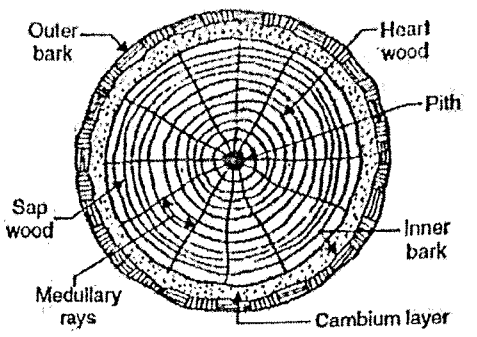


Scoring Indicators

COURSE NAME: BUILDING CONSTRUCTION AND CONSTRUCTION MATERIALS

COURSE CODE: 3013

QID:2110220099

Q No	Scoring Indicators	Split score	Sub Total	Total score
PART A				9
I. 1	Bricks, tiles, cement, precast concrete, plywood, glass etc.	Any 2 0.5x2	1	
I. 2	The process of chemical combination of lime with such a quantity of water as will readily absorb is called slaking of lime.	1	1	
I. 3	Fly ash, Blast furnace slag	0.5x2	1	
I. 4	Gypsum(Calcium sulphate) and water	0.5x2	1	
I. 5	Distempers are paints consisting of powdered chalk, pigments and glue mixed in water.	1	1	
I. 6	Group A- Residential building Group C- Institutional building	0.5x2	1	
I. 7	Stepped footing, Wall footing, Column footing, Isolated footing, Combined footing (Any 2)	0.5x2	1	
I. 8	Rubble masonry and Ashlar masonry	0.5x2	1	
I. 9	A roof with sloping surface is known as a pitched roof	1	1	
PART B				24
II. 1		1.5	3	
		1.5		

	Parts			
II. 2	<p>Silica- The presence of silica prevents cracking, shrinking and warping of raw bricks. It imparts uniform shape to the bricks.</p> <p>Alumina- This constituent imparts plasticity to the earth so that it can be moulded.</p>	1.5 1.5	3	
II. 3	<p>Properties of mild steel:</p> <p>Following are the properties of mild steel:</p> <p>(1) It can be magnetised permanently.</p> <p>(2) It can be readily forged and welded.</p> <p>(3) It cannot be easily hardened and tempered.</p> <p>(4) It has fibrous structure.</p> <p>(5) It is malleable and ductile.</p> <p>(6) It is not easily attacked by salt water.</p> <p>(7) It is tougher and more elastic than wrought-iron.</p> <p>(8) It is used for all types of structural work.</p> <p>(9) It rusts easily and rapidly.</p> <p>(10) Its melting point is about 1400°C.</p> <p>(11) Its specific gravity is 7.80.</p> <p>(12) Its ultimate compressive strength is about 80 to 120 kN per cm².</p> <p>(13) Its ultimate tensile and shear strengths are about 60 to 80 KN per cm².</p>	Any 3 3	3	
II. 4	<p>Methods of water proofing</p> <p>1) Waterproofing with bituminous sheets.</p> <p>2) Water proofing by slurry coats on the roof and covering it with tiles.</p> <p>3) Waterproofing with elastomeric paints.</p> <p>4) Waterproofing with epoxy formulations.</p>	Any 3 3	3	
II. 5	<p>Suggestion</p> <p>Justification</p>	1 2	3	

