



WINTER – 18 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.

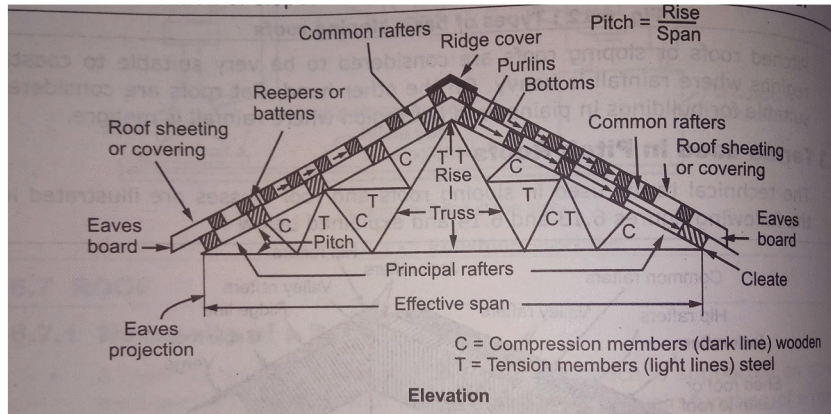
Q. No.	Sub Q. N.	Answer	Marking Scheme
Q.1	(A)	Attempt any SIX of the following.	(12)
Q.1	A)a) Ans.	Define foundation with one purpose of it. Foundation is lowest part of structure below ground level which provides a base for a building structure. Purpose of foundation: 1) To distribute the weight of the structure over large area so as to avoid overloading of the soil beneath. 2) To avoid unequal settlement of the structure. 3) To provide a leveled surface for building operation. 4) The foundation takes the structure deep into the ground, thus increasing the stability of building and prevents overturning.	01 M 01 M (any one)
Q.1	A)b) Ans.	Define frog and state its purpose. A small depression created purposely on one side of brick is called as Frog. Purpose:- 1) The name of brick manufacturer can be engraved in the frog. 2) The frog forms a key between two courses of brickwork.	01 M 01 M (any one)
Q.1	A)c) Ans.	Enlist various sizes of door for residential building. Sizes of door for residential building: a) External door- 1.2m X 2.1m b) Internal door- 0.9m X 2.0m c) WC/Bath- 0.8m X 2.0m	02 M (any two)
Q.1	A)d) Ans.	Enlist types of stairs. Types of stair: 1)straight stair 2) Quarter turn stair 3)Half turn stair 4)Open well stair	0 2 M (any four)



		5) Dog-legged stair 6) Spiral stair 7) Bifurcated stair 8) Circular stair	
Q.1	A)e) Ans.	Define: i) Pitch ii) Newel post 1) Pitch: The angle of inclination of the stair with the floor is known as pitch of the staircase. 2) Newel post: These are the principal post supporting a hand rail.	02 M
Q.1	A)f) Ans.	Enlist types of pointing. Types of pointing: 1. Flush pointing 2. Recessed pointing 3. Beaded Pointing 4. Struck Pointing 5. Rubbed, keyed or grooved pointing 6. Tuck Pointing 7. V- pointing 8. Weathered pointing	2 marks (1/2 mark each – Any four)
Q.1	A)g) Ans.	Enlist any four causes of cracks in masonry wall. Causes of Cracks: 1) Due to movement of ground 2) Due to temperature variation 3) Due to moisture changes 4) Due to effect of chemical reaction 5) Due to creep and elastic deformation 6) Due to vegetation	02 M (any four)
Q.1	A)h) Ans.	Define prestressed concrete. Prestressed concrete:- It is a member of concrete in which internal stresses are induced in planned manner so that the stresses resulting from the superimposed loads are counteracted to a desired strength.	02 M
Q.1	(B)	Attempt any TWO of the following.	(08)
Q.1	B)a) Ans.	Enlist four components of superstructure and draw figure of typical pitched roof. Components of superstructure: 1) Plinth 2) Floor 3) Wall 4) Column 5) Beam 6) Roof 7) Doors 8) Windows 9) Lintel 10) Sill 11) Staircase 12) Parapet.	02 M (any four)



Typical sketch of pitched roof:



02 M

Q.1

B)b)
Ans.

State the necessity and methods of timbering and strutting.

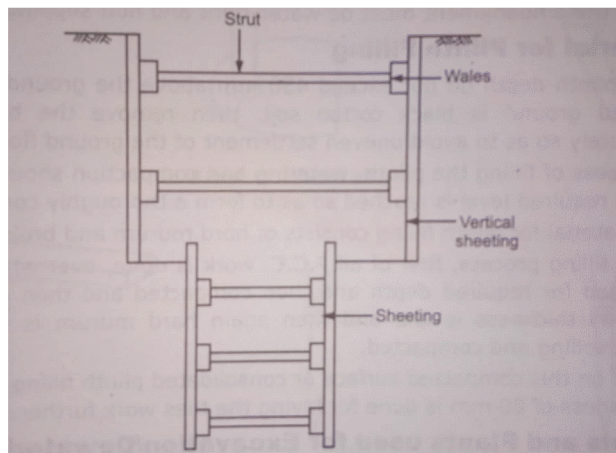
The purpose of timbering is to uphold sides of excavation so as to avoid collapse of side and to avoid wasteful labour cost of clearing the falling material from trench bottom. A method of giving the temporary support to the side of deep trench or when subsoil is loose or very soft is known as timbering (i.e. shoring) and strutting.

