



WINTER- 17 EXAMINATION

Subject Name: Building Construction

Model Answer

Subject Code:

17308

Important Instructions to examiners:

- 1) The answers should be examined by key words and not as word-to-word as given in the model answer scheme.
- 2) The model answer and the answer written by candidate may vary but the examiner may try to assess the understanding level of the candidate.
- 3) The language errors such as grammatical, spelling errors should not be given more Importance (Not applicable for subject English and Communication Skills).
- 4) While assessing figures, examiner may give credit for principal components indicated in the figure. The figures drawn by candidate and model answer may vary. The examiner may give credit for any equivalent figure drawn.
- 5) Credits may be given step wise for numerical problems. In some cases, the assumed constant values may vary and there may be some difference in the candidate's answers and model answer.
- 6) In case of some questions credit may be given by judgement on part of examiner of relevant answer based on candidate's understanding.
- 7) For programming language papers, credit may be given to any other program based on equivalent concept.

Q. No.	Sub Q. N.	Answer	Marking Scheme
Q.1	(A)a) Ans:-	State any two functions of foundation. The functions of Foundation are <ul style="list-style-type: none">• To transfer the load of the structure up to the hard strata this can support it without settling down.• To distribute the load of the structure over a large bearing area so as to bring the intensity of load within the safe bearing capacity of soil.• To distribute load the bearing surface at a uniform rate to avoid differential settlement.• To prevent the lateral movement of supporting material.• To attain a level and firm bed for building operations.• To increase the stability of the structure as a whole.	Any two 01 mark for each
Q.1	(A)b) Ans:-	State any four tools required for construction of brick masonry Following are tools required for construction of brick masonry 1) Trowel 2) Plumb bob 3) Hammer 4) Spirit level 5) Mason square 6) Steel tape 7) Brick axe 8) Line and Pins	Any four 1/2 mark for each
Q.1	(A)c) Ans:-	Suggest suitable type of door for i) Main door of residential building ii) Garage i) Main door of residential building :- Fully panelled door ii) Garage :- Rolling shutter	01 mark for each
Q.1	(A)d) Ans:-	State any four means of vertical communication. Various means of vertical communication 1. Stairs: - Stair is a set of steps leading from one floor to the other. 2. Lifts:- It is a mechanical device which carries men and material from one floor to the other 3. Ramps: - It is the sloping surface used for easy connection between the floors. 4. Escalators: - It is a power driven inclined continuous stair-way used for raising and lowering passengers.	Any four 1/2 mark for each

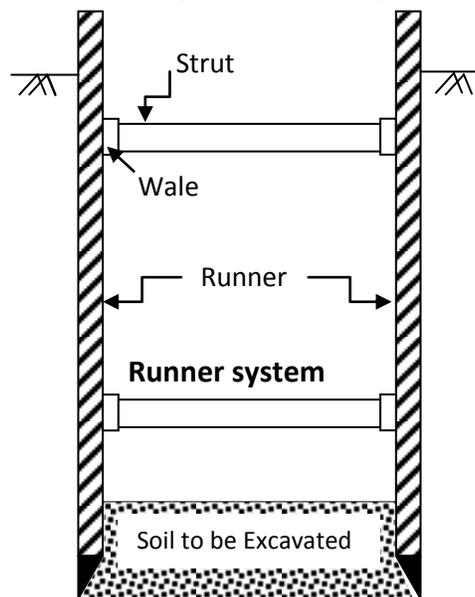


Q.1	(A)e) Ans:-	In connection with stair define the term – pitch, tread. Pitch: - It is the angle which the line of nosing of the stair makes with horizontal. Tread: - It is the upper horizontal portion of a step upon which the feet is placed while ascending or descending.	01 mark for each
Q.1	(A)f) Ans:-	What is pointing? State any two types of pointing. Pointing:- Final treatment with cement or lime mortar made to the joints of the masonry to provide neat appearance is termed as pointing. Types of Pointing: <ul style="list-style-type: none">• Beaded pointing• Flush pointing• Recessed pointing• Rubbed or grooved pointing• Struck Pointing• Tuck Pointing• V-pointing• Weathered Pointing	01 mark Any two 1/2 mark for each
Q.1	(A)g) Ans:-	What is rebarring technique Rebarring techniques are modern methods of maintenance of faulty reinforced concrete work (RCC). Removing the concrete at the weak sections and strengthening the bars there, and again re-concreting the exposed bars is known as 'rebarring technique'.	02 marks
Q.1	(A)h) Ans:-	List any four accessories required for pre-stressing work. Following accessories required for pre-stressing work 1. Tensioning apparatus 2. Temporary gripping device 3. Releasing Device 4. Anchorage	1/2 mark each
Q.1.	(B)a) Ans:-	State one function each of plinth, roof, parapet and beam. Plinth: To provide protection from rainwater and crawling animals and insects, to provide a space for plinth filling layers and flooring. Roof: To protect inside building from rains and wind , snow fall, to provide safety to users of building. Parapet: To provide safety of terrace user (usually children's), to prevent upward movement (uplift) of pitched roof on walls. Beam: To support the transverse (vertical) load of building structure, to resist shear forces and bending moment developed in it due to loads.	01 mark each
Q.1.	(B)b) Ans:-	State any four precautions to be taken while marking layout on ground. The necessary precaution to be taken while marking layout on ground are as follows 1. All vertical wooden post should be firmly fixed into the ground with concrete and curing should be done to the concrete work for the period of 7 days before fixing horizontal railing. 2. Horizontal wooden planks called as railing should be straight and should have standard size. 3. Joints of the wooden railing should not be overlapped but should be joined by small wooden planks on either side of joint and nailed properly. 4. All vertical post should be kept generally at the same level 5. Horizontal wooden railing should have same level throughout and leveled should be found either by level tube or dumpy level. 6. Railing should be fixed by the nails of 50 mm in dia.	Any four 01 mark for each