	<p>Initial cost is more</p> <p>Not economical if there are no reuses.</p> <p>Only economical in large construction works or in situations where large number of reuses of the same shuttering is possible</p> <p>More skilled labourers is required in making steel forms</p>				
II.9	<p>Lifts</p> <p>1. Closed cabins inside vertical shafts that are used to transport people between different floors in high rise buildings.</p> <p>2. Lifts are fast and can move up or down at great speeds....vertical movement.</p> <p>3. Move up or down using counterweights or traction cables.</p> <p>4. Less space is used for its construction as the elevator is limited to the shaft & machine room, which connects all the floors.</p> <p>5. Limited number of people can accommodate at a time.</p>	<p>Escalators</p> <p>1.Moving stairways that allow people to move between floors in busy places such as shopping malls, airports, and railway stations.</p> <p>2. These are slow moving...horizontal & inclined movement.</p> <p>3. The steps of are fixed and linked together and move up but come down from behind on a conveyor belt that is driven by a motor.</p> <p>4. Space used is same as the staircases & connects 2 floors .</p> <p>5. There is no waiting period as one can set foot anytime to climb up or come down.</p>	Any 3 3	3	

	6. If there are electricity cut-outs then it doesn't work.	6. It's very versatile, if there is electric cut-outs then one can climb those steps, which acts like a staircase.			
II.10	<p>Ridge piece: The board placed on the apex line of the sloping roof onto which the upper ends of other rafters are fastened.</p> <p>Common rafter: These are inclined wooden members running from the ridge to the eaves.</p> <p>Wall plate : These are long wooden members, which are provided on the top of stone or brick wall, for the purpose of fixing the feet of the common rafters.</p>		1	3	
			1		
			1		

	PART C			42	
III. 1	<p>Natural Seasoning</p> <p>In this method, the seasoning of timber is carried out by natural air and hence it is also sometimes referred to as air seasoning. The timber has to be stacked properly depending upon the species of timber and the environmental conditions. The timber log is cut and sawn into suitable section of planks or scantlings. Then they are stacked either horizontally or vertically. The stack is to be protected from fast blowing wind, rain and extreme heat of sun. Hence the stack should be preferably be covered by a roof material. The advantage of natural seasoning is that it does not require skilled supervision. This method of seasoning timber is cheap and simple. The disadvantage of natural seasoning is that, as the process depends on the natural air, it sometimes become difficult to control it as well as the drying of different surface may not be even and uniform.</p> <p>Artificial Seasoning</p> <p>It is a quicker method of seasoning timber to the desired</p>		2	7	7
			5		