Method of timbering and strutting:

Timbering and strutting 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

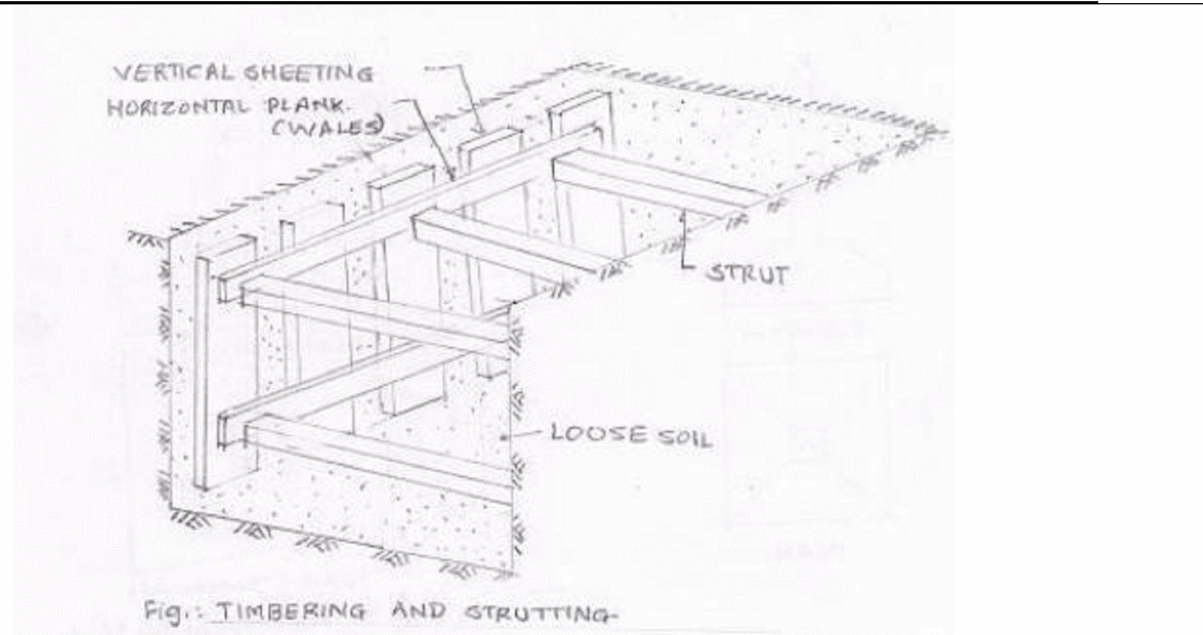
1) Vertical sheeting:- In this case, excavation is progressed in stages by providing an offset at the end of each stage. This method is best suited for deep trenches in soft ground.



02 M

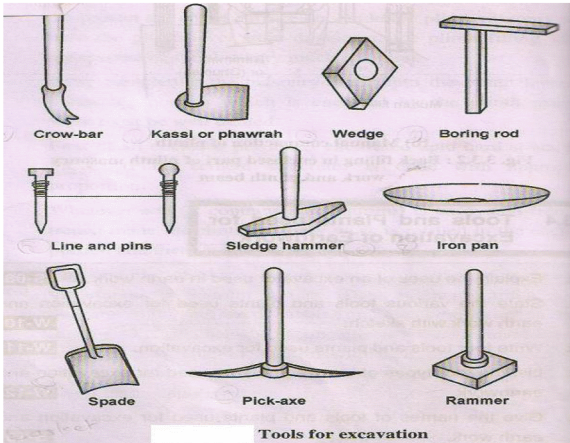
02 M
(any one sketch)

2)Box sheeting:- If the depth of the excavation is upto 4m and if soil is loose, the box sheeting method is used. It is just like box consisting of vertical sheets and held in position by horizontal rows of wales and made tight by providing strut. Sometime a certain distance is kept in between vertical sheeting. If soil is very loose then horizontal sheets are provided. Braces are also provided in case of more height.



Q.1 B)c)
Ans.

Enlist four tools used for excavation with neat sketch.



Any four
01 M
each

Q.2 Attempt any FOUR of the following :

(16)



Q.2 (a) Differentiate between load bearing and framed structure.

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	4) Multi storied construction is possible
4) Construction 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 earthquake seriously affects load bearing structures	6) Machine vibration and earthquake forces are resisted effectively

Any related differences.

Any four
01 M
each



Q.2	(b) Ans.	State four design principles of earthquake resisting building. The building or structures which come under seismic or earthquake zones are required to resist the earthquake or seismic forces. There are some design principles generally considered while constructing the structures in earthquake zones. 1. Continuity in the construction of a structure: The structures coming in the seismic zone should be constructed in such a way that the total structure act as a single unit. 2. Sufficient space between adjacent structures: To avoid collision during an earthquake it is advisable to keep some space between the adjacent structures. The recommended gap width varies from 15 mm to 30 mm per storey. 3. Foundation: Loose soil settles easily during an earthquake. So avoid constructing a structure on loose soil. And proper parameters of earthquake design should be adopted while designing foundation. 4. Avoid unnecessary projections: The unnecessary projections such as balconies, canopies, etc should be avoided and if they are in the structure they should be firmly tied with the main part of structure. 5. Shape of structure: a) Simple rectangular structure is considered good in this case. b) The length of the building should not exceed three times its width. c) Symmetrical designed structure with respect to mass and rigidity is also preferred.	4 marks (Any four 01 M each)
Q.2	(c) Ans.	State the precautions to be taken while marking layout on ground. The following precautions should be taken while marking layout on ground: 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 level should be found either by level tube or dumpy level. 6. Railing should be fixed by the nails of 50 mm in dia. 7. Nails of 40 mm in dia. should be used for locating the centre 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.	Any four 04 M (01 M each)



17. Prepare the location sketch of reference markings.
18. Mark the face line or centre line correctly.
19. Use correct plumb bob for centering.

