WINTER – 2015 EXAMINATION

Subject: Building Construction **Subject Code**: **17308**

Important Instructions to examiners:

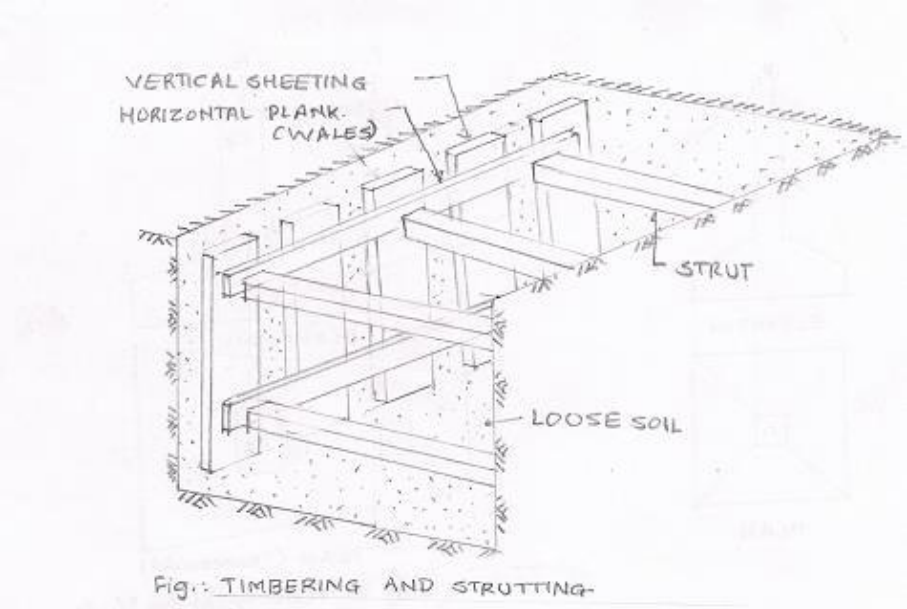
1) The answers should be examined by key words and not as word-to-word as given in the model answer scheme.
2) The model answer and the answer written by candidate may vary but the examiner may try to assess the understanding level of the candidate.
3) The language errors such as grammatical, spelling 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 the candidate and those in the 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 the model answer.
6) In case of some questions credit may be given by judgment 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.

Model Answer

Que. No.	Sub. Que.	Model Answers	Marks	Total Marks
1)	**A)**	**Attempt any SIX of the following:**		**12**
	a)	**List out any four types of pile foundation.**		
	Ans.	**Types of pile foundation-** 1. Timber pile 2. Concrete pile 3. Steel pile 4. Bearing pile 5. Friction pile 6. Batter pile 7. Under reamed pile 8. Tapered piles 9. Precast RCC pile	**(1/2 mark each any four)**	**2**
	b)	**Define Corbel, Cornice**		
	Ans:	**Corbel –** A corbel is projecting stone which is usually provided to serve as support for roof tiles, beams, weather shed.	**1**	
		Cornice-A cornice is a course of stone provided at the top wall.	**1**	**2**
	c)	**List any four Types of Doors.**		
	Ans.	Following are the types of doors- 1. Panelled door 2. Battened Door 3. Flush Door 4.Collapsible Door 5. Rolling Door 6. Revolving Door 7. Glazed Door	**(1/2 mark each any four)**	**2**

