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312338 - Building Material and Construction
(Sem II)

As per MSBTE's K Scheme
CE / CR / CS

Unit III		Construction of substructure and Superstructure	Marks - 24	
S. N.	MSBTE Board Asked Questions		Exam Year	Marks
1	<ul style="list-style-type: none"> Define lintel and sill. OR Enlist functions of Sill and Lintel. OR State the functions of window sill and lintel. 		W-22 W-19 S-19	2M 2M 2M
Ans.	<p>Functions of Sill:</p> <ol style="list-style-type: none"> To prevent the exposed masonry wall top from weathering. To support the frame of window / Door. To give good finish to wall openings <p>Functions of Lintel:</p> <ol style="list-style-type: none"> To transfer the load of wall above the opening to side. It holds chajja. To prevent load on frame. To strengthen the wall 			
2	State the two functions of 'Lintel and Chajja'.		S-22	2M
Ans.	<p>Functions of Lintel:</p> <ol style="list-style-type: none"> To transfer the load of wall above the opening to side. It holds chajja. To prevent load on frame. To strengthen the wall <p>Functions of Chajja:</p> <p>Chajja means a sloping or horizontal structural overhang projecting from the bottom</p>			

	<p>of a beam or a lintel, usually provided over openings on external walls 1. To provide protection from sun and rain and for architectural purpose.</p> <p>2. It is used for architectural purposes.</p>		
3	<ul style="list-style-type: none"> • Compare various parameters of load bearing and framed structures. • Compare load bearing structure and framed structure.(four points) 	S-22 W-19 S-19 W-22	4M
Ans	Load Bearing Structure	Framed Structure	
	1. Load of slab/ roof is transferred through wall to foundation.	1.Load of slab / roof is transferred through column to foundation.	
	2. Walls are thick about 0.45 m	2.Walls are thin about 0.1 m	
	3. Less carpet area.	3. More carpet area.	
	4. Costly structure.	4. Economic Structure.	
	5. More time is required for construction	5. Less time is required for construction.	
	6. Height is limited up to 3 storeys.	6. Multistoried buildings can be constructed.	
	7. More material required.	7. Less material is required.	
4	State any two purposes of Plinth.	W-19	2M
Ans.	<ol style="list-style-type: none"> 1. To prevent entry of flood water into building. 2. To avoid dust, Insects, Reptiles, etc entries inside the building 3. To facilitate easy drainage of sewage water. 4. To enhance appearance of building 5. To support the superstructure wall & transfer load to footing. 6. To prevent from dampness. 7. To support flooring tiles 		
5	State any two building components with their function.	S-19 S-22	2M 4M
Ans	<p>Following are the Components of building -</p> <p>1. Foundation :</p> <p>a) The function of foundation is to transfer the load of the building upto the hard strata which can support it without settling down.</p> <p>b) Foundation also helps in spreading the load over a large area to decrease the load</p>		

intensity.

2. Plinth:

a) It provides protection from rainwater and crawling animals and insect.

3. Floor:

a) It provides good resistance to wear and tear occurring due to its daily use.

b) It provides leveled surface for comfortable movement.

4. Walls:

a) Wall form the outer limits of the building and separate the rooms from each other.

5. Roofs:

a) Roof protect from the elements like rain, sun, wind, frost, snowfall, etc.

6. Windows:

a) Windows are provided for admission of light and free circulation of air into the building.

7. Doors:

a) Doors are used for free movement of occupants in and out of the house.

b) The outer doors are means of isolating the house from the surroundings from privacy and security point of view.

8. Beams:

a) It supports the transverse load of building structure.

b) It takes tensile load of a structure.

9. Columns:

a) It gives the support to the floors at various levels in framed structure or RCC structures.

b) It takes compressive load of structure.

10. Sill :

a) It provides a suitable finish to window opening.

b) It also affords a protection to the wall below the window.

c) It also provides the support to the vertical members of the openings.

11. Staircase:

a) It provides an easy access from one floor to other.

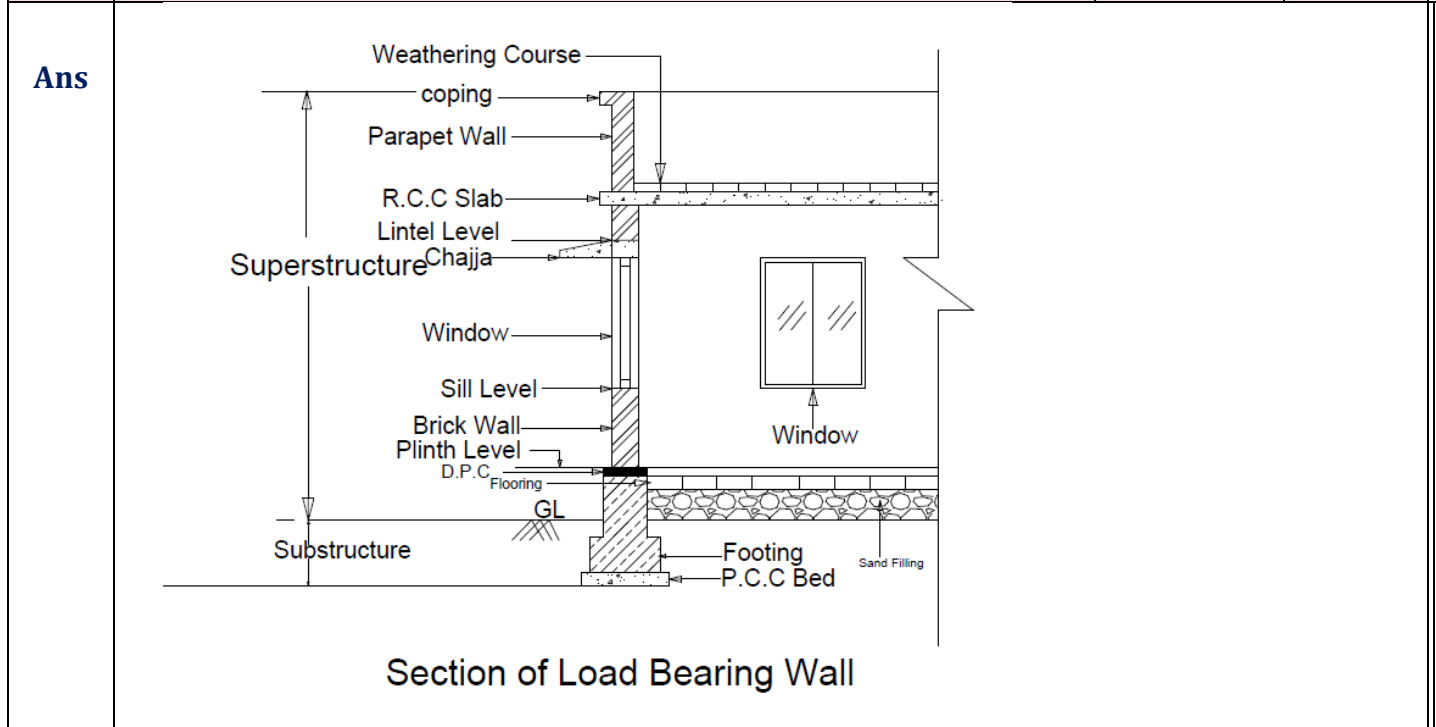
12. Parapet:

a) Parapet acts as a protective solid balustrade for the users.

b) It acts as a safe guard wall for small children on terrace.

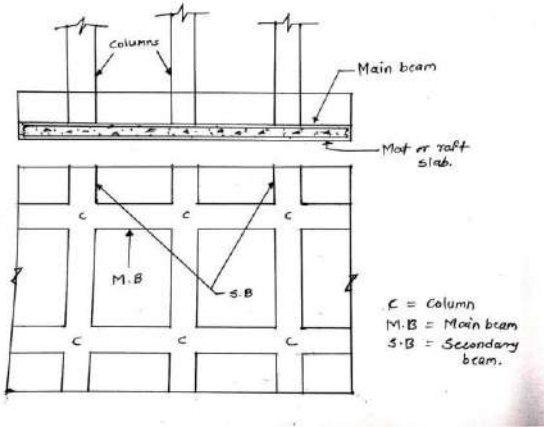
6	State any two purposes of foundation. OR State any two functions of foundation of a building.	S-19	2M
Ans	<p>The purpose of foundation are-</p> <ol style="list-style-type: none"> 1) To support the structure. 2) To distribute load of the entire structure over a wide spread area, so that the chances of unequal settlement are minimized. 3) To increase the stability of the structure. 4) To provide a leveled surface for super structure. 5) To provide the structural safety to super structure against scouring due to animals, flood water etc. 6) To prevent or minimize the cracks due to movement of moisture in case of weak or poor soils etc. 		
7	State the classification of building as per type of construction.	S-19	2M
Ans	<p>The Classification of building as per type of construction is as follows:</p> <ol style="list-style-type: none"> 1. Load Bearing Structure 2. Framed Structure 3. Composite Structure 		
8	Define sub structure and super structure. Give their components also. OR Define the terms sub structure and super structure used in building construction. OR Define sub-structure and super-structure.	S-19	4M
		W-18	2M
		W-22	2M
Ans	<p><u>Sub structure: -</u> A part of structure lying below the ground surface is known as substructure. <u>Components of substructure :-</u> 1) foundation <u>Super structure: -</u> A part of structure lying above the ground surface is called superstructure. <u>Components of super structure:</u> 1)Plinth 2) Floor 3) Wall 4) Column's 5) Beam 6) Roof 7) Doors 8) Windows 9) Lintel 10)Sill 11) Staircase 12) Parapet.</p>		

9	Draw a neat labelled sectional view showing different components of building from foundation to parapet , for a load bearing brick Masonry wall	W-18	6M
		W-19	4M

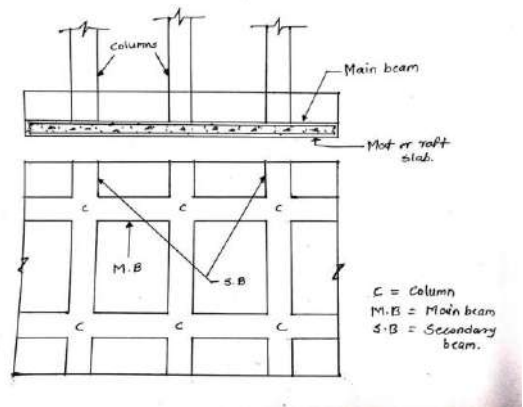


10	Explain the necessity of shoring and under pinning used in building construction.	W-22	4M
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Ans	<p>Shoring is the temporary structure constructed to support an unsafe structure particularly walls during repairs.</p> <p>Necessity of shoring:</p> <ol style="list-style-type: none"> 1. To repair bulging out of wall due to poor workmanship. 2. To repair the cracks in the wall because of settlement of foundation. 3. To dismantle adjacent structure. 4. To make openings in existing wall. <p>Underpinning is the process of strengthening and stabilizing the foundation of an existing building or other structure.</p> <p>Necessity of Underpinning:</p> <ol style="list-style-type: none"> 1. The original foundation is simply not strong or stable enough, e.g. due to decay of wooden piles under the foundation. 2. The usage of the structure has changed. 3. The properties of the soil supporting the foundation may have changed (possibly through subsidence) or were mischaracterized during planning.
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Ans	<p>4. The construction of nearby structures necessitates the excavation of soil supporting existing foundations.</p> <p>5. It is more economical, due to land price or otherwise, to work on the present structure's foundation than to build a new one.</p>		
11	Suggest the economical type of foundation where ground is of refilled soil and its bearing capacity is low. Draw the neat sketch of foundation suggested.	W-22	6M
Ans.	<p>Raft foundation is suitable ground is soft, Clayey or marshy having low bearing capacity.</p> 		
12	Enlist any four types of shallow foundations.	S-22	2
Ans.	<ol style="list-style-type: none"> 1. Wall Footing 2. Isolated Footing 3. Combined Footing 4. Raft Footing 		
13	<p>Classify the Deep foundations based on materials and functions.</p> <p>OR</p> <p>Classify the piles as per functions and materials used</p>		4
Ans	<p>Classification of pile as per</p> <p>Functions:-</p> <ol style="list-style-type: none"> 1. End bearing piles 2. Friction piles 3. Sheet piles 4. Anchor piles 5. Batter piles 6. Fender piles 7. Compaction piles <p>Materials:-</p> <ol style="list-style-type: none"> 1. Timber piles 2. Concrete piles 3. Steel piles 4. Composite piles 2. 		