Q.2 (d)
Ans.

State the requirements of good foundation.

Requirements of good foundation-

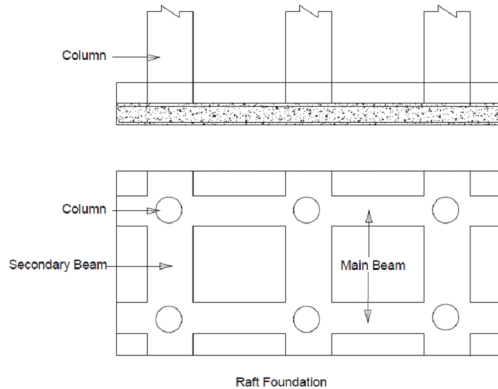
1. To distribute the weight of the structure over large area so as to avoid overloading of the soil beneath.
 2. Avoids unequal settlement of the structure.
 3. To provide a leveled surface for building operation.
 4. The foundation takes the structure deep into the ground, thus increasing the stability of building and prevents overturning.
- Other related requirements.

Any four
01 M
each

Q.2 (e)
Ans.

Draw neat sketch of raft foundation and state its suitability.

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.



02 M

02 M

Q.2 (f)
Ans.

Differentiate between brick masonry and stone masonry.

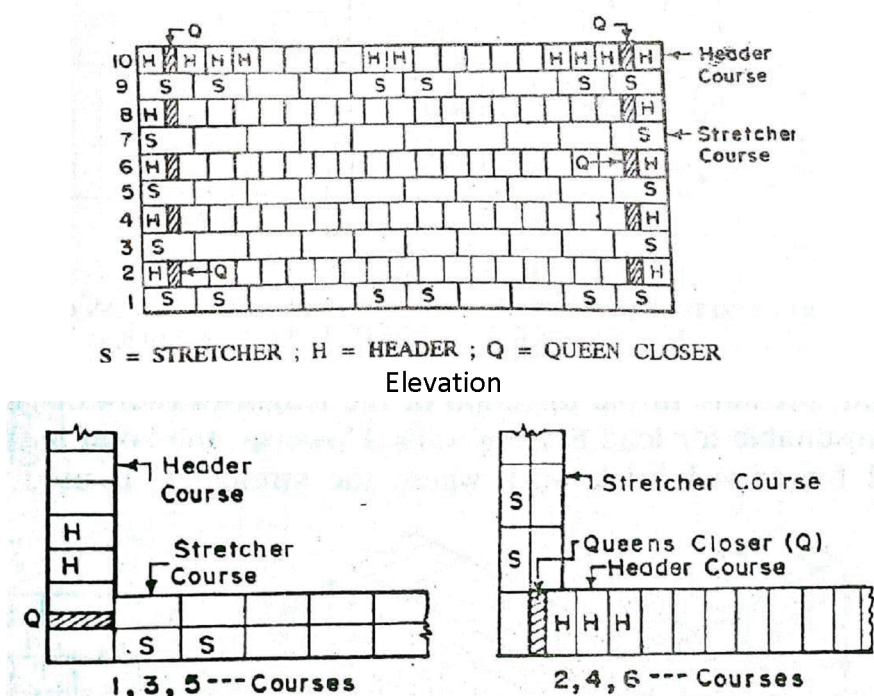
Brick masonry	Stone masonry
It is cheaper than stone masonry.	It is stronger than Brick masonry
It is cheaper in places where clay is available in abundance.	It is cheaper in places where stone is available in abundance
Brick masonry gives less aesthetic view.	Stone masonry gives more aesthetic view than brickwork
Brick masonry offer better fire resistance than stone.	Stone masonry offers less fire resistance.
Thickness of mortar joint in brick work is less	Thickness of mortar joint in stone work is more
It is more lightweight than stone masonry	It is more watertight than brick masonry
Bricks are uniform in size so not much skill is required for proper bond	The size of stone is not uniform therefore greater care and skill should be required
Plastering increases the life of brick masonry and saves from decaying.	Plaster does not stick nicely to a stone surface. It is difficult to apply any finishing to the stone surface

4 marks

(Any
four
01 M
each)

