing building or any other infrastructure. These involve installation of permanent or temporary support to an already held foundation so that additional depth and bearing capacity is achieved. Following are the different underpinning methods used for foundation strengthening:	3	3	

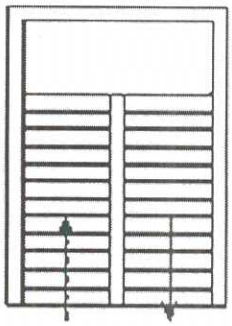
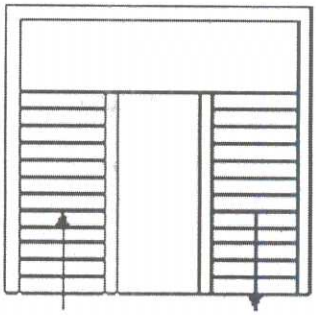
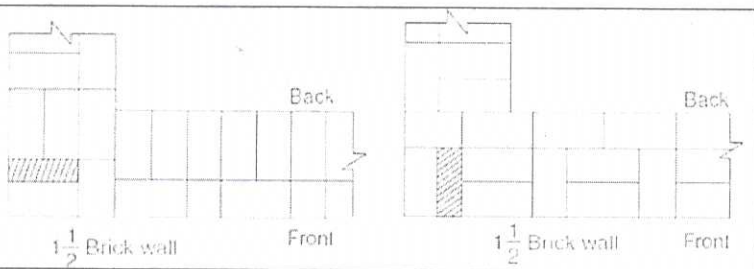
	• Mass concrete underpinning method (pit method) • Underpinning by cantilever needle beam method • Pier and beam underpinning method • Mini piled underpinning • Pile method of underpinning • Pre-test method of underpinning			
	PART C			**42**
III. 1	1. Selection of suitable clay. 2. Preparation and tempering of mud. 3. Moulding of brick units. 4. Drying of moulded brick. 5. Loading of dried brick in kilns. 6. Firing or burning of dried bricks. 7. Cooling of units.	1 1 1 1 1 1 1	7	
III. 2	**First Class Bricks:** • These bricks are **table moulded** and of standard shape and they are **burnt in kilns**. • The surface and edges of the bricks are sharp, square, smooth and straight. • They comply with **all the qualities of good bricks**. • Compressive strength not less than 107 kg/cm^2 • Water absorption 12% to 15% of its dry weight when immersed in cold water for 24 hrs. • These bricks are used for superior work of permanent nature. **Second Class Bricks:** • These bricks are **ground moulded** and they are **burnt in kilns**. • The surface of these bricks is somewhat **rough and shape is also slightly irregular**. • These bricks **may have hair cracks** and their edges may not be sharp and uniform. • Water absorption is **16 to 20%** • Compressive strength not less than **70 kg/cm^2** • These bricks are commonly used at places where brick work is to be provided with a coat of plaster.	3.5 3.5	7	
III. 3		Any 3 names - 1 Any 3 Fig – 6	7	

				
III. 4	**Distempers** • Consists of powdered chalk as base, clean water with some glue as vehicle and colouring pigment depending upon the nature of colour required. • Are available in the form of powder (dry distempers) or in the form of paste (Oil bound distempers) • Provide better and smooth surface than white wash • More durable • Provide pleasing appearance • The cheapest form of finish (other than white wash) **Varnishes** • Transparent or semi-transparent solution of resinous substance either in turpentine or alcohol or linseed oil. • Resins are used instead of base • Commonly used resins are copal, amber, shellac, mastic, gum etc • Solvent helps in spreading resin over the surface. Commonly used solvents are boiled linseed oil, turpentine oil, methyl alcohols • Driers are used to accelerate the process of drying. Litharge, lead acetate, white copper are commonly used.	3 4	7	
III. 5	Ingredients of an oil paint **1. Base** • Provides body to the paint • Provides an opaque coating and hides the surface to be painted • Provides strength to the paint & reinforces the film after it has dried • Makes the paint film, durable and more resistant to abrasion • In drying it minimises shrinkage cracks in film • Prevents penetration of paint to the underlying surface. **2. Vehicle or carrier** • Liquid substances which holds the solid materials of the paint. • Acts as a binder to the base and pigment and allow easy application. • Imparts durability, toughness and water proof ness to the paint film • Commonly used vehicles are **linseed oil**, poppy oil, nut oil, tung oil etc. **3. Colouring Pigments** • Finely divided solid substance which provides required	List – 2 Explanation of each - 5	7	