Que. No.	Sub. Que.	Model Answers	Marks	Total Marks
1)	**d)**	**State the various means of vertical communication.**		
	Ans.	Various means of vertical communication are- 1. Staircase 2. Elevators or Lift 3. Escalators 4. Ramps	**(1 mark each any two)**	**2**
	e)	**Define the following terms with reference to stairs-** **1. Winders 2. Landing**		
	Ans.	**Winders-** Winders are the tapering steps, such as those which are used to change the direction of stair. **Landing-** it is platform at the top or bottom of flight between the floors.	**1** **1**	**2**
	f)	**State any two purposes of plastering.**		
	Ans.	**Purposes of plastering are-** 1. To provide an even smooth, regular, clean and durable finished surface. 2. To conceal the defective workmanship 3. To preserve and protect the surface from atmospheric influences by acting as a protective coating 4. To fill the joints formed in masonry work 5. To cover inferior quality material. 6. To provide a satisfactory base for decorating the surface by applying white – washing, color washing painting	**(1 mark each any two)**	**2**
	g)	**State two causes of cracks in masonry work.**		
	Ans.	**Causes of cracks in masonry work-** 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	**(1 mark each any two)**	**2**
	h)	**Give four components of door frame.**	**(1/2 mark each any four)**	
	Ans.	**Components of door frame-** 1. Head 2. Horn 3. Style 4. Top rail 5. Lock rail 6. Bottom Rail 7. Panel 8. Hold fast 9. Post or jamb		**2**

Que. No.	Sub. Que.	Model Answers	Marks	Total Marks
1)	**B)**	**Attempt any <u>TWO</u> of the following:**		**8**
	i)	**Define superstructure. List six components of superstructure of residential building**.		
	Ans.	**Superstructure-** The part of structure lying above the ground is known as super structure. **Components of superstructure of residential building-** 1. Plinth 2. Floor 3. Walls 4. Roofs 5. Windows 6. Doors 7. Beams 8.Columns 9. Slabs 10.Staircase 11. Lifts 12. Parapet 11. Lintels	**1** **(1/2 mark each any six)**	**4**
	ii)	**Give four precautions you will take while marking foundation of residential building.**		
	Ans.	**Precautions while marking foundation of residential building-** 1. All vertical wooden post should be firmly fixed into ground with concrete and curing should be done to the concrete work for the period of 7 days before fixing the horizontal railing. 2. Horizontal wooden planks (railing) should be straight and have standard size. 3. Joints of wooden railing should not be overlapped but should be joined by small wooden planks on either side of joint and nailed it properly. 4. Horizontal wooden railing should have same level throughout and level should be found either by level tube or dumpy level. 5. Railing should be fixed by the nails of 50 mm in diameter 6. Nails of 40mm in diameter should be used on railing for locating the Centre of column in framed structure 7. A diagonal check should be done for everyday work while locating the Centre of column 8. Periodical checking should be done by measuring distances of each rail from the face marking or origin. 9. Height of railing should be minimum to reduce the chances of error while plotting the Centre inside the excavation trenches. 10. Position of nails on horizontal railing should not be disturbed till the completion of plinth work 11. All column numbers marked on wooden railing should be visible 12. Lime powder should be thoroughly mixed with sand while plotting the layout on ground so that lime powder will not fly away with wind action. 13. Any discrepancies or errors found at any stage should be immediately brought to the notice of the architect or chief authorities.	**(1 mark each any four)**	**4**

Que. No.	Sub. Que.	Model Answers	Marks	Total Marks
1)	**B) iii)**	**Explain Timbering and strutting for foundation trench.**		
	Ans:	**Timbering and strutting**: - 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 and strutting.	***1***	
		It consists of timber planks and strut to give temporary support to the side of trench. It helps to reduce width of foundation. The purpose of timbering of Foundation trenches is to uphold sides of excavation so as to avoid collapse of side and to avoid wasteful labour cost of clearing falling earth from trench bottom. There are various methods of timbering and strutting. e.g. Vertical sheeting, Box sheeting, Runner system, Sheet piling, stay bracing etc.	***2***	
		 Fig.: TIMBERING AND STRUTTING.	***1***	**4**
2)		**Attempt any <u>FOUR</u> of the following:**		**16**
	a)	**Explain the functions of –** **1. Sill 2. Lintel 3. Plinth 4. Weather shed**		
	Ans:	**1.Sill-**		
		1. To provide suitable finish to window opening.	***1***	
		2. It also affords a protection to wall below the window	***(any one)***	
		3.It also provides the support to vertical members of the openings		
		4. It shed off rain water from the face of wall immediately below the opening		