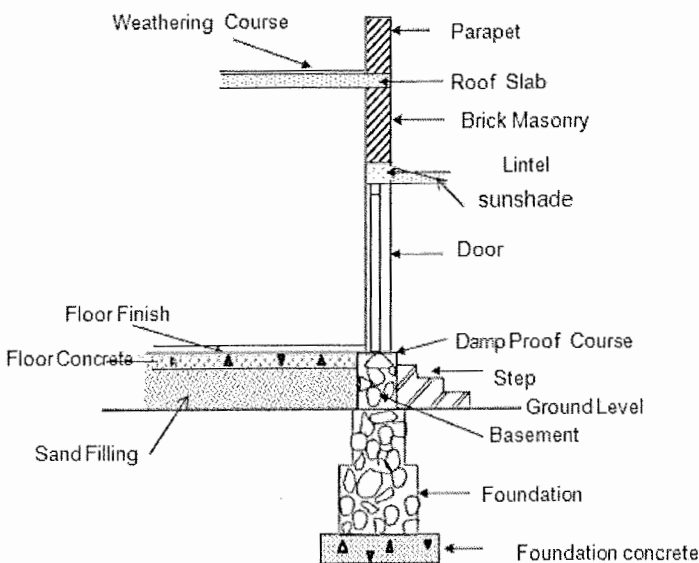
<p>moisture content under controlled conditions. The drying conditions required for different species of timber are different and artificial seasoning makes it possible to provide conditions cited to each species. The advantages of artificial seasoning are speed, adaptability and precision. The various methods of artificial seasoning are boiling, chemical seasoning, electrical seasoning and water seasoning which are as follows</p> <p>(i) Boiling: In this method of artificial seasoning, the timber is immersed in water and water is then boiled. This is a very quick method. The timber is thus boiled with water for about three to four hours. It is then dried very slowly under a shed. The periods of seasoning and shrinkage are reduced by this method, but it affects the elasticity and strength of wood. In place of boiling water, the timber may be exposed to the action of hot steam. This method of seasoning proves to be costly.</p> <p>(ii) Chemical Seasoning: This is also known as salt seasoning. In this method, the timber is immersed in a solution of suitable salt. It is then taken out and seasoned in the ordinary way. The interior surface of timber dries in advance of exterior one and chances of formation of external cracks are reduced.</p> <p>(iii) Electrical seasoning: In this method, the use is made of high frequency alternating currents. The timber, when it is green offers less resistance to the flow of electric current. The resistance increases as the wood dries internally which also results in the production of heat. This is the most rapid method of seasoning. But the initial and maintenance costs are so high that it becomes uneconomical to season timber on commercial basis by this method.</p> <p>(iv) Kiln Seasoning: In this method, the drying of timber is carried out inside an airtight chamber or oven. Depending upon the mode of construction and operation, the kilns are of two</p>			
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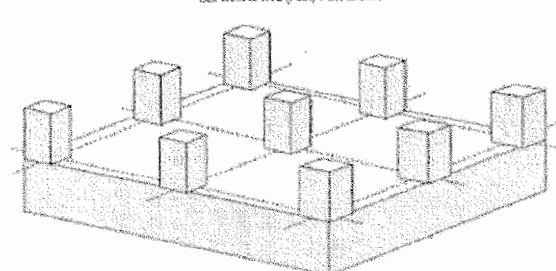
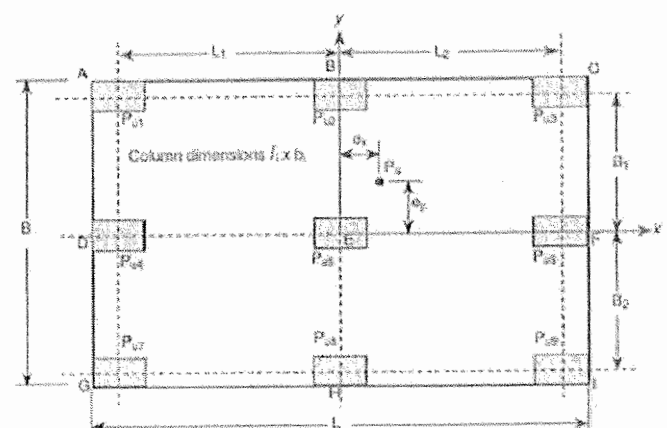
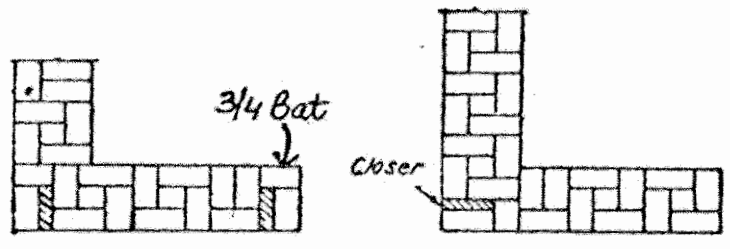
	<p>types namely stationary kilns and progressive kilns. Stationary kiln is adopted for seasoning timber which requires a close control of humidity and temperature. It gives better results. Progressive kiln is used for seasoning timber on a large scale. If not properly attended the drying in this kiln may prove to be unsatisfactory. The kiln seasoning though costly gives well seasoned timber as it controls three important conditions namely circulating air, relative humidity and temperature.</p> <p>(v) Water seasoning: The water seasoning is a quick method and it renders timber which is less liable to shrink or warp. It also removes organic materials contained in sap of timber. It however weakens the timber and makes it brittle.</p>			
III. 2	<p>Manufacturing processes of bricks</p> <p>The processes involved in the manufacture of bricks are as follows:</p> <p>(i) Preparation of clay: The clay is dug out from the ground after the top layer of soil is removed The clay obtained is cleaned of pebbles, stones and vegetable matter etc and is exposed to atmosphere for softening. Then water is added into clay. Any ingredient to be added to clay is mixed and proper blending with water is done before tempering the clay upto a proper degree of hardness.</p> <p>(ii) Moulding: Moulding is done using hand moulding or machine moulding. Moulding is the process of filling the prepared clay into moulds of definite size and pattern. This gives an even surface and shape to the brick.</p> <p>(iii) Drying: The moulded bricks are dried to remove moisture from the clay. The bricks are stacked by providing proper spacing so as to allow free circulation of air. The bricks should be allowed to dry till they become leather hard or bone-dry</p>	2	1.5	1.5
			7	7