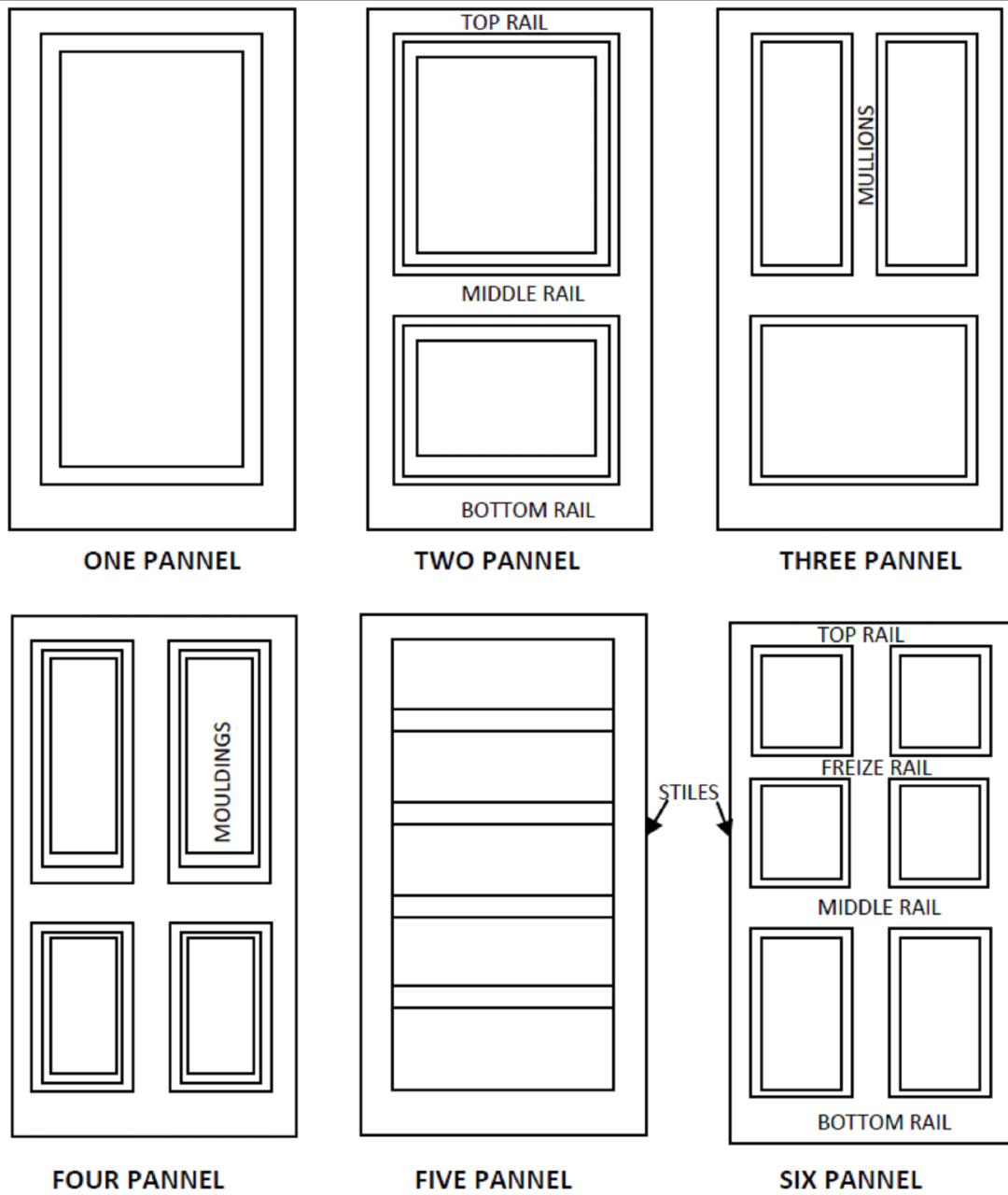
Any other related differences.



Q.3		<p>Attempt any FOUR of the following.</p>	(16)
Q.3	(a) Ans.	<p>Describe in brief English bond with neat sketch.</p> <p>English Bond</p>  <p>S = STRETCHER ; H = HEADER ; Q = QUEEN CLOSER</p> <p>Elevation</p> <p>Header Course</p> <p>Stretcher Course</p> <p>Header Course</p> <p>Stretcher Course</p> <p>Queens Closer (Q)</p> <p>Header Course</p> <p>1, 3, 5 --- Courses</p> <p>2, 4, 6 --- Courses</p> <p>Plan of stretcher course</p> <p>Fig – English Bond – One brick wall</p> <p>This bond has alternate courses of headers & stretchers with a closer placed next to quoin header. Following points should be remembered</p> <ol style="list-style-type: none"> 1) A heading course should never start with a queen closer. 2) Every alternate header comes centrally over the joint between two stretchers in course below giving a lap of 5 cm. 3) There is no continuous vertical joint. 4) Walls of an even number of half bricks in thickness, present the same appearance on both faces. 5) Walls of an odd numbers of half bricks in thickness will show each course comprising of headers on one face & stretchers on another face. 6) The middle portion of each of the thicker walls consists headers. 7) The number of vertical joints in the header course is twice the number of joints in the stretcher course. 8) This bond is stronger and costlier than Flemish bond. 	04 M (02 M for figure , 1/2 M each for any four points explanation
Q.3	(b) Ans.	<p>Enlist any four types of Arch and state function of arch.</p> <p>Types of Arch:</p> <p>According to Shape</p> <ol style="list-style-type: none"> 1. Flat arch 2. Segmental Arch 3. Semi-circular Arch 4. Horse Shoe Arch 5. Pointed Arch 	



		<p>6. Venetian Arch 7. Florentine Arch 8. Relieving Arch 9. Stilted Arch 10. Semi-Elliptical Arch</p> <p>According to number of centers</p> <p>1. One-centered arches 2. Two-centered arches 3. Three-centered arches 4. Four-centered arches 5. Five-centered arches</p> <p>According to workmanship</p> <p>1. Rough arch 2. Rough or rough-cut arch 3. Gauged arch</p> <p>According to material of construction</p> <p>1. Stone arches 2. Brick arches 3. Concrete arches</p> <p>Function of arch Arches bridge an opening in wall and support the load of the portion of wall above the openings and transmit such load to the end of the walls or piers or jambs or column over which they are supported. Blind arches are used to lighten the masonry structure or simply decorative purpose</p>	<p>04 M (02 M for types , 1/2 M each for any four types) &</p> <p>(02 M for function)</p>
Q.3	(c) Ans.	<p>Draw neat sketch of fully paneled door. Sketch of fully paneled door</p>	



04 M for any one

NOTE: Students may draw different arrangement of panels.