Que. No.	Sub. Que.	Model Answers	Marks	Total Marks
2)	**a)**	**2. Lintel-** 1. It supports the portion of wall over the opening. 2. They are used to transmit the load to adjacent wall over which they are supported **3. Plinth –** 1. It provides protection from rainwater and crawling animals and insects. 2. It also provides space for courses which finally supports the flooring tiles. **4. Weather shed-** 1. To protect the inner part of room from weathering effect such as wind, direct sunlight, rain, frost etc.	**1 *(any one)*** **1 *(any one)*** **1**	**4**
	b) **Ans:**	**Explain role of maintenance and repairs in the useful life of a building** **Role of maintenance and repairs -** 1. If proper maintenance and repairs is done periodically, then life of building is increased. 2. If proper maintenance and repairs is done periodically, then durability of building is increased. 3. Beauty of building is remained as it is. 4. Any possible leakage of water can be possibly prevented.	**1 Mark each**	**4**
	c) **Ans:**	**Explain procedure for plinth filling.** This is filling in plinth with rubbles and hard murum to raise the level up to the plinth. **1.To protect the plinth masonry work on exposed side-** After completion of plinth masonry work in the trenches which are already excavated, the remaining portions of trenches are refilled by selected material. Sometimes, The excavated materials of trenches are used for filling the gap which is remained on one side of plinth masonry work. **OR** **2.To protect the plinth masonry work on internal sides-** After completing masonry work up to the plinth level, the remaining	**4**	

<table>
<tr><th>Que. No.</th><th>Sub. Que.</th><th>Model Answers</th><th>Marks</th><th>Total Marks</th></tr>
<tr><td>2)</td><td>c)</td><td>Portion is enclosed by plinth masonry work .Enclosed portion is excavated up to hard strata; The PCC is done with appropriate proportion. Soil s excavated from trench made for plinth masonry work is refilled in the enclosed portion ad then compacted. Then rubbles of bigger sizes are used for soling purposes over the compacted murum Then again murum is spread over the soling surface of rubbles and Then compacted. Then bed concrete is placed on the entire compacted surface of murum filling of plinth level for the further process of flooring work.</td><td>4</td><td>4</td></tr>
<tr><td></td><td>d)

Ans:</td><td>State any four purposes of foundation.

Purposes of foundation-
1. To distribute the weight of structure over large area so as avoid overloading of the soil beneath.
2. Due to loading of sub soil, The structure may settle. The work of foundation is to prevent unequal settlement
3. The foundation provides a level surface for building operations
4. The foundation takes the structure deep into the ground, thus increasing stability of building and prevents over turning.
5. The soil should carry the load of the structure safely without failure.</td><td>(1 mark each any four)</td><td>4</td></tr>
<tr><td></td><td>e)

Ans:</td><td>State the situations where you would recommend the following type of foundation-
1.Well Foundation 2. Stepped Foundation
3. Raft Foundation 4. Pile Foundation
1. Well Foundation- In sandy soil.
2. Stepped Foundation- In load bearing structure.
3. Raft Foundation- a. When allowable soil is low and structure load is heavy. b. When ground is soft, clayey or marshy
4. Pile Foundation- a. When loose soil is extended to greater depth.
b. offshore construction
c. Structure susceptible to unequal settlement</td><td>1
1
1
1</td><td>4</td></tr>
<tr><td></td><td>f)

Ans:</td><td>Compare stone and brick masonry with respect to any four points

<table>
<tr><th>Sr. No</th><th>Stone Masonry</th><th>Brick masonry</th></tr>
<tr><td>1</td><td>It is stronger than brick masonry.</td><td>It is comparatively less strong than stone masonry.</td></tr>
<tr><td>2</td><td>It is cheaper in places where stone is available in abundance.</td><td>It is cheaper in places where clay is available in abundance.</td></tr>
<tr><td>3</td><td>Stone masonry offers less fire resistance.</td><td>Brick masonry offers better fire resistance.</td></tr>
</table></td><td></td><td></td></tr>
</table>