7. Nails of 40 mm in dia. Should be used for locating the center of column in framed structure and locating the centre of masonry wall in load bearing structure
8. A diagonal check should be done for every day work while locating the centre of column.
9. Strict instruction should be given to the staff and labours not to sit on railing such that bending of railing is avoided and it helps for better accuracy
10. Periodical checking should be done by measuring distances of each rail from the face marking or origin
11. Position of nails on the horizontal railing should not be disturbed till the completion of the plinth work
12. All column number i.e. C₁, C₂, C₃ etc. marked on wooden railing should be visible.
13. All the work should be certified by RCC consultant and Architect
14. To prevent the lime powder flowing away with wind action, it should be thoroughly mixed with sand.
15. Marking with lime powder should be clear and distinct to excavate the pits and trenches properly by labour.
16. Measure or check all distances by steel tape.
17. Prepare the location sketch of reference markings.
18. Mark the face line or center line correctly.
19. Use proper or correct plumb bob for centering.

Q.1. (B)c) What is meant by timbering and strutting? Draw a neat sketch of runner system in section.
Ans:-

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 timber planks and strut to give temporary support to the side of trench. Timbering of deep trenches can be done with the help of the following methods: 1) Vertical sheeting 2) Box sheeting 3) Runner system 4) Sheet piling 5) stay bracing



02 marks for explanation and 02 marks for fig.



Q.2	a) Ans:-	Compare framed and load bearing structure on any four points <table border="1"><thead><tr><th data-bbox="228 191 781 226">Ans:- Load bearing structure</th><th data-bbox="781 191 1338 226">Framed Structure</th></tr></thead><tbody><tr><td data-bbox="228 226 781 306">1) Suitable for hard strata available at shallow depth .</td><td data-bbox="781 226 1338 306">1) Suitable for any type of strata at any depth.</td></tr><tr><td data-bbox="228 306 781 386">2) Thick wall reduce the floor area.</td><td data-bbox="781 306 1338 386">2) More floor area available due to thin walls.</td></tr><tr><td data-bbox="228 386 781 466">3) Allowed up to 3-4 storeys.</td><td data-bbox="781 386 1338 466">3) Multi storied construction is possible.</td></tr><tr><td data-bbox="228 466 781 546">4) Constriction is slow and time consuming.</td><td data-bbox="781 466 1338 546">4) Fast and speedy construction.</td></tr><tr><td data-bbox="228 546 781 625">5) Economical up to 2 storeys.</td><td data-bbox="781 546 1338 625">5) Economical for multistoried building.</td></tr><tr><td data-bbox="228 625 781 743">6) Vibration due to machine and earth quake seriously affects load bearing structures.</td><td data-bbox="781 625 1338 743">6) Machine vibration and earthquake forces resist effectively.</td></tr><tr><td data-bbox="228 743 781 821">7) Flexibility for internal support changes or alterations.</td><td data-bbox="781 743 1338 821">7) Flexibility for partition walls.</td></tr></tbody></table>	Ans:- Load bearing structure	Framed Structure	1) Suitable for hard strata available at shallow depth .	1) Suitable for any type of strata at any depth.	2) Thick wall reduce the floor area.	2) More floor area available due to thin walls.	3) Allowed up to 3-4 storeys.	3) Multi storied construction is possible.	4) Constriction is slow and time consuming.	4) Fast and speedy construction.	5) Economical up to 2 storeys.	5) Economical for multistoried building.	6) Vibration due to machine and earth quake seriously affects load bearing structures.	6) Machine vibration and earthquake forces resist effectively.	7) Flexibility for internal support changes or alterations.	7) Flexibility for partition walls.	Any four 01 mark for each
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Q.2	b) Ans:-	State any four general design principles of earthquake resisting structure while planning stage. <p>Following are the general design principles of earthquake resisting structure while planning stage.</p> <ol style="list-style-type: none">1. Weight of structure: The light building are preferred consistent with structural safety2. Continuity of construction: The part of building should be tied together in such manner that the building act as a one unit.3. Projecting and suspended part: Projecting part should be avoided as far as possible.4. Building configuration: The building should have a simple rectangular plan and be symmetrical both with respect to mass and rigidity, so that center mass of rigidity of the building coincide with each other.5. Straight in various direction: The structure shall be designed to have adequate strength against earthquake effect along the both the horizontal axes.6. Foundation: The structural shall not be fonded on loose soil.7. Ductility: Providing reinforcing steel in masonry, as it increase the strength and stability.	Any four 01 mark for each																
Q.2	c) Ans:-	What is meant by Job layout? State the factors on which it dependents. <p>A plan in which the arrangements for placing site office, store room, labour quarter, medical aid centre, godowns for keeping construction materials and other facilities are properly prepared or chalkout, is called as Job layout. The arrangement for processes should be such that the work is done smoothly and in orderly manner. Job layout depends on following factors.</p> <ol style="list-style-type: none">1) Method of construction.2) Nature and type of work.3) Location, area and topography of the site.4) Requirements of site office, store rooms, labour quarter, godowns, first aid and space for it.	02 marks Any two 01 mark for each																

