

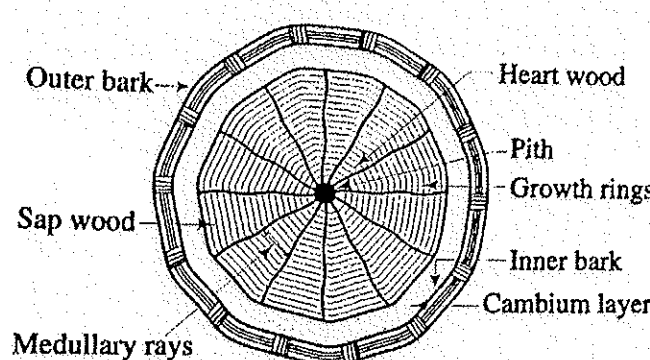
## SCHEME OF VALUATION

(Scoring indicators)

Revision: -2015

Course code: - 3011

Course Title: - Construction materials & Engineering

Question No:	Scoring indicator	Split up score	Sub Total	Total
<b>I.</b>	<b>PART -A</b>			
1.	Sprinkling of water ,punting	2	2	
2.	Bulking of sand or fine aggregate is the phenomenon of increase in sand volume due to the increase of moisture content.	2	2	
3.	Rubber moulded products are widely used industrially (and in some household applications) in the form of rubber goods and appliances.Rubber is used in garden hoses and pipes for small scale gardening applications. Most of the tyres and tubes used in important role in the automobile industry and the transportation industry.	1+1	2	
4.	Different types of masonry units or materials are combined to form a single structural material. is known as composite masonry.	2		
5.	Elevators, or lifts, carry passengers and freight up and down; escalators are moving staircases from one story of a building to the next; and moving sidewalks carry people horizontally or at a slight incline.	2	2	10
	<b>PART -B</b>		2	
II. 1		4+2		30
2	SLIP RESISTANCE  SURFACE ABRASION RESISTANCE		6	

3.	<p>WATER ABSORPTION</p> <p>MECHANICAL STRENGTH</p> <p>STAIN AND CHEMICAL RESISTANC</p> <p>SUBSIZE</p> <p>SHADE / TONALITY</p> <p>PROPERTICE</p> <p>Asbestos has a high tensile strength.It is a superior electrical insulator.</p> <p>Due to its incombustibility, it serves as a good heat insulator.</p> <p>It resists attacks by acids.,It is non-porous, soft, and elastic.</p> <p>Its melting point ranges from 1200 to 1500 °C, and it is fire-resistant.</p> <p>Since it adheres well to cement, the fibre can be utilized as a fibre reinforcement.It is resistant to rusting.</p> <p>USESS</p> <p>Asbestos is a good heat insulator and, as such, is used for insulating furnaces, steam, exhaust pipes, boilers, etc.</p> <p>Asbestos, being high-temperature resistant, is often used for making moulded shapes to resist high temperatures.</p> <p>Firefighting personnel uses fire-proof suits made of asbestos.</p> <p>Asbestos cement sheets are the cheapest roofing materials.</p> <p>Asbestos cement pipes are used as down-take pipes of rainwater from the roof., Asbestos forms an effective damp-proof layer.</p>	6*1	6	
4.	<p>PAIN T-Wearability</p> <p>Covering ability</p> <p>Ease of cleaning</p> <p>Environmentally friendly</p> <p>Aesthetic</p> <p>Practical and cost effective</p>	3*1	6	
		3		

	TYPES			
	Oil paint.			
	Emulsion Paint.			
	Enamel Paint.			
	Bituminous Paint.			
	Aluminium Paint.	3		
	Anti-Corrosive Paint.			
	Synthetic Rubber Paint.			
5.	TYPES BOND			
	Stretcher bond			
	Header bond		6	
	English bond and	6*1		
	Flemish bond			
	Facing bond			
	Dutch bond			
	English cross bond			
	Brick on edge bond			
	Raking bond			
	Zigzag bond			
6.	To anchor the mass of the building.		6	
	To dispense load transferred and spread uniformly.	1*6		
	To lay out the lateral stability of the structure evenly.			
	To erupt movement of soil.			
	To protect from natural forces.			
	To suppress the growth of mold.			