Que. No.	Sub. Que.	Model Answers	Marks	Total Marks
2)	**f)**	**Continued...**		

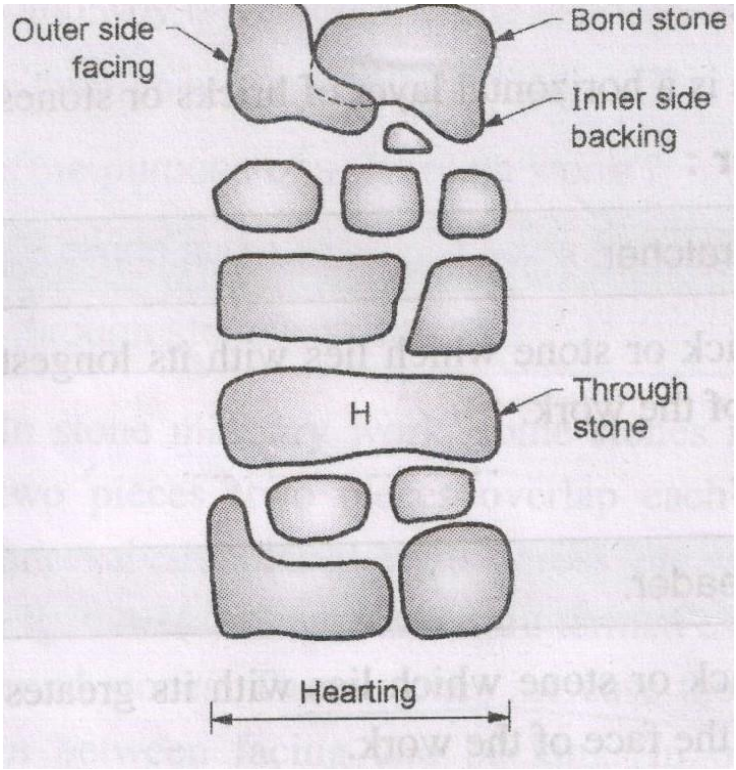
4	Stone masonry gives more aesthetic view if properly done.	Brick masonry gives less aesthetic view.
5	Mortar joints in stone work are more.	Mortar joints in brick work are less.
6	It is more water tight than brickwork.	It is less watertight than stonework.
7	Plaster does not stick nicely to a stone surface. It is difficult to apply any finishing to the stone surface	Plastering increases the life of brick masonry and saves from decaying.
8	Stone masonry is heavier.	Brick masonry is light weight.

(1 mark each any four) — **4**

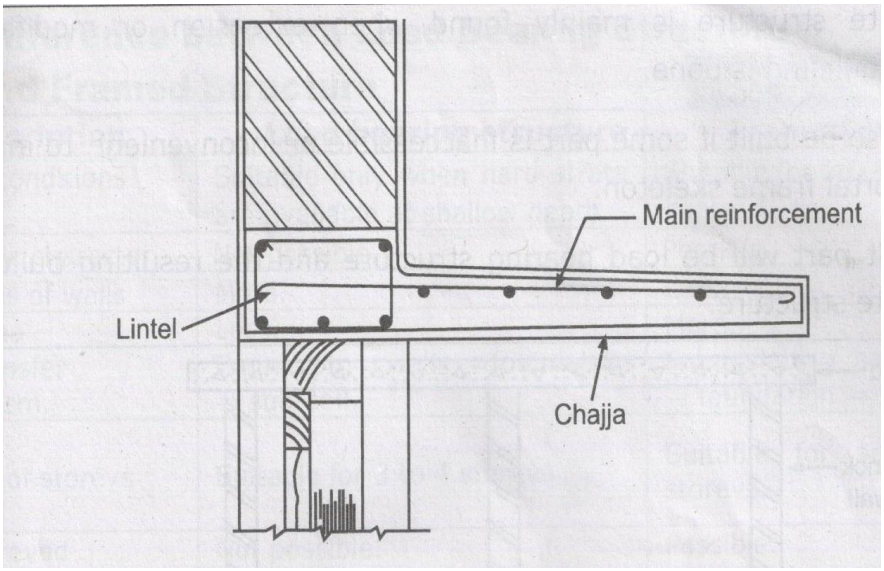
3 — **Attempt any <u>FOUR</u> of the following:** — **16**

a) **Draw a neat sketch of masonry. And show the following components 1.Facing 2. Backing 3. Bond stone 4.Hearting**