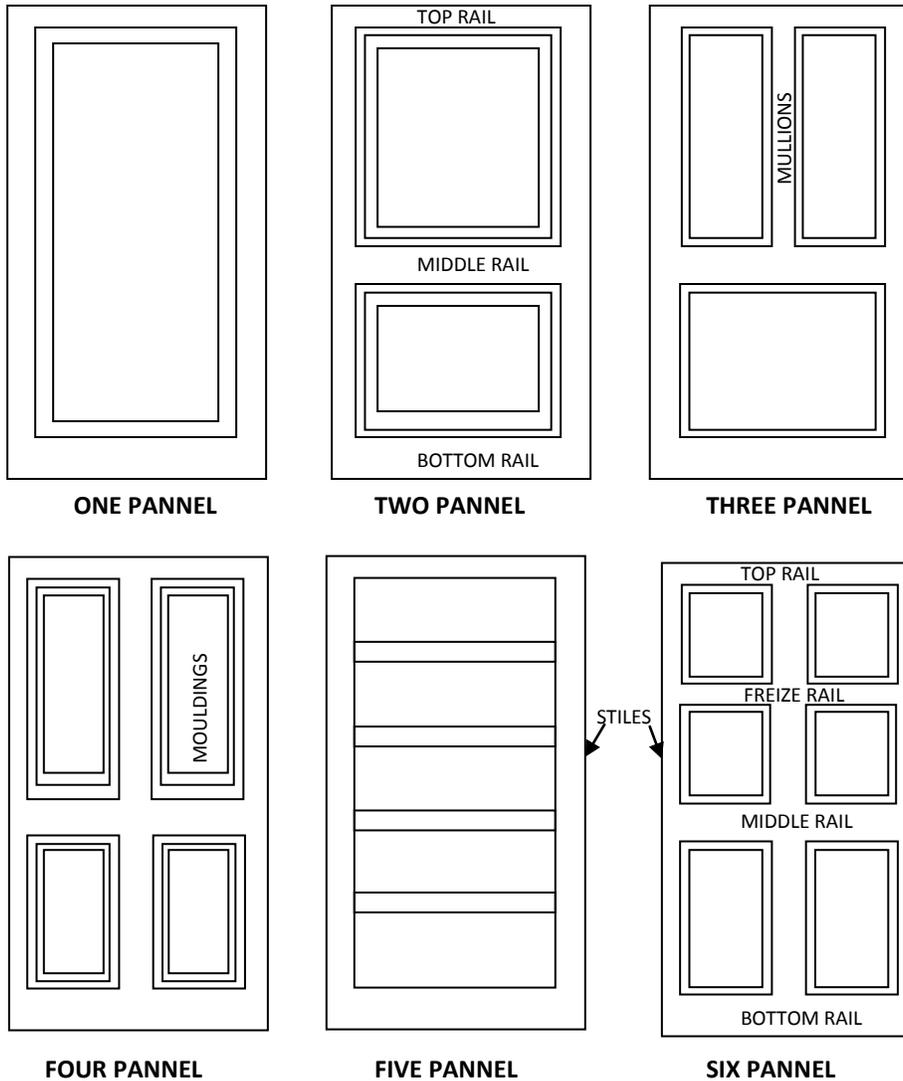


Q.2	d) Ans:-	<p>What is shallow foundation? State the situations where combined column footing and raft foundation are suitable.</p> <p>Shallow Foundation:- When the foundation is placed immediately below the lowest part of structure, it is called as 'shallow foundation'. It can also be defined as, 'when the depth of foundation is less than or at the most equal to its width, the foundation is called as shallow foundation.</p> <p>The situations where combined column footing and raft foundation are suitable.</p> <p>Combined column footing:- When the columns are very near to each other so that their footings overlap, bearing capacity of the soil is less requiring more area under individual footing, the end column is near a property line.</p> <p>Raft foundation:- For made up ground, Soft clay, marshy site having low bearing capacity and heavy concentrated loads on column.</p>	02 marks 01 mark 01 mark																
Q.2	e) Ans:-	<p>Classify the piles as per functions and materials used</p> <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>	02 marks 02 marks																
Q.2	f) Ans:-	<p>Sate any four requirements of good stone masonry.</p> <p>The requirements of good stone masonry are as follows:-</p> <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. It 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. 11. The exposed joints of the masonry should be properly pointed by mortar. 	Any four 01 mark for each																
Q.3	a) Ans:-	<p>Compare stone masonry and brick masonry on any four points.</p> <table border="1" data-bbox="228 1514 1385 1984"> <thead> <tr> <th data-bbox="228 1514 824 1549">Stone masonry</th> <th data-bbox="824 1514 1385 1549">Brick masonry</th> </tr> </thead> <tbody> <tr> <td data-bbox="228 1549 824 1633">1) It is stronger than Brick masonry</td> <td data-bbox="824 1549 1385 1633">1) It is comparatively less stronger than stone masonry</td> </tr> <tr> <td data-bbox="228 1633 824 1717">2) It is cheaper in places where stone is available in abundance</td> <td data-bbox="824 1633 1385 1717">2) It is cheaper in places where clay is available in abundance</td> </tr> <tr> <td data-bbox="228 1717 824 1801">3) Stone masonry gives more aesthetic view than brickwork.</td> <td data-bbox="824 1717 1385 1801">3) Brick masonry gives less aesthetic view.</td> </tr> <tr> <td data-bbox="228 1801 824 1885">4) Stone masonry offers less fire resistance.</td> <td data-bbox="824 1801 1385 1885">4) Brick masonry offer better fire resistance than stone.</td> </tr> <tr> <td data-bbox="228 1885 824 1927">5) Mortar joint in stone work is more</td> <td data-bbox="824 1885 1385 1927">5) Mortar joint in brick work is less</td> </tr> <tr> <td data-bbox="228 1927 824 1969">6) It is more watertight than brick masonry</td> <td data-bbox="824 1927 1385 1969">6) It is less watertight than stone masonry</td> </tr> <tr> <td data-bbox="228 1969 824 1984">7) Stone masonry is heavier</td> <td data-bbox="824 1969 1385 1984">7) Brick masonry is light weight.</td> </tr> </tbody> </table>	Stone masonry	Brick masonry	1) It is stronger than Brick masonry	1) It is comparatively less stronger than stone masonry	2) It is cheaper in places where stone is available in abundance	2) It is cheaper in places where clay is available in abundance	3) Stone masonry gives more aesthetic view than brickwork.	3) Brick masonry gives less aesthetic view.	4) Stone masonry offers less fire resistance.	4) Brick masonry offer better fire resistance than stone.	5) Mortar joint in stone work is more	5) Mortar joint in brick work is less	6) It is more watertight than brick masonry	6) It is less watertight than stone masonry	7) Stone masonry is heavier	7) Brick masonry is light weight.	Any four 01 mark for each
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Q.3 b) Draw a neat labeled sketch of fully panelled door in elevation.