	<p>with moisture content of about 2 percent.</p> <p>(iv) Burning: Burning imparts hardness and strength to the bricks and makes them dense and durable. Burning is done either in clamps or kilns. The clamps are temporary structures and they are adopted to manufacture bricks on a small scale. The kilns are permanent structure and are adopted to manufacture bricks on a large scale.</p>	2		
III. 3	<p>Cement Concrete Flooring</p> <p>Concrete is most commonly used flooring material. It is suitable for any type of construction and is cheaper than others and durable. Cement Concrete mix of 1:3:6 to 1:5:10 or lime concrete with 40% 1:2 lime sand mortar and 60% coarse aggregate is used as base course. After hardening, 1:2:4 cement concrete mix with 40 mm thick layer is laid as topping</p> <p>Bricks Flooring</p> <p>Bricks can also be used for flooring purposes, but they are not suitable floor materials for residential or public buildings. Brick floorings are generally used in unimportant rooms, godowns, etc. For this well burnt bricks are preferable and bricks should be in uniform size and have same color.</p> <p>Marble Flooring</p> <p>Marble is a type of metamorphic rock and is used widely for floorings in commercial buildings, kitchens, bathrooms etc. they are stain proof and easily cleanable. They are also available in different colors and designs.</p> <p>Ceramic Flooring</p> <p>Ceramic tiles are famous floor covering materials. Ceramic is inorganic material and it possess properties like good compressive resistance, brittleness and hardness etc</p>	7	7	7

III. 4	<p>Properties of plywood</p> <ol style="list-style-type: none"> 1) They possess uniform tensile strength in all directions. 2) They are light in weight. 3) They are not easily affected by moisture. 4) Their expansion and shrinkage are very low. 5) They do not split in an axial direction. <p>Uses of plywood:</p> <ol style="list-style-type: none"> 1) Plywood are used for partitions. 2) Plywood are used for concrete formwork. 3) Plywood are used in railway coaches. 4) Plywood are used for paneling walls. 5) Plywood are used in the construction of furniture's and doors. 	Any 4 4	7	7
		Any 3 3		

III. 5	<p>Classification of glass</p> <p>1) Soda lime glass - This is a soft glass. This is a mixture of sodium silicate and calcium silicate. It is used in the manufacture of glass tubes and other laboratory apparatus.</p> <p>2) Potash lime glass - This is also called bohemian glass or hard glass. It is the mixture of potassium silicate and calcium silicate. This type of glass is used in the manufacture of glass articles which have to withstand high temperatures such as combustion tubes.</p> <p>3) Potash lead glass - This is also known as flint glass. It is mainly a mixture of potassium silicate and lead silicate. It is used in manufacture of artificial gems, electric bulbs, lenses and prisms etc.</p> <p>4) Common glass - This is also known as flint glass. It is mainly a mixture of sodium silicate, calcium silicate and iron silicate. It is mainly used in the manufacture of bottles for medicines.</p> <p>5) Borosilicate glass - Borosilicate glass is made mainly of 70% to 80% silica and 7% to 13% boric oxide with smaller amount of alkalis and aluminium oxide. They are used for the manufacture of laboratory apparatus</p>	Any 4 List-2 Exp-5	7	7
III. 6	<p>Types of structural steel sections</p> <p>1) Angle sections</p> <p>2) Channel sections</p> <p>3) I- sections</p> <p>4) T- sections</p> <p>5) Plates</p> <p>6) Round bars</p> <p>7) Square bars</p> <p>8) Flat bars</p> <p>9) Tubes</p>	Any 4 4	7	7