Ans:



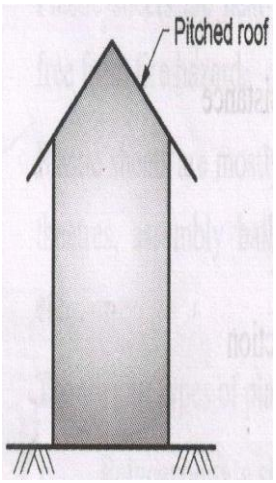
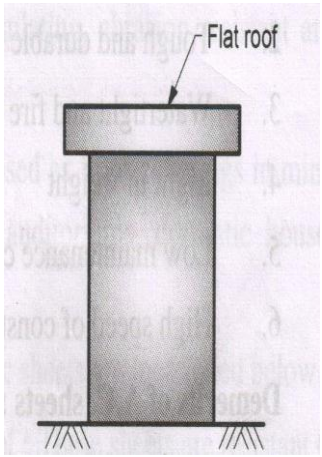
1 Mark each (4 components) — **4**

Que. No.	Sub. Que.	Model Answers	Marks	Total Marks
3)	b)	**Enlist the functions of an lintel and sketch a RCC Lintel in section**		
	Ans:	**Function of Lintel-** 1. It supports the portion of wall over the opening. 2. They are used to transmit the load to adjacent wall over which they are supported	**2**	
		Sketch a RCC Lintel-  	**2**	**4**
	c)	**Which type of door you would suggest for the following situation-** **1. Main entrance of residential bungalow** **2. Bathroom and WC** **3. Shop** **4. Computer Laboratory**		
	Ans:	**1. Main entrance of residential bungalow -** Fully paneled wooden door	**1**	
		2. Bathroom and WC- Flushed Door	**1**	
		3. Shop – Rolling steel shutter	**1**	**4**
		4. Computer Laboratory- Fully Glazed door	**1**	

Que. No.	Sub. Que.	Model Answers	Marks	Total Marks
3)	**d)**	**State the four requirement of good staircase.**		
	Ans:	**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 proper so as to carry without 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- **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. Width of stair should not be less than the width of stair. **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	**(1 mark each any four)**	**4**
	e)	**Explain tremix flooring. Also state where it is provided.**		
	Ans:	**Definition:** Method of removal of surplus water from the concrete to maintain optimum water/cement ratio by vacuum system so as to increase impact strength or toughness and abrasion value of wearing course of concrete. **Procedure:** 1. The tremix equipment for dewatering of concrete consists of a vacuum pump which is self-discharging and can be run continuously on electric motor or petrol engine. Tremix machine assembly plays roll in dewatering. In the sucking operation, filter pads restricts the particles in concrete to enter in pump. 2. Immediately after vacuum dewatering the flatness of concrete surface is checked and adjusted with a control tool and finishing operation with a power trowel can start. Power trowel may be of rotating blades and guiding ring which gives a smooth top layer of concrete.	***1*** ***2***	