Ans:- Sketch of fully panelled door in elevation



Any one
04 marks

NOTE: Students may draw different arrangement of panels.

Q.3 c) What is lintel? State one thumb rule used in designing bearing of lintel. State any four types of lintels.

Ans:- A lintel is a horizontal structural member which is placed across an opening to support the portion of the structure above it. It is a sort of beam, the width of which is equal to the width of the wall, and the ends are supported on the wall.

One thumb rule used in designing bearing of lintel

- 1) The bearing of the lintel at its ends should be 10cm or 4cm for every 30cms of span, whichever is greater.
- 2) For very long spans, the bearing should be at least equal to the depth of lintel.

Types of lintel

- 1) Stone lintel
- 2) R.C.C. lintel
- 3) Wooden lintel

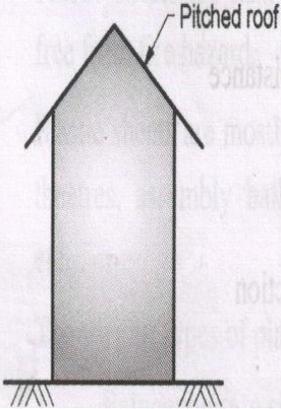
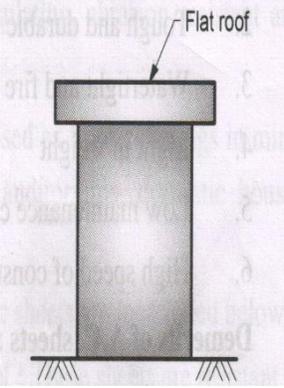
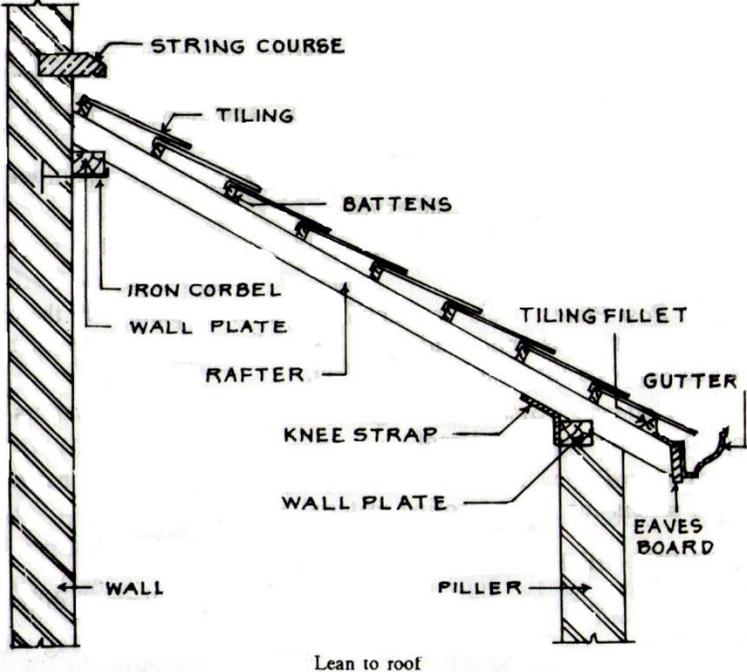
01 mark
definition
of lintel,

01 mark
on
thumb
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02 marks
on any
four
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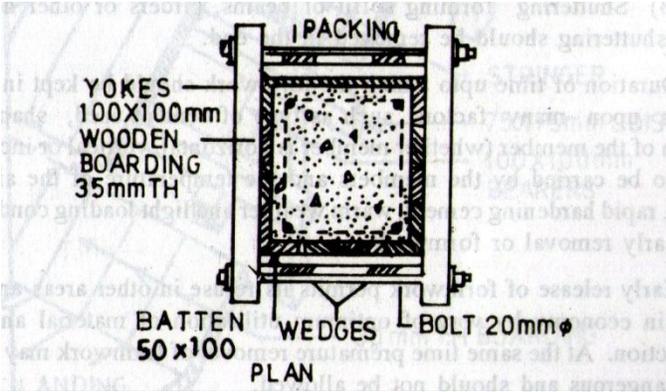