7.	<p>To provide insulation against heat and cold.</p> <p>Underpinning is a method of construction that sees the depth of the foundations to a building being increased. The soil beneath the existing foundation is excavated and is replaced with foundation material, normally concrete, in phases. Underpinning requires close attention to design, methodology and safety procedures.</p> <p>Mass concrete underpinning method (pit method)</p> <p>Underpinning by cantilever needle beam method.</p> <p>Pier and beam underpinning method.</p> <p>Mini piled underpinning.</p> <p>Pile method of underpinning.</p>	6	6	
PART -C				
<b>UNIT -1</b>				
III.	<p>a) Igneous Rocks: These rocks are formed from the cooling and solidification of molten materials (magma or lava). The rate of cooling and the mineral composition determine the texture and appearance of igneous rocks. There are two main types of igneous rocks:</p>	1		
	<p>Sedimentary Rocks: These rocks are formed from the accumulation, compression, and cementation of sediment particles (such as sand, clay, and organic materials) over time. Sedimentary rocks often contain fossils and can provide valuable insights into Earth's history. There are three main types of sedimentary rocks:</p>	1		
	<p>Metamorphic Rocks</p> <p>They are formed when the already existing rocks undergo changes due to intensive heat and pressure. E.g. Marble, Slate</p>	1		
	<p>Siliceous Rocks</p> <p>They are sedimentary rocks which mainly contain silica. They are hard and durable. E.g. Flint, Chert</p>	1		
	<p>Argillaceous Rocks</p> <p>They are sedimentary rocks with the main constituent as argil i.e.,</p>	1		

	<p>clay. These stones are hard and durable but they are brittle. They cannot withstand shock. E.g. Mud stone, Claystone, Slates and laterites.</p> <p>Calcareous Rocks</p> <p>They basically are sedimentary rocks with main constituent as calcium carbonate. Limestone is calcareous rock of sedimentary origin while marble is a calcareous rock of metamorphic origin.</p> <p>Stratified</p> <p>Stratified rocks show a layered structure and can be easily split up into slabs. Sedimentary rocks are stratified rocks. E.g. sandstone, limestone, slate, etc.</p> <p>Unstratified</p> <p>They cannot be easily split into thin layers. Igneous rocks are unstratified rocks. E.g. Granite, trap, marble, etc.</p> <p>Metamorphic rocks may be either stratified or unstratified</p>			
b)	<p>Characteristics required for good bricks -Size</p> <p>Shape</p> <p>Color</p> <p>Texture</p> <p>Compactness</p> <p>Compressive strength</p> <p>Hardness</p> <p>Soundness</p> <p>Toughness</p> <p>Water absorption</p> <p>Expansion</p> <p>Extent of burning during manufacturing</p> <p>Thermal conductivity, Efflorescence</p>			
		1		
		1		
			7	
		8		
			8	15

<p>IV.</p> <p>a)</p> <p><u>IV</u></p> <p>b)</p>	<p style="text-align: center;">OR</p> <p>The flask is allowed to dry completely and made free from liquid and moisture. The weight of the empty flask is taken as W1.</p> <p>The bottle is filled with cement to its half ( Around 50gm of cement) and closed with a stopper. The arrangement is weighed with stopper and taken as W2.</p> <p>To this kerosene is added to the top of the bottle. The mixture is mixed thoroughly and air bubbles are removed. The flask with kerosene, cement with stopper is weighed and taken as W3.</p> <p>Next, the flask is emptied and filled with kerosene to the top. The arrangement is weighed and taken as W4.</p> $\frac{W2 - W1}{(W2 - W1) - (W3 - W4)} \times 100$ <p>A ferrous metal is a classification of metals that is primarily composed of iron. This category includes a wide range of materials, with iron being the predominant element. The term "ferrous" is derived from the Latin word "ferrum," which means iron.</p> <p>Ferrous metals are known for their exceptional mechanical properties, making them valuable in numerous industrial applications. They are celebrated for their high strength, durability, and ability to withstand extreme temperatures, making them suitable for demanding environments. The magnetic properties of ferrous metals are another distinguishing feature attributed to the presence of iron.</p> <p>A non-ferrous metal is a type of metal that does not contain a significant amount of iron and, as a result, lacks magnetic properties. These metals are prized for their resistance to rust and corrosion, making them highly valuable in applications where exposure to moisture or harsh environments is a concern. Unlike ferrous metals, non-ferrous metals do not exhibit magnetic properties, which is a distinguishing feature</p>	<p>7</p> <p>4</p> <p>4</p>	<p>15</p> <p>8</p>	
<p>V</p> <p>a)</p>	<p style="text-align: center;"><u>UNIT - II</u></p> <p>Solvent</p> <p>The common solvents usually used in paints are water and mineral spirits. It is indicated that water is normally used in acrylic paint, whereas mineral spirits are mostly used for oil-based paint</p> <p>Binders</p> <p>Binders play important roles in paint production, According to , it will influence the toughness, flexibility and durability of paint.</p>	<p>7</p>		