14	State the necessity of providing Combined column footing and Raft foundation	W-19	
Ans.	<p><u>(i) Combined column footing:-</u> A combined footing provided as a column for two or more columns in a row. Combine footing is also provided when the columns are very near to each other and isolated footing of these column will overlap on each other.</p> <p><u>(ii) Raft foundation:</u> It is suitable where ground is soft, Clayey or marshy having low bearing capacity, and where sub soil water conditions are uncertain. The raft foundation is also used to reduce settlement above highly compressible soils. When total individual footing area of all columns exceeds 50% of built up area of building at ground floor.</p>		
15	Suggest relevant type of foundation with sketch for a Residential Building with Marshy soil at a greater depth with justification and explanation.	W-19	6M
Ans	<p>Raft foundation is suitable for a residential building with Marshy soil at greater depth</p> <p>It is suitable where ground is soft, Clayey or marshy having low bearing capacity and where sub soil water conditions are uncertain. The raft foundation is also used to reduce settlement below highly compressible soils</p> <p>It proves to be to be economical under waterlogged area where pile foundation cannot be used advantageously and independent column footing becomes impracticable.</p> <p>Raft is acting as a floor consisting of thick reinforced concrete slab covering the entire area of the bottom of the structure.</p>		



16	<p>Explain raft foundation with neat sketch and explain its Suitability</p>	S-19, S18	6M
	<p>Suggest suitable type of foundation for steel columns carrying Heavier loads with justification.</p>	S-22	4M

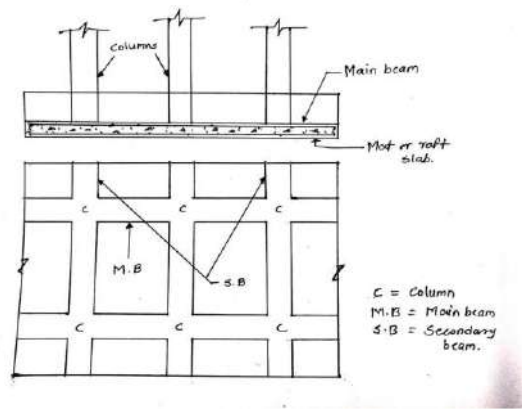
Raft Footing:

It is suitable where ground is soft. Clayey or marshy having low bearing capacity, and where sub soil water conditions are uncertain. The raft foundation is also used to reduce settlement below highly compressible soils

Diagram to be drawn

Raft is acting as a floor consisting of thick reinforced concrete slab covering the entire area of the bottom of the structure.

Ans.

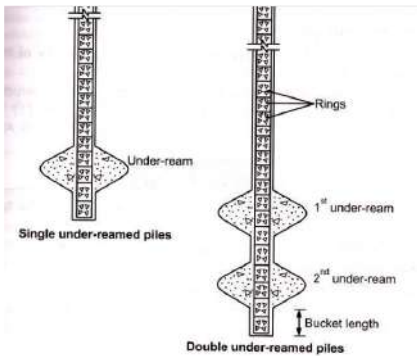


17	State any two purposes of foundation.	S-19	2M
19	<p>The purpose of foundation are-</p> <ol style="list-style-type: none"> 1) To support the structure. 2) To distribute load of the entire structure over a wide spread area, so that the chances of unequal settlement are minimized. 3) To increase the stability of the structure. 4) To provide a leveled surface for super structure. 5) To provide the structural safety to super structure against scouring due to animals, flood water etc. 6) To prevent or minimize the cracks due to movement of moisture in case of weak or poor soils etc. 		
19	Define job layout and site clearance.	S-19	2M
Ans.	<p>Job layout:</p> <p>A plan in which the arrangement for placing site office, store room, labour quarter, medical aid center, godowns for keeping construction material and other facility are properly prepared is called as job layout or site layout.</p> <p>Site Clearance:</p> <p>Site clearance is the process of removing big trees, plant, roots, old construction etc. to prepare a leveled ground for marking of layout.</p>		
20	<ul style="list-style-type: none"> • Suggest relevant type of foundation with sketch for educational building on black cotton soil with justification • Suggest relevant type of foundation with sketch for commercial building on black cotton soil. 	S-19 W-22	6M
Ans.	<p>Black cotton soil- Pile foundation.</p> <p>In case the depth of black cotton soil is more, the following type of foundation may be provided</p> <ol style="list-style-type: none"> 1. Strip or pad foundation 		

2. Pier foundation with arches and

3. Under reamed pile foundation

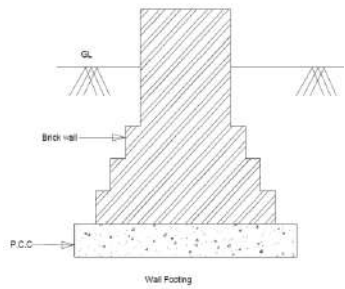
Under-reamed piles are best solution for foundation problem in black cotton soil or such similar type of expansive soil. They are bored cast-in-situ concrete piles having bulb shaped enlarged base.