<table>
<tr><th>Que. No.</th><th>Sub. Que.</th><th>Model Answers</th><th>Marks</th><th>Total Marks</th></tr>
<tr><td>3)</td><td>e)</td><td>Application:
1. Using in parking decks
2. Used in bridges
3. Used in industrial flooring
4. Places, where the surface is in contact with impact loading.</td><td>1</td><td>4</td></tr>
<tr><td></td><td>f)</td><td>Describe procedure of laying pavement blocks</td><td></td><td></td></tr>
<tr><td></td><td>Ans:</td><td>Procedure of laying payment blocks-
1. Preparation of ground- It should be well compacted. It should be watered properly to gain the considerable strength.
2. Preparation of subgrade- If subgrade is of concrete having proportion 1:2:4. It should be mixed manually or mechanically. It should be provided with proper slope. A layer of 75 to 100mm of crushed sand is provided to compensate gradient differences.
3. Laying of pavement block- Interlocking precast blocks are available in various shapes and sizes as per requisites for the said purpose.
4. Finalizing the pavement: The blocks are then placed in proper order, designs may be embossed onto the blocks for maintaining a mosaic pattern for finalizing the pavement. Joints around the shoulders should be filled with rich grout or mortar (Coloured grout is advisable for decorative purpose)</td><td>4</td><td>4</td></tr>
<tr><td>4)</td><td></td><td>Attempt any <u>FOUR</u> of the following:</td><td></td><td>16</td></tr>
<tr><td></td><td>a)</td><td>Compare pitched roof and flat roof with respect to four points.</td><td></td><td></td></tr>
<tr><td></td><td>Ans:</td><td>
<table>
<tr><th>Sr. No</th><th>Pitched roof</th><th>Flat roof</th></tr>
<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. Madras ferrace roofs
2.Bengal ferrace roofs</td></tr>
<tr><td>3.</td><td>It is suitable at the place where there is heavy rainfall</td><td>It is not suitable at the place where there is heavy rainfall</td></tr>
</table>
</td><td></td><td></td></tr>
</table>

Que. No.	Sub. Que.	Model Answers	Marks	Total Marks
4)	**a)**	Continued..		

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.		

(1 mark each any four) — **4**

b) **List four defects in plastering describe any one in detail.**

Ans:

Defects in plastering-

1. Blistering of plastered surface
2. Cracking
3. Efflorescence
4. Flaking
5. Peeling
6. Popping
7. Rust strains
8. Uneven surface

½ mark each (Any four) — **4**

Cracking- Cracking consist of formation of cracks in the plaster work resulting from-

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 drying or due to thermal expansion.
5. Due to excessive shrinkage
6. Faulty workmanship

2

Note- Any other explanation above should be considered.

<table>
<tr><th>Que. No.</th><th>Sub. Que.</th><th>Model Answers</th><th>Marks</th><th>Total Marks</th></tr>
<tr><td>4)</td><td>c)

Ans:</td><td>Explain the procedure of internal plaster.

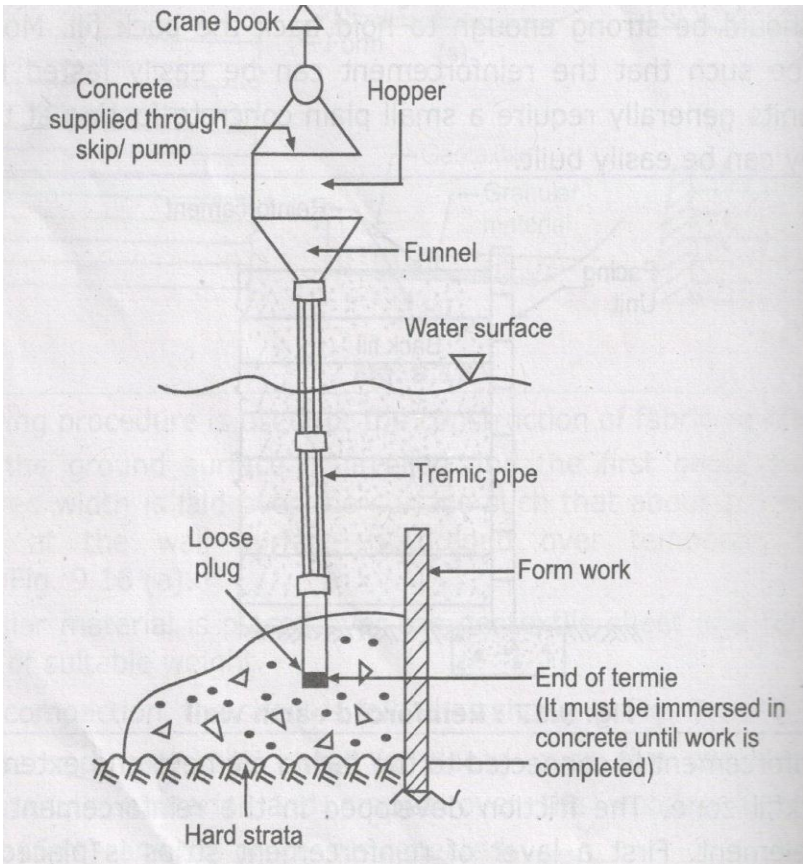
Following are the steps involved in internal plaster:
1. Pointing for brick or block work and provision of hacking for R.C.C. to be ensured.
2. Chicken mesh for joint region of masonry and R.C.C. to be checked
3. Surface to be cleaned off excess material using wire brush
4. Surface to be cured using water, prior to plaster initiation
5. Bull marks are initially marked on the wall for reference of thickness
6. First coat of cement mortar in the proportion 1:6 (cement to sand ratio) of thickness 10 mm to be applied.
7. Level and verticality (to be checked every 3 ft.) using plum bob, wooden / aluminum float and line dori to be checked.
8. A layer of Neeru/POP is then applied of thickness 3mm.
9. White wash the surface
10. Final finishing is then applied in the form of paint.</td><td>4</td><td>4</td></tr>
<tr><td></td><td>d)