		<p>4) Marble lintel 5) Granite lintel 6) P.C.C. lintel 7) kadappa lintel</p>													
Q.3	d) Ans:-	<p>State any four requirements of good stair. Following are the general requirements of a stair –</p> <p>1. Location- A stair should be located in buildings in a position where there is both light and ventilation.</p> <p>2. Materials- It should be constructed of sound materials and with good workmanship.</p> <p>3. Width of stair- Width of stair should be proper so as to carry the user without much crowded or inconvenience. Width of staircase depends on its location and type of building.</p> <p>4. Length of flight- A flight should not contain more than 12 steps or less than 3 steps to give comfort and safety.</p> <p>5. Pitch of stair- the ascent and descent of stair should be relatively easy and the proportions of going and rise should confirm to one of the following rules- Going in cm + 2 x Rise in cm = About 60 cm Going in cm + Rise in cm = Approximately 400 to 410 cm</p> <p>6. Head room- Unobstructed vertical height must be provided (not less than 2.1 to 2.3 m)</p> <p>7. Step Dimensions- The rise and going should be of such dimensions so as to provide comfort to users. Going should not be less than 25 cm though 30 cm going is quite comfortable. The rise should be between 10 cm to 15 cm. Width of landing should not be less than the width of stair.</p> <p>8. Materials of construction- The material used for construction of stair should be such as to provide-</p> <ol style="list-style-type: none"> 1. Good workmanship 2. Sufficient strength 3. Fire Resistance 	Any four 01 mark for each												
Q.3	e) Ans:-	<p>Suggest a suitable type of floor finish for</p> <p>i) Living room ii) Bath room iii) Hospital iv) Foot path.</p> <p>Suitable type of floor finish for</p> <p>i) Living room:- Ceramic tiles, kotah, vitrified tiles.</p> <p>ii) Bath room:- Glazed tiles, Ceramic tiles.</p> <p>iii) Hospital:- Marble, Ceramic tiles, kotah, vitrified tiles,</p> <p>iv) Foot path:- Pavement block, chequered tiles, interlocking blocks.</p>	01 mark for each												
Q.3	f) Ans:-	<p>Compare pitched and flat roof on any four points.</p> <table border="1"> <thead> <tr> <th>Sr. No</th> <th>Pitched roof</th> <th>Flat roof</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Sloping roof is known as Pitched roof</td> <td>A roof which is nearly flat is known as flat roof</td> </tr> <tr> <td>2.</td> <td>Types- 1. Single roofs 2. Double or purlins roofs 3. Trussed roof</td> <td>Types- 1. Mud Terrace roofs 2. Bengal Terrace roofs</td> </tr> <tr> <td>3.</td> <td>It is suitable at the place where there is</td> <td>It is unsuitable at the place of heavy</td> </tr> </tbody> </table>	Sr. No	Pitched roof	Flat roof	1	Sloping roof is known as Pitched roof	A roof which is nearly flat is known as flat roof	2.	Types- 1. Single roofs 2. Double or purlins roofs 3. Trussed roof	Types- 1. Mud Terrace roofs 2. Bengal Terrace roofs	3.	It is suitable at the place where there is	It is unsuitable at the place of heavy	
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		heavy rainfall	rainfall	Any four 01 mark for each
		4. Initial cost is less than flat roof	Initial cost is higher than pitched roof	
		5. Progress of the work is fast as compared to flat roof	Progress of the work is slow as compared to pitched roof	
		6. 		
Q.4	a) Ans	Draw a neat sketch of lean to roof naming the parts.		4 marks
				
Q.4	b) Ans	<p>What is plastering? State any four purpose of plaster.</p> <p>Plastering is a process of covering rough surface with a plastic material to obtain an, even, smooth, regular, clean and durable surface.</p> <p>List of purpose of plastering:</p> <ol style="list-style-type: none"> 1. To protect the external surface against the penetration of rainswater and other atmospheric agencies. 2. To give smooth surface in which dust and dirt cannot lodge. 3. To give decorative effect. 4. To protect surface against vermit. 		02 mark for definition
Q.4	c) Ans	<p>State the procedure of application of paint on new wood surface.</p> <p>The process of painting on new wood work can be divided into the following different stages.</p>		1/2 mark for each purpose



		<p>i. Preparation of surface: Wood work to be painted must be properly seasoned, clean, dry and free from dust. The surface should be smoothed by rubbing it with a fine grade sand paper or glass paper used obliquely across the grain and rendered free from grease.</p> <p>ii. Knotting: Knotting is the process of sealing the knot by suitable means so that the resin from the knot may not destroy the paint film by way of cracking, peeling or brown discoloration.</p> <p>iii. Priming: This consist in applying first coat or the priming coat on the surface to fill the pores of wood by penetrating the primer inside the wood. The main function of priming coat or the primer is to serve as the foundation for the subsequent coat.</p> <p>iv. Stopping: This consists in filling up all nail-holes, cracks, open joint, dent and other such defect with the putty. Stopping is done soon after the priming coat is dry. After the putty has dried, the surface is once again rubbed with glass paper or pumice stone to level the same.</p> <p>v. Undercoating: After the primary coat is dry, second coat or under coating are applied on the primed surface. The colour of the under coat should approximately be of the same shade as that of the desired finished. Two or more under coating are sometimes necessary to achieve the object.</p> <p>vi. Finishing coat: This is the last coat applied on the surface after the under coat is properly dry. This coat is applied very carefully in a workman like manner, so that the finished surface is free from thin patches and brush mark.</p>	4 marks
Q.4	d) Ans	<p>State any eight precautions to be taken while plastering.</p> <p>i. Before application of the plastering, the surface must be clean and free of dirt, oil, or other elements which may interfere with bonding.</p> <p>ii. Smooth or non-absorbent surfaces should be prepared.</p> <p>iii. It is strongly recommended that the surfaces be dampened with clean water prior to applying the plastering for improved performance in adhesion, durability, and reduced cracking.</p> <p>iv. Sand must be used sieved and washed.</p> <p>v. The material used in preparation of plastering mixes must be measured by volume using gauge-boxes or by weight.</p> <p>vi. Chicken mesh of 20 gauges as approved shall be used over junctions of concrete and masonry or two dissimilar materials.</p> <p>vii. Raking out of joints is expected to be carried out along with masonry but it should be checked thoroughly so as to receive good key.</p> <p>viii. The method of application is also important and hence it is recommended that the mix be thrown on the surface rather than stuck with trowel. This increases the adhesion.</p> <p>ix. Scaffolding should be rigid, allowing free and safe movement on the platform and it should be at sufficient distance or height from the working areas. Scaffolding shall be with proper railings.</p> <p>x. Corners, external or internal, shall be finished along with final coat. It is advisable to have rounded corners.</p> <p>xi. Finishing of plaster may be carried out with wooden float (randhas) or trowelled smooth with sheet metal trowels as specified. Care shall be taken</p>	1/2 mark for each