Q.3

(d)
Ans.

State the requirement of good staircase.

Following are the general requirements of a stair –

- 1. Location-** A stair should be located in buildings in a position where there is both light and ventilation.
- 2. Materials-** It should be constructed of sound materials and with good workmanship.
- 3. Width of stair-** Width of stair should be sufficient to carry users with much convenience. Width of staircase depends on its location and type of building.
- 4. Length of flight-** A flight should not contain more than 12 steps or less than 3 steps to give comfort and safety.
- 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-

04 M
(1/2 M
for each
)



Going in cm + 2 x Rise in cm = About 60 cm
Going in cm + Rise in cm = Approximately 400 to 410 cm
6. Head room- Unobstructed vertical height must be provided (not less than 2.1 to 2.3 m)
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.
8. Materials of construction- The material used for construction of stair should be such as to provide-

1. Good workmanship
2. Sufficient strength
3. Fire Resistance

Q.3

(e)

State any four types of floor with their suitability.

Types of floor

Ans.

1. **Brick flooring:** This type of flooring is commonly used in ware houses, go-downs or store or places where heavy articles are stored.
2. **Mud flooring:** This type of flooring has good thermal insulation and keep house cool in summer and keep warm in winter, hence suitable adverse conditions of climate. These floor not used in commercial or professional buildings but only in residential buildings.
3. **Murum flooring :** This flooring has similar type of properties like mud flooring. These floor not used in commercial or professional buildings but only in residential buildings.
4. **Cement Concrete flooring:** This type of flooring is commonly used in residential, public buildings, industrial floorings, go-downs and workshops, etc. Concrete floors are strong and durable.
5. **Flag Stone flooring:** This type of flooring is suitable in go-downs, motor shed, stores, pavement etc.
6. **Terrazzo flooring:** Terrazzo flooring is yet another type of flooring that has been commonly used in India. As this type of flooring gives a pleasing look, it has been extensively provided in living rooms, bed room's etc. It is widely used in residential houses, offices, schools, hospitals and other public buildings.
7. **Mosaic flooring:** Mosaic floorings in commercial buildings, kitchens, bathrooms of residential buildings etc.
8. **Marble or Granite flooring:** Marble is a type of metamorphic rock and is used widely for floorings in commercial buildings, kitchens, bathrooms etc. they are stain proof and easily cleanable. Hence, they are used where extra cleanliness is required especially in bathrooms.
9. **Timber or wood flooring:** Wood or timber is one of the most common methods of flooring. It is preferred when the timber is cheaply available, such as in hilly areas. Timber blocks or timber bards are provided as flooring covers. Wooden floors are most suitable for dance floors, auditoriums etc. Damp proof course below the flooring is necessary for wooden floors.
10. **Tiled flooring:** These floors are used in residential houses, offices, schools, hospitals and other public buildings.
11. **Marble flooring:** These floors are used in bathrooms and kitchen of residential

04 M
(01 M
for each
-any
four)



		<p>buildings, and in hospitals sanatoriums, temples etc.</p> <p>12. Glass flooring: This type of flooring is used for special condition like transmit light from upper floor to lower floor and specially to admit light to the basement from upper floor.</p> <p>13. Flooring (VDF) / Trimix Flooring & IPS Flooring.</p> <p>Any other related types.</p>	
Q.3	(f) Ans.	<p>Describe in brief mezzanine floor, stating its location and use.</p> <p>Mezzanine floor – An intermediate floor between main floors of a building, and therefore typically not counted among the overall floors of a building such floors are known as Mezzanine floors. It is used to effectively increase the vertical space. Mezzanine floor can create the additional floor of space for a variety of different use such including storage or extra office space. Mezzanine floor are very quick and cost effective way to create a new space without the expenses and inconvenience of relocation.</p> <p>Location of Mezzanine floor –</p> <ol style="list-style-type: none"> 1. It is in-between the floor and ceiling of any storey. 2. It can be constructed in any type of building like public, residential shops, garages, go-down etc. <p>Uses of Mezzanine floor –</p> <ol style="list-style-type: none"> 1. It gives more space for storage. 2. It gives extra space for working 3. It gives the additional intermediate floor 4. It increases the utility of shops, go-down 	4 marks (2 marks for description and 1 mark for location and 1 mark for uses)
Q.4		Attempt any Four Of The Following:	(16)
Q.4	(a) Ans.	<p>Draw neat sketch of king post truss.</p> <p style="text-align: center;">King Post Roof Truss</p>	4 marks (2 for Labeling and 2 for diagram)
Q.4	(b) Ans.	<p>Describe in brief Necessity of plastering</p> <p>Necessity of plastering are</p> <ol style="list-style-type: none"> 1. To provide an even smooth, regular, clean and durable finished surface. 	