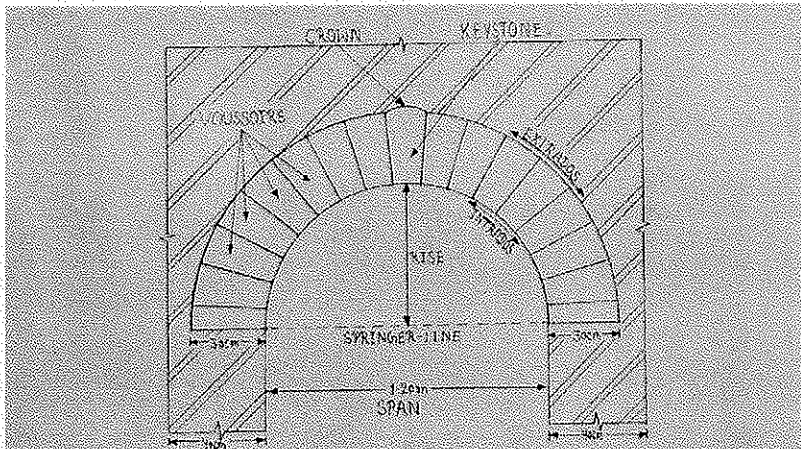
	<p>Pigments and fillers</p> <p>Last but not least, Pigment is also an essential component of paint. Nowadays, people often use clay, calcium carbonate or silica as pigments to determine paint's color. Calcium carbonate seems to be the most popular choice because of its reasonable price and suitability in case that calcium carbonate must be pure and white enough as standardized.</p> <p>b) Natural rubber possesses excellent elasticity, tear resistance, and low-temperature flexibility. It is known for its high resilience, allowing it to return to its original shape after being stretched or deformed. It also has good tensile strength and abrasion resistance.</p> <p>Conveyor belts: Natural rubber is used in the manufacturing of conveyor belts due to its excellent tensile strength, flexibility, and durability.</p> <p>Footwear: Natural rubber is extensively used in the production of footwear, including rubber boots, sandals, and athletic shoes, owing to its cushioning properties and water resistance.</p> <p>Gloves: Natural rubber gloves provide protection in various industries, including healthcare, laboratory work, and chemical handling, due to their elasticity, tear resistance, and barrier properties.</p>		7	
VI	<p>OR</p> <p>a) Aluminium Skirting</p> <p>Roofs</p> <p>Cladding</p> <p>Window and door frames</p> <p>Solar panels</p> <p>Staircases and safety ramps</p> <p>Air conditioning systems</p> <p>Heating systems / exchanger</p> <p>b) Plywood:</p> <p>It is made up of thin layers of wood called veneers of different thickness and glued together to get the desired product. Here, the name 'ply' refers to plywood and the most common type is 3-ply (number indicates layers used) which is strong, durable, and more decorative than plywood with more plies, recommended for interior uses.</p> <p>Fibreboard:</p> <p>A dense composite wood fibres are glued together to form this fibreboard.</p>	4	8	15
		7*1	7	
		4*2		