		<p>to avoid excessive trowelling and overworking of the wooden float.</p> <p>xii. Plaster shall be cut to correct horizontal or vertical line at the end of the day or if work requires to be suspended for any reason.</p>	
Q.4	e) Ans	<p>Draw a neat sketch of wooden form work for rectangular column in plan naming the parts.</p> 	4 marks
Q.4	f) Ans	<p>Describe the procedure of water proofing of sanitary block after construction.</p> <p>Procedure of water proofing of sanitary block after construction:</p> <p>Step 1 Surface preparation: The first step would be surface preparation to receive waterproof. Built up, slab sunk surface should be cleaned to remove dirt, dust, laitance, soft mortar and all loosely adhered particles.</p> <p>Step 2: Testing the substrate: For best results, it is always advisable to check the condition of concrete slab as it's the substrate for receiving waterproofing built up. The cleaned concrete surface is subjected to water ponding by allowing water to stand (for 48 hrs.) on the prepared area. The surface is inspected for any leakages, dampness, dripping, if the same is observed it need to be rectified by crack filling the visible cracks on slab and injection grouting as per the procedure explained in Step 3.</p> <p>Step 3: Strengthening the substrate (Crack repair and Grouting): Visible cracks to be sealed by creating "V" groove, making the inside of the crack bigger ($< \frac{1}{4}$ ") than it are at the surface, this helps the repair material (non- shrink repair grout) bond with the crack. Followed by attending cracks, Injection grouting is done using injection grout pump with a non- shrink cement grout at leakage points or at well distributed points (grid of 2'X2') this makes the substrate concrete slab less porous.</p> <p>Step 4: Water proofing Built up:</p> <p>a) Plumbing/Pipe Insertions: All Pipe inserts must be installed prior to the application of waterproofing system on the sunken slab. The opening on punctured walls around the pipes should be packed using with a mix of Cement Sand (1:3) mix with Styrene Butadiene Bonding emulsion, at least 48 hours prior to application of waterproofing.</p> <p>b) The slab should be Pre-wetted to make it saturated and free water to be drained using a dry cloth.</p> <p>c) Applying a coat of cement slurry with waterproofing compound. The coat has to be</p>	4 marks



		<p>extended on the masonry wall at least 2' above sunk. Apply another coat of cement slurry with waterproofing compound (second coat) after 06 hrs. of first coat.</p> <p>d) Brick bat layer serve as economical sunk filler as they are available easily at any site and also light weight in comparison to concrete.</p> <p>e) Fill joints with CM 1:4 along with water proofing compound. Perform curing for 03 day.</p> <p>f) Finish brick bat coba with joint less water proofing screed (Cement Sand Mortar of 1:3) admixed with water proofing compound. The surface has to be finished smooth and checked for slope check. Also ensure proper finishing around Nhani traps/inserts.</p> <p>g) Go for water ponding test, check for any leakages.</p> <p>h) Cure the top finish layer for a minimum of 7 days.</p>	
Q.5	a)	<p>State any four requirement of good foundation.</p> <ol style="list-style-type: none">It should transfer load from the superstructure safely to the ground without settlement.Foundation should be stable against overturning and sliding.Foundation base should be rigid so that deferential settlements are minimized; especially for the case where imposed load is not spread evenly.Foundation should be taken sufficiently deep to guard the building against damage or distressed caused by swelling and shrinkage of the soil	1 mark for each
Q.5	b) Ans	<p>State any eight causes of cracks in building.</p> <p>The important causes responsible for occurrence of cracks in building are as under:</p> <ol style="list-style-type: none">Cracks due to moisture changes: Shrinkage on account of drying out of moisture content in building materials is one of the main factors responsible for cracks in the building.Cracks due to temperature variation: Almost all materials expand on heating and contract on cooling. In some materials the change in temperature can cause appreciable changes in their size.Cracks due to elastic deformation and creep: The deferent components of building viz. wall, column, beam, slab etc. undergo elastic deformation when loaded.Cracks due to effect of chemical reaction: The Carbone dioxide present in the air reacts chemically with cement based products resulting in appreciable increase in volume of these materials which ultimately lead to cracking.Cracks due to moment of ground: In case where a building is erected on or near an area which is likely to be subjected to mining substance, landslides, earthquakes etc. the moment of ground due to these factor can cause cracks in building.Cracks due to vegetation: Cracks many a times occur due to the existence of fast growing tree in the vicinity of the building. The root of the growing trees causes drying and shrinkage of the soil and this can result in unequal settlement of the foundation leading to cracks.Cracks due to faulty design: In case of design of building the basic data not taking in account like soil bearing capacity and environmental exposure condition etc. therefore design is not applicable for the proposed	1/2 mark for each