	Neat Sketches	3		
III. 7	 <p style="text-align: center;">COMPONENTS OF A BUILDING</p>	7	7	7
III. 8	<p>Raft foundation</p> <p>A foundation system in which essentially the entire building is placed on a large continuous footing.</p> <p>Usually large concrete slab supporting many columns.</p> <p>Commonly used as foundation for silos, chimneys, large machinery.</p> <p>It is a flat concrete slab, heavily reinforced with steel, which carries the downward loads of the individual columns or walls.</p> <p>Raft foundation is generally suggested in the following situations:</p> <p>(a) Whenever building loads are so heavy or the allowable pressure on soil so small that individual footings would cover more than floor area.</p> <p>(b) Whenever soil contains compressible lenses or the soil is sufficiently erratic and it is difficult to define and assess the extent of each of the weak pockets or cavities and, thus, estimate the overall and differential settlement.</p>	4	7	7

	<p>(c) When structures and equipment to be supported are very sensitive to differential settlement.</p>   <p style="text-align: center;">Top View of Mat (Raft) Foundation</p>	3		
<p>III. 9</p>	 <p style="text-align: center;">One-and-a-half-bricks double Flemish bond.</p>	3.5 3.5	7	7
<p>III. 10</p>	<p>Windows</p> <p>Different types of windows are</p> <ol style="list-style-type: none"> 1) Casement window 2) Corner window 3) Sliding window 4) Louvered or venetian window 5) Bay window 6) Dormer window 	3	7	7

	<p>7) Gable window</p> <p>8) Skylight</p> <p>Casement window: - It is a window that is attached to its frame by one or more hinges. These are hinged at the side. They are used singly or in pairs within a common frame, in which case they are hinged on the outside. When fully opened, offer the maximum amount of ventilation. Operates like a hinged door, except that it opens and closes with a lever inside the window. The shutter consists of styles, top rail, bottom rail and intermediate rail. Depending upon the design, the frame can have additional vertical and horizontal members i.e. mullion and transom respectively. The panels may be either glazed, unglazed or partly glazed and are fixed in the grooves made in rails and styles.</p> <p>Corner window: - These are provided at the corner of the room. Light and air is admitted from two directions. The jamb post at the corner is made of heavy section.</p> <p>Sliding windows-Are windows constructed in a frame and installed so that they slide open and closed, as opposed to opening, in or out, on a hinge.</p> <p>Louvered windows: - Are type of window made of glass slats set in metal clips that can be opened and closed in unison.</p> <p>Bay windows: - Are specially designed windows which create a niche in a home filled with light. Typically, they highlight a stunning view such as the ocean or a sweeping meadow, and they are often designed with window seats so that people can sit in the windows and enjoy a book.</p> <p>Dormer window and Gable window. The windows provided at the dormer end and gable end of the sloping roof to provide light and ventilation to the enclosed space below the roof.</p>	4		
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III. 11	<p>Lifts</p> <p>1. Passenger lift: These are ordinary lifts. Which are commonly used in high rise buildings. When the numbers of floors are more than four, lifts are generally provided. The passenger lifts consist of a cabin having standing capacity of 4-20 persons. The passenger lifts are used in residential buildings, office buildings, hotels, hospitals, commercial complexes etc. The passenger lifts are placed alongside the stairs and near to the entrance of the buildings. The passenger lift moves at a speed of 0.5 m/s to 1.0 m/s. Passenger lifts should be properly ventilated fitted with a fan and comfortably standing space.</p> <p>2. Goods or Service lift: These lifts are used in factories, ware houses and similar other buildings. These lifts are meant for lifting heavy equipments, goods etc. The speed of these lift vary from 0.25 m/s to 1.0 m/s.</p> <p>3. Open lifts: Open lifts are only moving platform which are generally used for providing service and maintenance work. Open lifts are not used for carrying passengers or goods.</p>	7	7	7
III. 12	<p>Roofing materials</p> <p>1) Thatch Covering: These coverings are provided for small spans, mainly for residential buildings in villages. Thatch is a roof covering of straw, reeds or similar materials. The thatch is well- soaked in water or fire resisting solution and packed bundles are laid with their butt ends pointing towards eaves. Thickness varies from 150 mm to 300 mm. They are tied with ropes or twines to supporting structures. The supporting structure consists of round bamboo rafters spaced at 200 mm to 300 mm over which split bamboos laid at right angles at close spacing. It is claimed that reed thatch can last 50 to 60 years while straw thatch may last for 20-25 years.</p> <p>The advantage of thatch roof is they are cheap and do not need</p>	Any 3 7	7	7