		<ol style="list-style-type: none">2. To conceal the defective workmanship3. To preserve and protect the surface from atmospheric influences by acting as a protective coating4. To fill the joints formed in masonry work5. To cover inferior quality material.6. To provide a satisfactory base for decorating the surface for applying white – washing, color washing painting	4 marks (1 for each)
Q.4	(c) Ans.	<p>Enlist any four types painting and four defects in painting</p> <p>Types painting</p> <ol style="list-style-type: none">1. White wash2. Colour Wash3. Oil bound distemper4. Plastic emulsion5. Oil paint6. Cement paint <p>Defects in painting</p> <ol style="list-style-type: none">1. Blistering2. Bloom3. Crawling or sagging4. Fading5. Flaking6. Flashing7. Grinning8. Running9. Sponification	4 marks (2marks for types and 2 marks for defects)
Q.4	(d) Ans.	<p>Write any four defects in plastering work and give remedies on it.</p> <p>Defects in plastering-</p> <ol style="list-style-type: none">1. Blistering of plastered surface2. Cracking :3. Efflorescence4. Flaking5. Peeling6. Popping7. Rust strains8. Uneven surface <p>1. Blistering Of plastered Surface: This is the formation of the plaster swelling out beyond the plastered surface due to late slaking of lime particles in the plaster.</p> <p>2. Cracking: It consists of formation of cracks in the plaster work resulting from-</p> <ol style="list-style-type: none">1. Structural defect in building.2. Discontinuity of surface.3. Background is not prepared up to mark.4. Movement in back ground due to rapid or due to thermal expansion.5. Due to excessive shrinkage.6. Faulty workmanship. <p>3. Efflorescence: It is the whitish crystalline substance which appears on the surface</p>	4 marks (1marks for each)



		<p>due to the presence of salts in plaster making materials as well as building materials like bricks, sand etc and even in water. This gives bad appearance.</p> <p>4. Flaking :It is the formation of very loose mass of plastered surface , due to poor bond between successive coats.</p> <p>5. Peeling : It is the complete dislocation of some portion of plastered surface resulting in the formation of a patch.</p> <p>6. Popping: It is the formation of conical hole in the plastered surface due to presence of some particles which expand on setting.</p> <p>7. Rust stains: These are sometimes formed when plaster is applied on metal laths.</p> <p>8. Uneven surface: This is obtained purely due to poor workmanship.</p>	
Q.4	e) Ans:	<p>State the necessity and material used in plinth protection.</p> <p>Necessity Plinth Protection:</p> <ol style="list-style-type: none">1. Plinth protection is required to avoid/ reduce water seeping in the earth reaching the plinth wall and reaches the floor level by capillary action.2. Plinth is susceptible to attacks of termites, ants, rats <p>Material Used:</p> <p>In technical terms, the area surrounding the building is usually known as the plinth protection. A plinth protection usually is done by pouring an approximate 100mm layer of plain cement concrete along the edge of the building. The main idea behind this is to prevent water retention along the edge of the building, thus ensuring its longer life. Dam proof course (DPC) is used for protection from moisture. For protection against termites soil insecticides such as DDT, BHC, PCP etc are used or continuous physical barriers in the form of concrete layer or metal layer may be provided.</p>	4 marks (2marks for necessity and 2 marks for material used)
Q.4	f) Ans:	<p>State necessity and importance of waterproofing.</p> <p>Waterproofing: Resistance of construction to the leakage of water is known as waterproofing. Basic requirements of all buildings are that the structure should remain dry as far as possible. If this condition is not satisfied, it is likely that the building may become inhabitable and unsafe from structural point of view. Hence in order to prevent the entry and exit of water from construction water proofing treatment is necessary.</p> <p>Necessity and Importance :</p> <ol style="list-style-type: none">i) One of the basic requirements in case of all the buildings is that the structure should remain dry as far as possible.ii) If this condition is not satisfied it is likely that the building may become inhabitable and unsafe from structural point of view.iii) This will improve the life of building and make the hygienic conditions in the building for the user.iv) Dampness in the building gives rise to breeding of mosquitoes.v) Dampness may cause unsightly patches.vi) Dampness may cause softening and crumbling of plaster.vii) Efflorescence may be caused due to dampness.viii) Timber and fittings are deteriorated due to dampness.ix) Electrical wiring and fittings may get damaged and may cause short circuiting	4 marks (1marks for each)
Q.5		Attempt any Four Of The Following:	(16)
Q.5	(a) Ans.	Draw neat sketch of formwork for R.C.C beam.	