		construction work due to these factor can cause cracks in building. viii. Cracks due to improper curing: Cracks many times occurs due to insufficient curing of structural element.	
Q.5	c) Ans	State any four applications of geotextile. Following are the applications of geotextile: i. Road Works: The basic principles of incorporating geotextiles into a soil mass are the same as those utilized in the design of reinforced concrete by incorporating steel bars. The fabrics are used to provide tensile strength in the earth mass in locations where shear stress would be generated. ii. Railway Works: The woven fabrics or non-woven are used to separate the soil from the sub-soil without impeding the ground water circulation where ground is unstable. iii. River Canals and Coastal Works: Geotextiles protect river banks from erosion due to currents or lapping. When used in conjunction with natural or artificial enrockments, they act as a filter. iv. Drainage: In civil engineering, the use of geotextiles to filter the soil and a more or less single size granular material to transport water is increasingly seen as a technically and commercially viable alternative to the conventional systems. v. Agriculture: It is used for mud control. For the improvement of muddy paths and trails those used by cattle or light traffic, nonwoven fabrics are used and are folded by overlapping to include the pipe or a mass of grit. vi. Stabilization: The geotextile is then able to allow water from the soft soil to pass into a more freely draining material. This consolidates the bottom layer, which strengthens it and makes it a more reliable base. vii. Reinforcement: The geotextile is a source of strength rather than strengthening the bottom soil as in stabilization. That also means that rather than being placed on top of a layer that needs to be strengthened, reinforcement applications are accomplished by placing the layer within the weak layer.	Any 4 1 Marks each
Q.5	d) Ans	Write the procedure of tremix concrete for floors. 1. The tremix concrete process removes surplus water present in the concrete. This is done using the vacuum equipment comprising of suction mat top cover, Filter pads and vacuum pump. The process starts immediately after surface vibration. 2. Filter pads are placed on the fresh concrete leaving about four inches of fresh concrete exposed on all sides. The top cover is then placed on the filter pads and rolled out till it covers the strips of exposed concrete on all sides. The top cover is then connected to the vacuum pump through a suction hose and the pump is started. 3. Vacuum is immediately created between the filter pads and the top cover. Atmospheric pressure compresses the concrete and the surplus water is squeezed out. This process lowers the water content in the concrete by 15-25%. 4. The dewatering operation takes approximately 1.5-2 minutes per centimeter thickness of the floor. The dewatered concrete is compacted and dried to such an extent that it is possible to walk on it without leaving any footprints. This is the indication of concrete being properly dewatered and	4 marks
Q.5	e) Ans	Define ready mix concrete. State any four advantages of it. Ready mix concrete (RMC) is a type of concrete which is manufactured in a cement	2 marks



factory, or specifically known as the batching plant, according to a given set of proportions, and then delivered to a work site, by truck mounted with mixers.

Advantages of Ready Mix Concrete:

1. Quality assured concrete: Concrete is produced under controlled conditions using consistent quality of raw material.
2. High speed of construction: Speed of construction can be very fast in case ready mix concrete is used.
3. Reduction in cement consumption by 10 – 12 % due to better handling and proper mixing.
4. Conservation of energy and resources because of saving of cement.
5. Environment pollution is reduced due to less production of cement.
6. Eliminating or minimizing human error and reduction in dependency on labour.
7. Timely delivered in mass concreting work.
8. No need for space for storing the materials like coarse and fine aggregate, cement, water and admixtures.
9. No delay due to site based batching plant erection/ dismantling; no equipment to hire; no depreciation of costs.

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definitio
n**

**Any four
½ marks
each
advantag
e**

Q.5

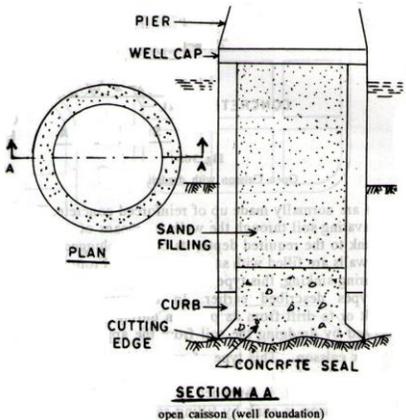
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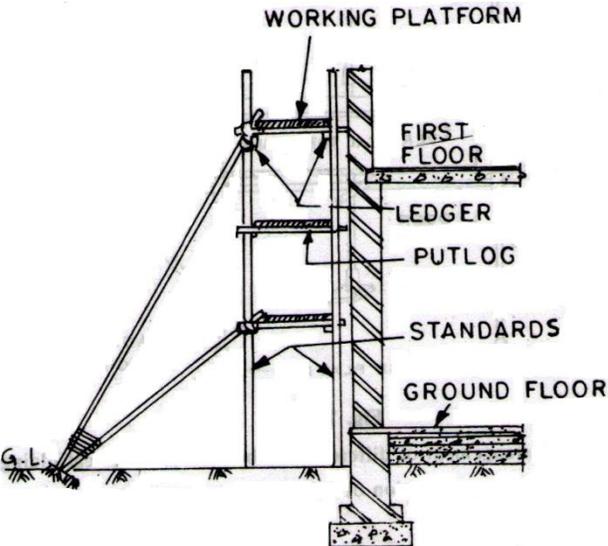
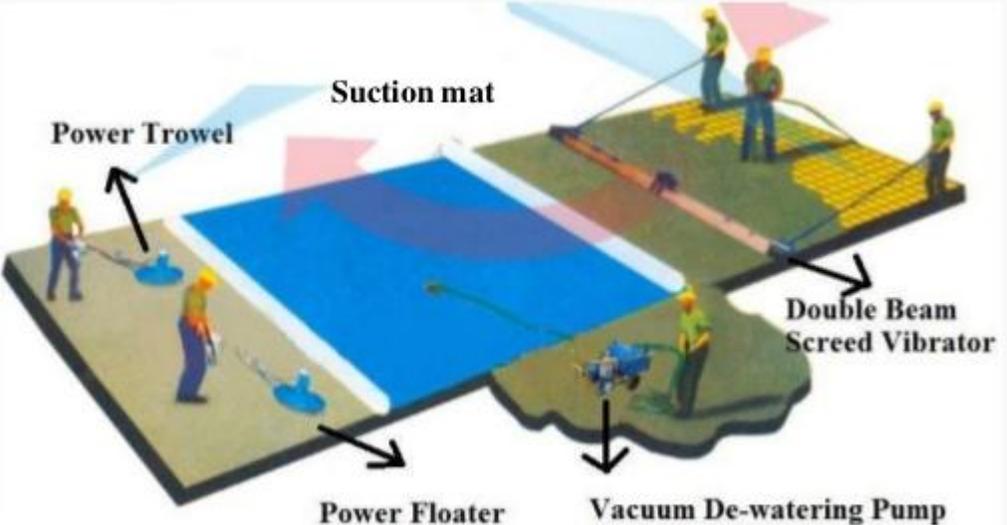
Differentiate between high impact resisting concrete and roller compacted concrete on any four points.