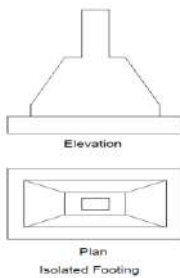
21	Differentiate between 'End bearing Pile' and 'Friction Pile'. OR Along with the neat sketches, distinguish between Bearing pile and Friction pile.	W-18 W-22	4M
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Ans.	End bearing Pile	Friction Pile
	1) When piles transfer load of the building through a soft soil strata to a suitable bearing stratum at greater depths then it is called a bearing pile.	1) When piles transfer the loads only by means of skin resistance without any end bearing then the piles are called as friction piles.
	2) The load is taken by the hard strata.	2) Load is taken by the friction developed between side of the pile and surrounding ground.
	3) Hard strata is essentially required	3) Hard strata is not essentially required
	4) It is used to transfer load through water or soft soil	4) It is used to transfer loads through a depth of friction

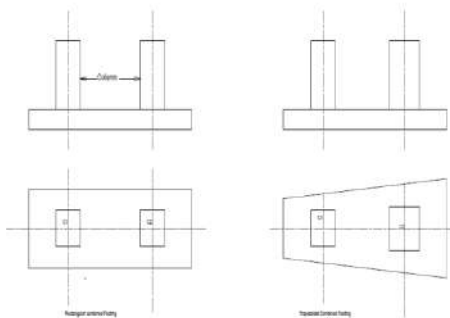
22	Explain timbering and strutting with a neat sketch.	W-18	4M
Ans.	<p>A method of giving the temporary support to the side of deep trench or when subsoil is loose or very soft is known as timbering (i.e. shoring) and strutting. It consists of timberplanks and strut to give temporary support to the side of trench.</p> <p>When the depth of trench is large, or when the sub-soil is loose, the sides of the trench may cave in. The problem can be solved by adopting a suitable method of timbering. Timbering of trenches, sometimes also known as shoring consists of providing timber planks or boards and struts to give temporary support to the sides of the trench. Timbering of deep trenches can be done with the help of the following methods:</p> <ol style="list-style-type: none"> 1. Stay bracing. 2. Box sheeting 3. Vertical sheeting 4. Runner system 5. Sheet piling <p>Draw Diagram</p>		
23	Draw neat sketches of any three shallow foundations and suggest suitability of them for different loading and soil conditions.	W-18	6M
Ans.	<p>Types of shallow foundation with their suitability:</p> <p><u>1. Wall Footing:</u> Wall footings are used for individual columns, walls and bridge piers where the bearing soil layer is within 3m (10 feet) from the ground surface. Soil bearing capacity must be sufficient to support the weight of the structure over the base area of the structure.</p>		



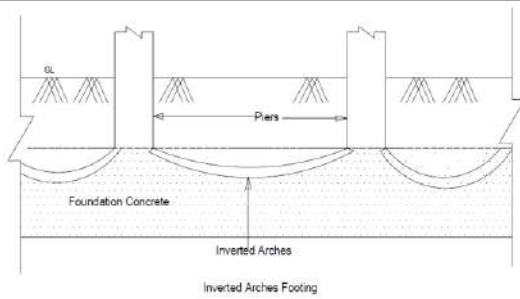
2. Isolated Footing: This foundation is constructed for single column and also called as pad foundation. The footing of concrete columns may be a slab, stepped or sloped type.



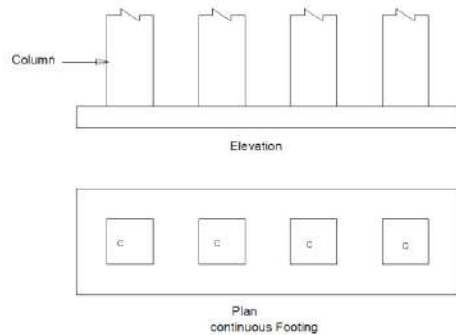
3. Combined Footing: A combined footing provided as a column for two or more columns in a row. Combine footing is also provided when the columns are very near to each other and isolated footing of these column will overlap on each other.



4. Inverted Arch footing: It is suitable to be used for the construction of bridges, tanks, underground sewers, and reservoirs. This type of foundation can be used for such structure where the load is concentrated over the column and where it is desired to distribute the load over a large area or in such cases where the bearing capacity of soil is poor.



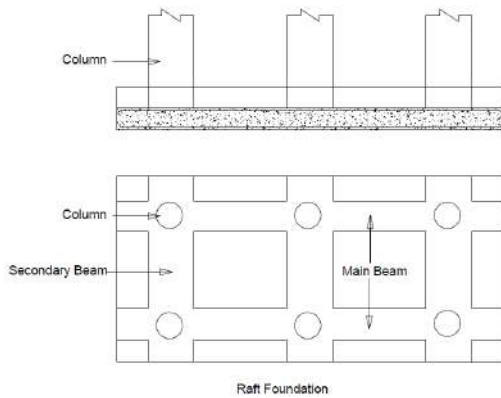
5. Continuous Footing: This type of footing is suitable at locations liable to earthquake activities. This also prevents differential settlement in the structure.



6. Cantilever Footing/Strap Beam: This type of footing may be used where the distance between the columns is so great that a combined becomes quite narrow with high bending moment.



7. Raft Footing: It is suitable where ground is soft. Clayey or marshy having low bearing capacity, and where sub soil water conditions are uncertain. The raft foundation is also used to reduce settlement above highly compressible soils.