	shade and colour to the paint • Reduces the intensity of development of cracks due to drying of vehicle **4. Solvent or Thinner** • A volatile substance added to the paint to make its application easy and smooth • Common solvents are turpentine, petroleum spirits, napthas and coal tar hydro carbons **5. Drier** • Metallic compounds when added in small quantities accelerates the process of drying • Absorbs oxygen from atmosphere and accelerates drying • Commonly used driers are litharge, lead acetate, manganese sulphate etc. **6. Inert filler** • Acts as an adulterant and modifies the weight of paint • Do not react chemically with any other ingredients Increases the volume of paint			
III. 6	Flyash • Fly ash is also known as a pulverized-fuel ash. • The fly ash particles are finer than cement particles and spherical. The color of fly ash is light grey to dark grey. • It reduces the cement aggregate reaction. • It improves the water tightness of concrete. • It improves the plasticity and cohesiveness of the mixture. Blast furnace slag • The highly cementitious properties of BFS, comprising of lime, silicates and aluminates, make it a good material to be used in concrete. • BFS is commonly used in both **cement production** as a substitute for clinker and in **concrete production** as a substitute for aggregates. • Its hydraulic property also allows its application in **soil stabilization** and in **mortar for masonry**. Silica fume • Micro silica or silica fume is SiO_2 / silicon di-oxide. It is an ultrafine powder collected as a by-product during the production of the silicon and ferrosilicon alloys. • It consists of spherical particles having an average diameter of 150nm. The main field application is as pozzolanic material for **high performance concrete.** Bagasse • By-product of the sugarcane mill. Solid by-product when the liquid components are extracted from the plants. • SCBA (Sugarcane Bagasse ash) is used as a mineral admixture in concrete and mortar. • Bagasse ash is also used for making bagasse bricks. Rice husk ash • Rice husk ash is a by-product of agriculture and is generated in rice mills. • Rice husk (rice hull) is the coating of seeds or grains of rice. When properly burnt, rice husk contains high amounts	List any 4 – 2 Explain any 2 – 5 marks	7	

	of silica (SiO_2). Hence it can be used as supplementary cementitious material in combination with cement to make concrete products. Coir fibres • Coir fiber is the natural fiber extracted from the husk of the coconut. • The coir fiber is the thickest and most resistant of all commercial natural fibers. • Low decomposition rate is the key advantage for making durable products. • Used in coir fiber-reinforced concrete and coir geotextiles			
III. 7	1. Wall/Strip footing 2. Isolated spread footing 3. Combined footing 4. Cantilever/Strap footing 5. Mat/raft footing 	List – 3 Any 4 Fig - 4	7	
III. 8	1. Pile foundations • Used when bearing capacity of soil is poor • Pile is a slender (long) member with a small cross-sectional area • Used to transmit foundation loads to a deeper rock stratum 2. Well foundation / Caissons • Provided below water level for bridges • Caisson means 'box' • Construction of structures in water Dams, bridges, etc. 3. Pier foundations • Relatively larger cross-sectional area than pile	List – 2 Fig – 2 Explanation - 3	7	

	  Fig 1 Parts of a Well Foundation			
III. 9	a) Baluster - Vertical member fixed between string and handrail for safety. b) Balustrade - Combined framework of handrail and balusters c) Newel post - Vertical member provided at beginning & end of a flight. d) Nosing - Projecting part of tread beyond the face of riser. e) Going - Horizontal distance b/w faces of two consecutive risers	1.5 1.5 1.5 1.5 1	7	
III. 10	1. Straight stairs 2. Turning stairs Quarter turn Half turn – dog legged and open well stairs. Three quarter turn 3. Geometrical stairs 4. Circular stairs  STRAIGHT STAIR 	List – 3 Any 2 – Figs - 4	7	

	 dog legged stair  Open well stair			
III. 11		3.5 each	7	
III. 12	1. Thatch - very cheap, suitable for small residential buildings in villages. 2. Shingle – used in hilly areas for low-cost housing. 3. Tiles – easily available at low cost. Can be easily manufactured and placed in position. Suitable for all climatic conditions. 4. Slates - Grey sedimentary rock that can easily split into thin sheets. A good slate is hard, tough, durable and have rough texture. Used in areas where slate quarries are nearby 5. AC sheets - Commonly used as covering materials in ware houses, godowns or for larger halls 6. GI sheets - Corrugated sheets fixed to steel purlins using J-bolts and washers. Galvanization of iron makes them rust proof 7. Aluminium sheets - Aluminum is lighter in weight. Good anti-rust effect. Durable, fire proof, and need no maintenance. Resistant to rot and rust, and insects like termites. 8. PVC sheets - Polyvinyl Chloride (PVC) sheets are flexible. Good damp proof. Durable and need no maintenance. Not suitable for high temperature regions. 9. RCC flat roof 10. Fiber reinforced cement board	Any 7	7	