Ans

High Impact Resisting Concrete	Roller Compacted Concrete
1. It is tougher than roller computed concrete.	1. It is lean, no slump concrete, it is compacted by vibratory roller
2. It is used in constructing railway platforms docks, yards and industrial floors.	2. It has become an accepted material for constructing dams and pavement.
3. It is used in parking places saving labour cost.	3. It is used in various concrete applications in paving project, saving labour cost.
4. It has a great resistance to wear and tear and resisting power to impact loads.	4. In India it has been used as base concrete in construction of concrete road the grade of concrete has a 10 MPa.

**1 marks
each**

Q.6	a)i) Ans	<p>Draw neat sketch of open caisson in section showing components.</p> <div style="text-align: center;">  </div>	4 marks
	a)ii) Ans	<p>State any four precautions to be taken for foundation in black cotton soil.</p> <p>Following are the precautions to be taken for foundation in black cotton soil.</p> <ol style="list-style-type: none"> 1. If the depth of black cotton soil at a given site is only 1 to 1.5 m the entire black cotton soil above the hard bed may be completely removed and the foundation laid on hard bed below. 2. To take the foundation to such depths where the cracks cease to extend. The minimum depth of foundation should be at least 1.5 m. 3. Construction in black cotton soil should be undertaken during dry season. 4. To limit the load on the soil to 5.5 ton / m² if water is liable to find an access to the foundations, the limit of loading should be restricted to 4.9 ton / m². 	1 marks each

<p>Q.6</p>	<p>b)i) Ans</p>	<p>State any four advantage of hollow concrete block masonry. Following are the advantages of hollow concrete block masonry.</p> <ol style="list-style-type: none"> 1. Regular, uniform size and less weight hollow concrete block afford great facility in masonry construction which ultimately results in rapid execution of work. 2. The hollow space in block enables the masonry to have good insulating properties against sound, heat and dampness. 3. The rough surface of the hollow concrete blocks makes plastering easier. 4. The hollow concrete blocks are manufactured in various shapes and size. 5. The large size of concrete block, the numbers of joints in work are lesser and hence there is saving of mortar. 6. There is great saving of material on account of the blocks being hollow from inside. <p>Draw a neat sketch of double scaffolding showing components.</p>	<p align="center">Any 4 1 marks each</p>
<p>Q.6</p>	<p>b)ii) Ans</p>		<p align="center">4 Marks</p>
<p>Q.6</p>	<p>c)i) Ans</p>	<p>With neat sketch explain tremie method of concreting.</p> 	<p align="center">2 marks for sketch</p>



Q.6	c)i) Ans	<ol style="list-style-type: none">1. The RMC is put on the floor.2. Initially, poker vibration is essential, especially at the panel edges.3. Poker vibrator & surface vibrator are used simultaneously.4. Vacuum dewatering process removes surplus water always present in the concrete with the help of FILTER MAT.5. The process of dewatering is starts immediately after surface vibration.6. The dewatering operation takes approximately 1.5-2 minutes per centimeter thickness of the floor.7. The finishing operation- floating & trowelling takes place right after dewatering.8. Floating operation generates skid-free finish.9. Trowelling is done with trowelling blades.10. Repeated passes with discs & blades improve the wear resistance substantially. <p>State four advantages and four disadvantages of prefabrication.</p> <p>Advantages of Prefabrication.</p> <ol style="list-style-type: none">1. Mass production of units.2. Reduction of costs and construction time on site.3. Effective use of formwork.4. Improved quality of units.5. Special shapes and surface finishes.6. Protection from hot or drying winds.7. Demountable structures. <p>Disadvantages of Prefabrication.</p> <ol style="list-style-type: none">1. Careful handling of prefabricated component is required.2. Need for cranes.3. Transportation difficulties.4. A small number of units required may prove to be uneconomical.5. Transportation cost may be higher for voluminous prefabricated sections.6. A small number of units required may prove uneconomical	<p>2 marks for explanati on</p> <p>Any four ½ marks each advantag e</p> <p>Any four ½ marks each disadvan tage</p>
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