24	What are the requirements of good foundation?	S-19	4M
Ans	<p>1) Location of foundation should be selected such that it can safely transfer load as per design with considering future expansion.</p> <p>2) Good designed foundation should resist earthquake pressure, landslide pressure etc.</p> <p>3) A good foundation should avoid unequal or differential settlement of the structure.</p> <p>4) A good foundation should avoid overturning of building.</p> <p>5) For good foundation area below foundation should be drained properly.</p> <p>6) Faulty designed superstructure cannot withstand by any foundation hence superstructure should be well planned and designed.</p> <p>7) A good foundation should consider environmental and other factors. ex. groundwater, frost action, soil erosion</p> <p>8) A good foundation should be strong as well as economical.</p>		
26	State the precautions to be taken while constructing a foundation in B.C. soil.		4M
Ans	<p>1) S.B.C. should be properly determined. In absence of test, it shall be limited between 5 - 10 t / sq. m.</p> <p>2) Foundation should be taken at least 50 cm lower than the depth of moisture</p>		

movement.

3) Depth should be much more than tension cracks.

4) If soil is in the top layer and does not exceed 1.5 m then entire soil larger should be replaced with non expansive soil.

5) When depth of clay layer is large, the contact of base should interposed with layer of sand / murum and around

6) Capping beam of piles should kept about 15cm high above B.C. soil

7) Foundation should be constructed in dry season.

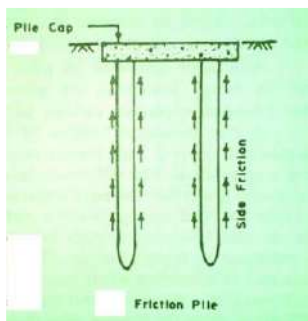
8) Provide plinth protection.

26

Explain with sketch i) Friction piles ii) End bearing pile

4M

i) Friction piles :



Explanation :

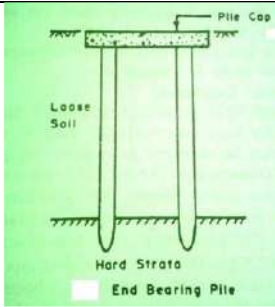
Ans

1) These used to transfer loads to a depth by means of skin friction along the length of the pile.

2) Used in granular soil where the depth of hard strata is very great.

3) Load carrying capacity depends on surface area and skin friction.

ii) End bearing piles :



Explanation :

- 1) Used to transfer load through water or soft soil to a suitable bearing stratum.
- 2) Used to carry heavy loads safely to hard strata.
- 3) Adopted when hard strata is available at few meter below the soft layer.
- 4) It settles less.

27	Classify the piles as per functions and materials used.		4M
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Ans	<p>Classification of pile as per</p> <p>Functions:-</p> <p>1. End bearing piles 2. Friction piles 3. Sheet piles 4. Anchor piles 5. Batter piles 6. Fender piles 7. Compaction piles</p> <p>Materials:-</p> <p>1. Timber piles 2. Concrete piles 3. Steel piles 4. Composite piles</p>		
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28	State the various requirements of good bricks.	W-22	4M
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Ans	<ol style="list-style-type: none"> 1. The brick should have uniform size and plane, rectangular surfaces with parallel sides and sharp straight edges. 2. The brick should have a uniform deep red or cherry colour. 3. The brick should have uniform texture. 4. The surface should not be too smooth to cause slipping of mortar. 5. Water absorption should not be more than 20% of its dry weight. 6. Crushing strength should not be less than 10N/mm². 7. The brick should be so hard that when scratched by a finger nail no impression 		
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29	State any eight points you will observe in the construction of Brick masonry work.	W-22	4M
Ans.	<p><u>Following points should be observed while constructing brick masonry:</u></p> <ol style="list-style-type: none"> 1. Bricks should be as per the specification. The bricks should be well burnt, reddish in colour, sound and hard. They should have uniform size and shape. 2. The bricks should be soaked in water to prevent absorption of moisture from mortar. 3. The bricks should be properly laid on their beds. The bricks should be laid with the frog upward. 4. The brickwork should be carried out in proper bond. 5. The mortar to be used for the work should be of good quality and of proportion as specified. 6. In the brickwork, use of brick bats should be avoided. 7. The brickwork should be carried out as per line and level. The vertical faces should be checked by means of plumb bob. 8. As far as possible, the brickwork should be raised uniformly. 9. Hold fasts for door should be properly fixed while doing masonry work. 10. Expansion joint should be provided after every 30m to 50m length of wall. 11. The single scaffolding should be adopted to carry out the brickwork at higher level. 12. After construction of brickwork there should be proper curing. 		
30	Enlist any four types of bonds used in brick masonry.	W-22	2M
Ans.	<ol style="list-style-type: none"> 1. Header Bond 2. Stretcher Bond 3. English Bond 4. Flemish Bond 		
31	Describe the precaution to be observed in stone masonry construction.	W-22	4M
Ans.	<ol style="list-style-type: none"> 1. The stones to be used for stone masonry should be hard, tough & durable. 2. The stone should be properly dressed as per the requirement. 3. The headers and bond stones should not be dumbbell shape. 4. Stones should have low water absorption. 		

5. It should have resistance against fire.
6. The stone masonry section should always be designed to take compression & not the tensile stresses.
7. It should have adequate resistance against weathering action.
8. It should be economical & easily available.
9. Proper bond should be maintained. Formation of vertical joints should not be there
10. Vertical surfaces of the wall should be constructed perfectly in plumb.

32

Describe Indian standard specifications for cleaning and treatment of forms and also stripping time of any four form work.

W-22

6M

- Indian standard specifications for cleaning and treatment of forms:
All rubbish, particularly, chippings, shavings and saw dust shall be removed from the interior of the forms before the concrete is placed. The face of formwork in contact with the concrete shall be cleaned and treated with form release agent. Release agents should be applied so as to provide a thin uniform coating to the forms without coating the reinforcement.
- Stripping time of form work:

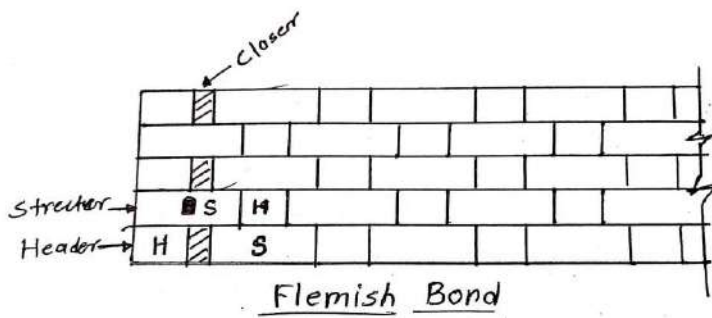
Sr. No	Types of formwork	Min period before striking formwork
1	Vertical formwork to columns, walls, beams	16-24h
2	Soffit formwork to slabs	3 days
3	Soffit formwork to beams	7 days
4	Props to slab i) spanning up to 4.5m ii) spanning over 4.5m	7 days 14 days
5	Props to slab i) spanning up to 6m ii) spanning over 6m	14 days 21 days

Ans.