<p>VII</p>	<p>Generally, Medium-density fibrewood known as MDF is commonly used, which is less expensive, stronger and a good alternative to plywood. We need to handle carefully the finished product to avoid cracks and splits.</p> <p>Laminates:</p> <p>Multiple layers of composite material are applied to make them strong and durable. They are an improved version of hardwood which looks very stylish and use for flooring, countertops, tabletops and other decorative spaces.</p> <p>Wood veneers in the simplest of terms are thin slices of natural wood generally less than 1/40" thick. These veneers are typically pressed onto or laminated to thicker core materials such as plywood, particle board and MDF to create structural panels to be used in place of thicker hardwood lumber.</p> <p><b>UNIT 3</b></p> <p>a) Advantages of hollow blocks: , thermal insulation, noise reduction. ...</p> <p>reduce the total weight of the building, uniform size, shape, plastering easier, less mortar. ...</p> <p>Disadvantages of hollow blocks:</p> <p>the bearing capacity is poor. poor seismic performance</p> <p>Reduced Strength: Hollow bricks may have lower compressive strength compared to solid bricks. This can be a concern in load-bearing applications or in areas with high structural requirements.</p> <p>Water Absorption: The hollow cavities in these bricks can make them more prone to water absorption. If not adequately waterproofed or sealed, this can lead to issues like dampness and reduced durability over time.</p> <p>Limited Load-Bearing Capacity: In certain construction situations, where high load-bearing capacity is required, solid bricks or other structural materials might be more suitable.</p> <p>Complex Construction: The construction process involving hollow bricks may be more complex compared to solid bricks. Proper techniques and expertise are required to ensure the correct placement</p> <p>b) Durability– Steel formwork is extremely durable and strong. It is able to withstand extreme weather conditions and heavy loads without breaking down. This makes steel formwork perfect for use in construction projects where the environment is harsh.</p> <p>Cost-Effective – Using steel formwork is much cheaper than using concrete formwork. Concrete formwork requires a lot of time and effort to build. In addition, it is expensive to maintain. On top of that, concrete formwork is not</p>	<p>8</p> <p>4</p> <p>7</p> <p>3</p>	<p>15</p>	
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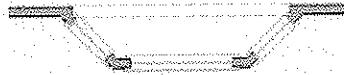
VIII	<p>as durable as steel formwork.</p> <p>Easy To Build – Building a steel formwork structure is relatively simple. You do not need any special tools to construct a steel formwork structure. All you need is a hammer, nails, and some wood boards.</p> <p>Efficient – The efficiency of a steel formwork structure comes from its design. A steel formwork structure is designed to hold the shape of the object being built. As a result, it does not require additional support to keep the shape of the structure intact.</p> <p>Versatile – A steel formwork structure can be used in many different ways. From building small structures to big buildings or even tunnels, a steel formwork structure can handle anything and can be customised into any required shape.</p> <p>Smooth Concrete Appearance – Steel formwork gives a smooth, clean finish after the completion of the curing process, unlike other material formworks that leave textures on the surface of the structures.</p> <p>Reusable – Steel forwork can be re-used multiple times if properly maintained, which is impossible for concrete or wood formwork. The criteria for reusing any steel formwork depends on the present condition</p>	4x2	8	15
a)	<p>The following points to be observed in supervising brick masonry construction are as follows: <input type="checkbox"/> The bricks to be used should fulfil all the requirements of the specification of the work. The bricks should be sound, hard, burnt well with uniform colour, shape and size. <input type="checkbox"/> The bricks should be immersed in freshwater at least for 2 hours before using in masonry. <input type="checkbox"/> Do not use broken bricks unless they are essential for making good bonds. <input type="checkbox"/> The bricks should be laid on their proper bond. The frog of the bricks should be kept upward. <input type="checkbox"/> Brick bats should be avoided. <input type="checkbox"/> The thickness of the joints should not exceed 13 mm. <input type="checkbox"/> The masonry walls should be always truly vertical and verticality should be checked continuously using a plumb bob. <input type="checkbox"/> Brickwork should be raised uniformly. Any part of the masonry should not be raised more than 90 cm to the rest of the masonry work. <input type="checkbox"/> The work should be raked back in successive courses if it is to be constructed later. <input type="checkbox"/> In masonry work, large voids should not be filled with mortar only. It is uneconomical. <input type="checkbox"/> Cement mortar should be used to enclose all the iron fixtures of doors and windows. <input type="checkbox"/> To achieve easy and adequate bond for plastering and pointing, the facing mortar joints should be raked for a depth of 13-19 mm when the mortar in the joint is green. <input type="checkbox"/> The finished brick masonry should be cured at least for 7 days.</p>	7	7	
b)	<p>Scaffolding is “a temporary elevated or suspended work unit and its supporting structure used for supporting worker(s) or materials, or both</p> <p>Single scaffolding – Made up of standards, ledgers, putlogs, and other components, single scaffolding is often used during brick masonry work</p> <p>Double scaffolding – Commonly used in stone masonry, double scaffolding has a second scaffold row for support because of the difficulty of making holes in a stone wall for putlogs.</p>	4	8	15