		<p>(a) Beam</p>	<p>4 marks- (sketch & labeling)</p>
<p>Q.5</p>	<p>(b) Ans.</p>	<p>Define prefabricated construction and state its advantages. Definition: The method in which the various components of building structure such as linear member such as beam, column, lintel etc., rigid frames ,roofing and flooring member, R.C. door and window frame , all panels, etc. are casted in the factory and then transported to the site where they are assembled is called as prefabrication Advantages:</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 climatic changes during construction 7.Demountable structures <p>Any other relevant advantages.</p>	<p>2Marks</p> <p>2 marks</p> <p>(½ Marks for any four advantage)</p>
<p>Q.5</p>	<p>(c) Ans.</p>	<p>State precautions to be taken while constructing foundation in black cotton soil. By adopting following precautions, safe bearing structure can be built in black cotton soil:</p> <ol style="list-style-type: none"> 1. For important structure, the raft foundation should be adopted. 2. To limit the load on the soil to 5.5 tonnes/sqr.m. 3. Provide reinforced concrete ties all around the main walls of building. 4. If the depth of the black cotton soil at a given site is only 1 to 1.5m, the entire black cotton soil above the hard bed may be completely removed and the foundation may be laid on the hard bed below. 5. Construction in black cotton soil should be undertaken during dry season. 6. The masonry for the walls should start at least 15 cm below the general ground level. 7. The depth of foundation of ordinary building should extend at least by 300mm beyond the depth of crack in black cotton soil. 8. Black cotton soil should be completely removed, if possible and convenient. 9. The black cotton soil should not be allowed to come in direct contact with the foundation masonry. <p>Any other relevant precautions.</p>	<p>4 marks (Any eight ½ Marks for each)</p>



Q.5	(d) Ans.	<p>State the advantages and limitations of RMC.</p> <p>Advantages-</p> <ul style="list-style-type: none">i. A centralized concrete batching plant can serve a wide area.ii. Better Quality concrete is produced.iii. wastage of basic material is avoided.iv. it reduce time required to prepare concrete.v. it also reduce noise and dust pollution at site.vi. It eliminates procurement/hiring of plant and machinery. <p>Limitation-</p> <ul style="list-style-type: none">i. The material is batched at central plant, and the mixing begins at that plant, so the travelling time from the plant to the site is critical for longer distances.ii. in case of machinery failure, RMC system fails to produce concrete, hence provision of additional batching plant is essential to maintain the continuity of supply of concrete at all times.iii. Access roads and site access have to be able to carry the weight of the truck and load.iv. in case of power failure, alternate diesel generating power should be kept ready as a standby. <p>Any other related points.</p>	2Marks (½ marks for each) 2 marks (1 marks for each)
Q.5	(e) Ans.	<p>State any two properties and two uses of:</p> <ul style="list-style-type: none">i) High impact resisting concrete.ii) Steel fiber reinforced concrete <p>i. High impact resisting concrete.</p> <p>Properties-</p> <ul style="list-style-type: none">a) the high impact resisting concrete is tougher than the ordinary concrete.b) it has great resistance to wear and tear.c) it has great resistance to abrasion.d) it has resisting power to impact load. <p>Uses:</p> <ul style="list-style-type: none">i. it is used in construction of runway.ii. it is used in construction of railway platform.iii. it is used in constructing industrial floor.iv. it also used in parking place. <p>ii. Steel fiber reinforced concrete</p> <p>Properties-</p> <ul style="list-style-type: none">1) It has high tensile and binding strength.2) It has high resistance to spalling.3) It has high impact strength and toughness.4) It improves ductility and resistance to cracking.5) It prevents rust stains.6) It is more durable. <p>Uses:</p> <ul style="list-style-type: none">1) It is used in making components of additional strength in flexure, impact and Spalling2) It is used in pavement concrete3) It is used in (airfield) concrete runway.4) It is used in hydraulic structure.5) It is also used in tunnel lining.6) It is used in industrial floor.7) It is used in bridge construction.8) In repair work.	1 marks (½ Marks for each) 1 marks (½ Marks for each) 1 marks (½ Marks for each)

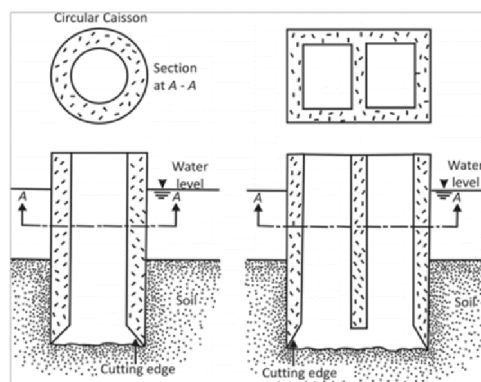


Q.5	(f) Ans.	<p>Enlist the equipment's used in termie (trimix) concreting and state the applications of termie (trimix)concreting.</p> <p>Equipments used:</p> <ul style="list-style-type: none">i. vacuum pump with fine wire gauge,ii. water separator,iii. Power trowel,iv. filtering mat,v. backing piece with rubber seal. <p>Application: a.it is used in parking decks b.it is used in bridges c. Used in industrial flooring Places, where the surface is in contact with impact loading. d. finishing is possible immediately after vacuum dewatering.</p>	2 marks (½ for each) 2 marks (½ for each)
Q.6		Attempt any TWO of The Following:	(16)
Q.6	(a) Ans.	<p>Describe in brief with neat sketch:</p> <ul style="list-style-type: none">i. under reamed pileii. well foundation: <p>i. under reamed pile</p> <p>Swelling and shrinkage due to the property of volumetric changes of expansive soil like black cotton soil results movement of the ground producing cracking of the order of (sometimes) 15 to 20 cm wide and 2.5 to 4 m deep. This property is very dangerous for the structures supposed to be founded on it. It is found that under-reamed piles provide an ideal solution to foundation in black cotton soil or other similar types of expansive soils.</p> <p>By providing under reamed bulbs the ultimate load capacities of piles increases significantly. A pile having a one bulb, is known as single under-reamed pile and the load bearing capacity is increasing by increasing the number of bulbs and the pile is known as multi – under reamed pile. The diameter of under reamed bulb is normally 2.5 times the diameter of the pile stem.</p> <div data-bbox="670 1377 973 1993" data-label="Diagram"><p style="text-align: center;">Under reamed pile with two under reams</p></div>	4 marks (2 for theory and 2 for diagram)