33	List two purposes of shoring.	W-19	2M
Ans.	<p><u>Purposes of Shoring :</u></p> <p>Shoring is the construction of a temporary structure to support temporarily an unsafe structure.</p> <ol style="list-style-type: none"> 1. To repair bulging out wall. 2. To repair the cracks in the wall. 3. To dismantle adjacent structure. 4. To make openings in existing wall. 		
34	State the precautions to be observed in stone masonry construction.	W-19	4M
Ans.	<p>Following are the precautions to be observed in stone masonry construction:</p> <ol style="list-style-type: none"> 1. Stone used in masonry should be well seasoned, hard, tough, uniform in texture. 2. Stones used should be free from defects like cracks, cavities and patches of loose or soft materials. 3. Proper bond should be maintained throughout the masonry. 4. The vertical joints should be staggered. 5. The vertical surface should be truly in plumb. 6. The stones to be used in masonry must be well watered before use. 7. The masonry work should be cured for at least two weeks. 8. Normally, the load or weight should act axially and centrally on masonry sections. 9. Every stone in ordinary walls should be bedded on the natural bed. 10. The exposed joints of the masonry should be properly pointed by mortar. 		

34	<p>Describe in brief with neat sketch</p> <p>(i) English bond</p> <p>(ii) Flemish bond</p>	W-19	6M
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Ans.	<p>English bond :</p> <p>The Bond with alternate courses of headers and stretchers with a closer placed next to quoin header is called as the English Bond.</p> <p>Points Should be Remembered for English bond:</p> <ol style="list-style-type: none"> 1. A heading course should never start with a queen Closer. 2. There is no continuous vertical joint. 3. Walls of even number of half bricks in thickness present the same appearance on both faces. 4. Walls of odd numbers of half bricks in thickness will show each course comprising of headers on one face and stretchers on another face. <div data-bbox="284 819 941 1092" style="text-align: center;"> </div> <p>Flemish Bond:</p> <p>The Bond which consists of the alternate header and stretcher in the course is called as Flemish Bond.</p> <p>Points should be remembered for Flemish bond.</p> <ol style="list-style-type: none"> 1. It starts with a header at the corner. 2. The vertical joints are staggered in each course. 3. Flemish Bond appears more attractive and pleasing but it is less stronger and compact than English Bond. 4. Flemish Bond is slightly economical as a number of brick bats can be used.
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35	<ul style="list-style-type: none"> Describe the terms facing and hearting in stonemasonry. Define facing, backing, hearting and Through stone with neat sketch. 	S-19 W-19	2M 4M
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Ans	<p>Facing: The material used in the face of the wall is known as facing.</p> <p>Backing: The material used in the back of the wall is known as backing.</p> <p>Hearting: The inner portion of the wall between the facing and backing is known as hearting.</p> <p>Through stone: A header stone having length equal to wall width is placed across the wall called through stone.</p>		

36	Describe any eight characteristics of good stone masonry.	S-19	4M
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Ans.	<p><u>The requirements of good stone masonry are as follows:-</u></p> <ol style="list-style-type: none"> The stones to be used for stone masonry should be hard, tough & durable. The stone should be properly dressed as per the requirement. The headers and bond stones should not be dumbbell shape. 		
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	<p>4. It should have low water absorption.</p> <p>5. It should have resistance against fire.</p> <p>6. The stone masonry section should always be designed to take compression & not the tensile stresses.</p> <p>7. It should have adequate resistance against weathering action.</p> <p>8. Headers or through stones should be provided at regular interval</p> <p>9. Proper bond should be maintained. Formation of continuous vertical joints should be avoided.</p> <p>10. Vertical surfaces of the wall should be constructed perfectly in plumb.</p> <p>11. The exposed joints of the masonry should be properly pointed by mortar.</p>		
37	<p>Differentiate between brick masonry and stone masonry.</p> <p>Compare brick masonry and stone masonry used in building construction.</p> <p>Distinguish between Brick masonry and Stone masonry.</p>	S-19 W-19 W-22	4M 4M 6M
Ans.	Brick masonry	Stone masonry.	
	1. It is cheaper than stone masonry	1. It is stronger than Brick masonry.	
	2. It is cheaper in places where clay is available	2. It is cheaper in places where stone is available in abundance	
	3. Brick masonry gives less aesthetic view.	3. Stone masonry gives more aesthetic view than brickwork.	
	4. Brick masonry offer better fire resistance than stone	4. Stone masonry offers less fire resistance	
	5. Mortar joint in brick work are less	5. Mortar joint in stone work are more	
	6. Bricks are uniform in size so much skill is not required for proper bond	6. The size of stone is not uniform therefore greater care and skill is required	
	7. Plastering increases the life of brick from decaying.	7. Plaster does not stick nicely to a stone surface. It is difficult to apply	