IX	<p>Cantilever scaffolding – Single-frame and double-frame cantilever scaffolding have standards supported by needles running into the wall. It’s often used when the ground doesn’t provide adequate support or stability, and for upper levels of higher walls.</p> <p>Suspended scaffolding – Wire ropes or chains affixed to the roof of the structure suspend the platforms of this scaffolding, which can be raised and lowered. It’s often used when frequent upward and downward mobility are needed, as with certain repair work, painting, window washing, e</p> <p>Shoring is “ The vertical supporting members in a formwork system</p> <p>H- or I-beam shoring – Commonly used to support excavations from 4 to 15 feet deep, steel H or I beams are placed into the ground by drilling or vibrating to support the piles.</p> <p>Secant pile shoring – A shoring wall is formed when there’s no room for open excavation with the use of interlocking primary and secondary piles.</p> <p>Contiguous pile shoring – This type of pile shoring is often used in clay soil and areas where water seepage is not a concern.</p> <p>Sheet pile shoring – Similar to H- or I-beam shoring, steel beams are driven into the ground with a vibro hammer to support the piles. Sheet pile shoring is often used for excavations around bodies of water.</p>	4		
	<p><b>UNIT 4</b></p> <p>a) Strength and stability</p> <p>Resistance to weather and ground moisture</p> <p>Durability and free from maintenance</p> <p>Fire resistance</p> <p>Resistance to passage of heat</p> <p>Resistance to passage of sound</p> <p>Bricks Flooring Material</p> <p>Marble Flooring Material</p> <p>Glass Flooring</p> <p>Tile, wood</p>			

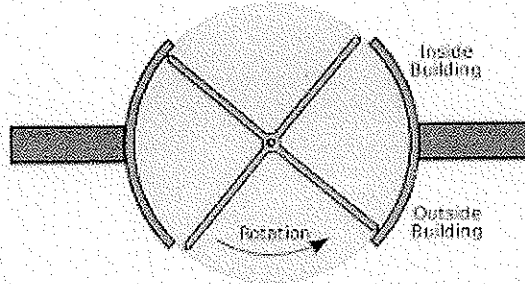
<p><u>IX</u> b)</p>	<p>Flat Arch</p> <p>Segmental Arch</p> <p>Semi-Circular Arch</p> <p>Horse Shoe Arch</p> <p>Pointed Arch</p> 	<p>3</p> <p>5</p>		<p>15</p>
<p>X a)</p>	<p>Pitched roof or Sloping Roof</p> <p>Flat Roof or Terrace Roof</p> <p>Shell Roofs or curved Roof</p> <p>Single Roofs</p> <p>Sloped roof- classification</p> <p>Lean-to-roof</p> <p>Couple roof</p> <p>Couple-close roof</p> <p>Collar-beam roof or collar tie</p> <p>King-post roof Truss</p> <p>Queen-post roof Truss</p> <p>Combinations of King-post and Queen-post Trusses</p> <p>Mansard roof Truss</p> <p>Truncated roof Truss, Belfast roof Truss, Composite roof Truss</p> <p>Steel sloping roof Trusses</p>	<p>7</p>	<p>8</p>	

X

b) Bay window is a generic term for all protruding window constructions, regardless of whether they are curved or angular, or run over one or multiple storeys.



A revolving door typically consists of three or four doors that hang on a central shaft and rotate around a vertical axis within a cylindrical enclosure



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8

15

4

4