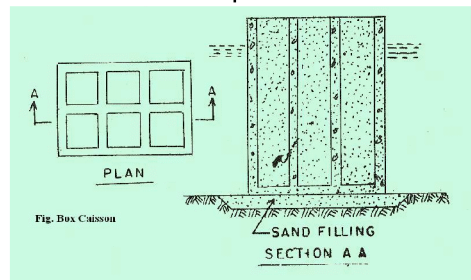
ii. Well foundation- Well foundation is a type of deep foundation which is generally provided below the water level for bridges. Caisson or well have been in use for foundations of bridges and other structures. Caisson is water tight structure preferably made of wood, steel, RCC constructed in connection with excavation for the foundation of bridges, piers, in rivers, dock structures

Types of caissons-

1. Open caisson (wells): Open caisson is a box opened both at top and bottom. It is made up to either timber, concrete or steel. The open caisson is called well. Well foundation is the most common type of deep foundation used for bridges in India. The shape of well is generally decided by the requirement of superstructure, vertical and horizontal forces on well, base of the pier or abutment etc.

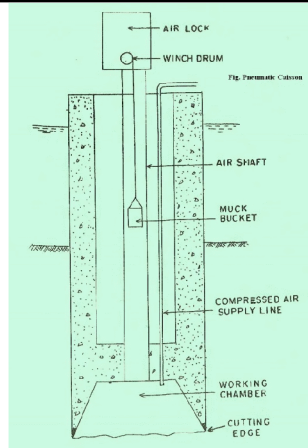


2. Box caisson: It is open at the top and closed at the bottom and is made of timber, reinforced concrete or steel. This type of caisson is used where bearing stratum is available at shallow depth. It is also used where the depth of water is about 6m to 8m.



3. Pneumatic caissons: Pneumatic caissons has its lower end designed as a working chamber in which compressed air is forced to prevent the entry of water and thus excavation can be done in dry conditions. the pneumatic caissons become useful when it is not possible to adopt wells. The pneumatic caissons are adopted when depth of water is more than 12m.

4 marks
(2 for theory and 2 for diagram)



Q.6	(b) Ans.	<p>i. State the necessity and type of scaffolding.</p> <p>ii. State the requirement of good masonry.</p> <p>i. state the necessity and type of scaffolding:</p> <p>Necessity-</p> <ol style="list-style-type: none"> i. To provide a working platform, so that the worker can stand on the platform to do the work easily and safely. ii. To provide platform for placing material and equipment needed by the workers to carry out their jobs. iii. to reach the construction point, as it progresses. iv. it is also needed for the repair or even demolition of building <p>Following are types of Scaffolding in construction:</p> <ol style="list-style-type: none"> 1. Single scaffolding or bricklayers scaffolding 2. Double scaffolding or masons scaffolding 3. Cantilever scaffolding or needle scaffolding 4. Suspended scaffolding 5. Trestle scaffolding 6. Steel scaffolding 7. Patented scaffolding <p>ii. state the requirement of good masonry.</p> <p>REQUIREMENTS OF GOOD MASONRY:</p> <ol style="list-style-type: none"> 1. The stones to be used for stone masonry should be hard, tough and durable. 2. The stones should be perfectly dressed as per the requirements. 3. In brick masonry, the brick should be rectangular having size 19x9x9 cm with plane faces and sharp edges. 4. Expansion joint should be provided after every 30m to 50m length of wall. 5. The mortar to be used should be good quality and in the specified ratio. 6. The construction work of masonry should be raised uniformly. 7. The plumb bob should be used to check the verticality of erected wall. 8. The masonry work should be properly cured after the completion of work, for a period of 2 to 3 weeks. 	<p>2 marks</p> <p>2 marks</p> <p>4 marks (1/2 for each)</p>



		<p>9. As far as possible broken stones or small stones or bats chips should not be used.</p> <p>10. Double scaffolding should be used for working at higher level.</p> <p>11. The masonry hearting should be properly packed with mortar and chips if necessary to avoid hallows.</p> <p>12. The properly wetted stones and bricks should be used to avoid mortar moisture being sucked.</p> <p>Any other related points.</p>	
Q.6	(c) Ans.	<p>State the necessity of soil reinforcing and enlist uses of geosynthetic material.</p> <p>Necessity of soil reinforcing:</p> <p>The soil is very weak in tension and when it is loaded by any type of structure over it then it is not able to transfer all the forces arising in a structure. Hence it becomes necessary to reinforce the soil by using some reinforcing material.</p> <ol style="list-style-type: none">1. Land slide prone area2. U/s and d/s of core of earthen dams3. Places where SBC of soil is to be increased4. Exposed vertical face of earth mass5. Slope stabilizing in cutting <p>Uses of geo synthetics -</p> <ol style="list-style-type: none">1. Improvement in the mechanical properties of soils2. Expensive structural designs are avoided3. Undesirable mixing of soil and demands for earth moving are minimized4. Construction time is shortened5. Embankment safety and stability is increased6. Natural appearance of landscape is maintained7. Cost of construction is optimized	<p>4 marks</p> <p>4 marks</p>