		any finishing to the stone surface	
	8. Brick masonry is light weight.	8. Stone masonry is heavier	
	9. It is easy to apply any finishing to Brick surface.	9. It is difficult to apply any finishing to stone surface	
38	<ul style="list-style-type: none"> • Explain the requirements of good form work with names and material proposed for beam of size 300 × 450 mm with neat labeled sketch. • Explain the requirement of good formwork. • Define form work and state the requirements of a good form work. • Define formwork and discuss requirements of good form work. 	<p>S-19</p> <p>W-18</p> <p>W-19</p> <p>S-22</p>	<p>6M</p> <p>4M</p> <p>4M</p> <p>6M</p>
Ans	<p>Formwork: It is a temporary ancillary construction used as a mould for the structure, in which concrete is placed and in which it hardens and matures.</p> <p>Requirements of good formwork:-</p> <ol style="list-style-type: none"> 1. It should be adequately strong to withstand an extensive variety of dead and live loads. For instance, self-weight, weight of reinforcement, weight of wet concrete, loads of workers, and any other loads during and after casting of concrete. 2. It should be inflexibly built and efficiently propped and supported to hold its shape without undue deflection. 3. The joints in the formwork should be tight enough to prevent leakage of cement grout. 4. The formwork should be created in such a way that it may allow the evacuation of different parts in the desired sequence without shaking or damaging the concrete. 5. The material of the formwork should be inexpensive, easily accessible and can be reused for several times. 6. The surface of the formwork should be plain and smooth, and set properly to the desired line and level. 7. The material of the formwork should not bend or get perverted in presence of 		

	<p>sun, rain or water at the time of concreting.</p> <p>8. It should be lightweight.</p> <p>9. It should be easy to remove.</p>		
39	Enlist any four types of bonds used in stonemasonry.	W-18	2M
Ans	<p>There are types of stone masonry as – Rubble, Ashlar, Coursed, Uncoursed, Random rubble, dry etc.</p> <p>Bonds are used in brick masonry as mentioned below.</p> <p>Types of bond:-</p> <p>1) Stretcher bond 2) Header bond 3) English bond 4) Flemish bond</p>		
40	Define 'Form work' in building construction.	W-18	2M
Ans	<p>Formwork:-</p> <p>The temporary casing provided to support concrete is known as formwork.</p>		
41	Describe any four forms of 'Rubble Masonry' with sketches.	W-18	4M
Ans	<p>1) Dry rubble masonry: - In dry rubble masonry, dressed or undressed stones are used without mortar. Bigger pieces of stones are arranged at the bottom and smaller pieces of stones are used at the top. These walls are generally broader at the bottom and thinner at the top.</p> <p>These types of masonry is used for the construction of retaining wall, boundary walls of a building.</p> <p>2) Uncoursed rubble masonry: - In Uncoursed rubble masonry, stones or rubbles are used without any dressing. The mason select the stones at random from heap and lays them inline and plumb so as to form a strong bond.</p> <p>These types of stone masonry is useful for compound wall of jail, plinth wall, retaining wall etc.</p>		

42	Explain the necessity of 'Scaffolding and Shoring'.	W-18	4
Ans:	<p>Necessity of scaffolding:</p> <ol style="list-style-type: none"> 1. To provide a working platform so that the worker can stand on the platform and do the work easily & safely 2. To provide a platform for placing material & logistics (tools & equipments) needed by the workers to carry out their job 3. Scaffolding support the platform that is used by the worker as their walking path to transport the material & logistics. 4. To reach the construction point as it progresses 5. Scaffolding is also needed for the repair or even demolition of building. <p>Necessity of shoring:</p> <p>To provide temporary support to structures: that are in an unsafe condition until such time as they have been made stable, or which might become unstable by reason of work carried out on or near them</p>		
43	As a 'Supervisor', state precautionary measures you will observe while constructing brick masonry, along with their reasons.	W-18	6M
Ans:	<p>Following Precautionary measures are to be observed as a supervisor while constructing brick masonry:</p> <ol style="list-style-type: none"> 1. Bricks should be as per the specification. The bricks should be well burnt, reddish in colour, sound and hard. They should have uniform size and shape. 2. The bricks should be saturated with water so as to prevent absorption of moisture from mortar. 3. The bricks should be properly laid on their beds. The bricks should be laid with the frog uppermost. 4. The brickwork should be carried out in proper bond. 5. The mortar to be used for the work should be of good quality and of proportion as specified. 		

6. In the brickwork, use of brick bats should not be more.

7. The brickwork should be carried out as per line and level. The vertical faces should be checked by means of plumb bob.

8. As far as possible, the brickwork should be raised uniformly.

9. Hold fasts for door should be properly fixed while doing masonry work.

10. Expansion joint should be provided after every 30m to 50m length of wall.

11. The single scaffolding should be adopted to carry out the brickwork at higher level.

After construction, the brickwork should be well-watered for a period of about two to three weeks, if lime mortar is used and for a period of about one to two weeks, if cement mortar is used.

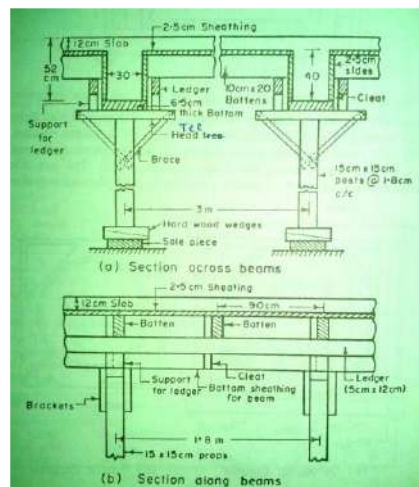
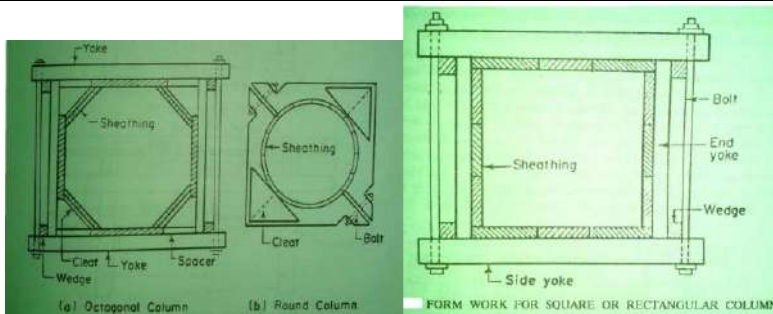
44

Draw the sketches of formwork for column and beam.