<p>skilled workers to build them. The disadvantages are they are very poor fire resistant and harbour rats and other insects.</p> <p>Uses- It is the oldest type of roof covering material and largely used in low cost houses and villages. It is used in abundance in the villages. It is suitable against high wind.</p> <p>2) Shingles: Wood shingles are nothing but the split or sawn thin pieces of wood. Their size varies from 300 mm to 400 mm and length from 60 mm to 250 mm. Their thickness varies from 10 mm at one end to 3 mm at the other end. They are nailed to supporting structures. They are commonly used in hilly areas for low cost housing. They have very poor fire and termite resistance.</p> <p>Uses- They are one of the most widely used roofing covers in North America because they have a relatively inexpensive up-front cost and are fairly simple to install.</p> <p>3) Tiles: Various clay tiles are manufactured in different localities. They serve as good covering materials. Tiles are supported over battens which are in turn supported by rafters/trusses etc. Allahabad tiles, Mangalore tiles are excellent interlocking tiles. They give good appearance also</p> <p>Uses- Clay tiles have been widely used as a roof covering material for residential buildings.</p> <p>4) Slates: A slate is a sedimentary rock. Its colour is gray. It can be easily split into thin sheets. Slates of size 450 mm to 600 mm wide, 300 mm long and 4 to 8 mm thick are used as covering materials of pitched roofs in the areas where slate quarries are nearby. A good slate is hard, tough and durable. They are having rough texture and they give ringing bell like sound when struck. They do not absorb water.</p> <p>Uses- Due to its thermal stability and chemical inertness, slate has been used for laboratory bench tops and for billiard table</p>			
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	<p>tops.</p> <p>5) A.C. Sheets: Asbestos cement is a material which consists of 15 per cent of asbestos fibres evenly distributed and pressed with cement. They are manufactured in sufficiently large size. The width of an A.C. sheet varies from 1.0 to 1.2 m and length from 1.75 to 3.0 m. To get sufficient strength with thin sections they are manufactured with corrugation or with traffords. They are fixed to the steel purlins using J-bolts. The roofing is quite economical, waterproof. However not very good thermal resistant.</p> <p>Uses- A. C. sheet covering is commonly used as a roofing material for factories, workshops, garages, offices etc.</p> <p>6) G.I. Sheets: Galvanised iron corrugated sheets are manufactured in the sizes 1.0 to 1.2 m wide and 1.65 m length. Galvanisation of iron makes them rust proof. They are fixed to steel purlins using J-bolts and washers. They are durable, fire proof, light in weight and need no maintenance.</p> <p>Uses- They are commonly used as covering materials for warehouses, godown, sheds etc.</p>			
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