S-17

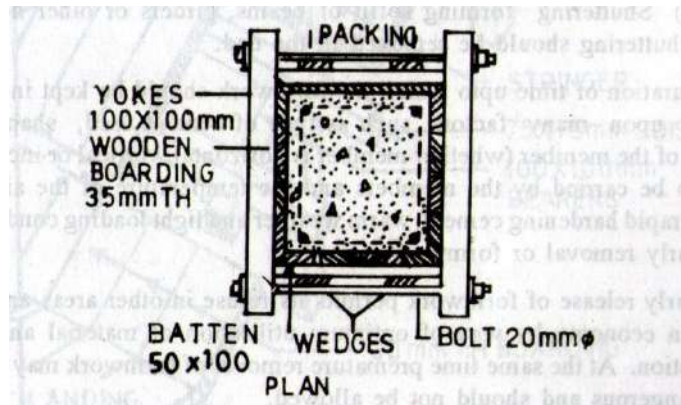
4M

Ans:



Note: Any one sketch of column formwork 1M, Labelling 1M, Any one sketch of beam formwork 1M, Labelling 1M

45	State the necessity of scaf folding	S-17	2 M
Ans:	<p>Necessity of scaffolding</p> <ol style="list-style-type: none"> 1. To provide a working platform, so that the worker can stand on the flatform to do work easily and safely 2. To provide platform for placing material and equipment needed by the workers to carry out their job. 3. To reach the construction point, as it progresses 		
46	Draw a neat sketch of wooden form work for rectangular column in plan naming the parts.	W-17	4M



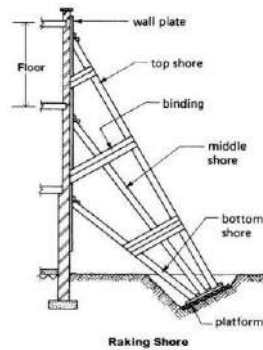
47	Draw a neat sketch of scaf folding for stone masonry construction work.	S-19	4M
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Ans:			
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48	Draw labeled sketch of English bond and Flemish bond showing plan and elevation.	S-22	6M
	<div data-bbox="501 191 1268 457" data-label="Image"> </div> <p data-bbox="786 531 987 562" style="text-align: center;">Flemish Bond</p> <div data-bbox="540 688 1230 953" data-label="Image"> </div> <p data-bbox="261 1003 456 1035">English Bond</p>		
49	Define shoring. Enlist types of shoring. Explain any one type with neat sketch.	6M	
Ans:	<p data-bbox="261 1230 396 1262">Shoring:-</p> <p data-bbox="261 1283 1471 1541">Shoring is the construction of a temporary structure to support temporarily an unsafe structure. These support walls laterally. Shoring can be used when walls bulge out, when walls crack due to unequal settlement of foundation and repairs are to be carried out to the cracked wall, when an adjacent structure needs pulling down, when openings are to be made in newly or enlarged in a wall.</p> <p data-bbox="261 1562 516 1593">Types of shoring:</p> <ol data-bbox="261 1619 521 1822" style="list-style-type: none"> 1. Raking shore 2. Flying shore 3. Dead shore <p data-bbox="261 1787 521 1818">1. Raking Shoring</p> <p data-bbox="261 1871 1344 1955">In this method, inclined members known as rakers are used to give lateral supports to walls.</p>		

A raking shore consists of the following components:

- 1.Rakers or inclined member**
- 2.Wall plate**
- 3.Needles**
- 4.Cleats**
- 5.Bracing**
- 6.Sole plate**



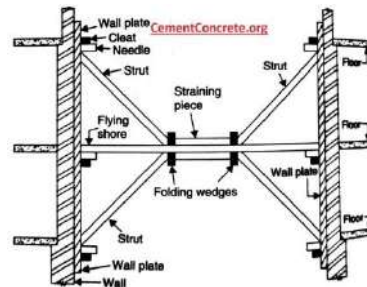
2. Flying Shoring

Flying shores is a system of providing temporary supports to the partly walls of the two buildings where the intermediate building is to be pulled down and rebuilt . All types of arrangements of supporting the unsafe structure in which the shores do not reach the ground come under this category.

The flying shore consists of wall plates, needles, cleats, horizontal struts (commonly known as horizontal shores) and inclined struts arranged in different forms which varies with the situation. In this system also the wall plates are placed against the wall and secured to it.

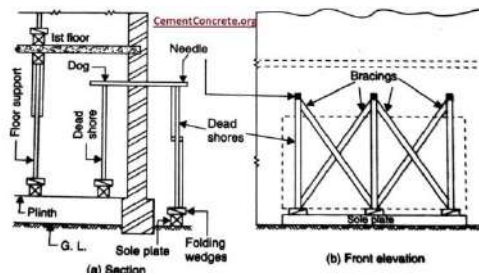
A horizontal strut is placed between the wall plates and is supported by a system of needle and cleats. The inclined struts are supported by the needle at their top and by straining pieces at their feet. The straining piece is also known as straining sill and is spiked to the horizontal shore. The width of straining piece is the same as that of the strut.

When the distance between the walls (to be strutted apart) is considerable, a horizontal shore cannot be safe and a trussed framework of members is necessary to perform the function of flying shore.



3. Dead Shore OR Vertical Shore

Dead shore is the system of shoring which is used to render vertical support to walls and roofs, floors, etc when the lower part of a wall has been removed for the purpose of providing an opening in the wall or to rebuild a defective load bearing wall in a structure. The dead shore consists of an arrangement of beams and posts which are required to support the weight of the structure above and transfer same to the ground on firm foundation below.



Thank You

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