Ans:</td><td>Distinguish between plastering and pointing

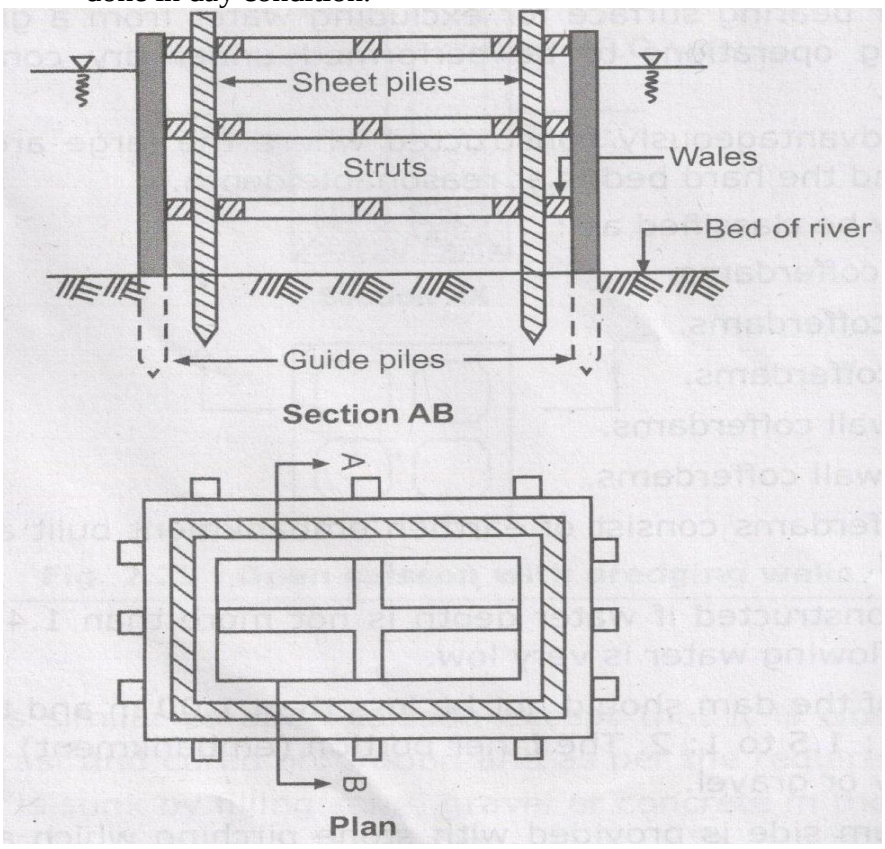
<table>
<tr><th>Sr. No.</th><th>Plastering</th><th>Pointing</th></tr>
<tr><td>1</td><td>Plastering is the covering with material of various compositions applied either externally to wall ceilings.</td><td>Pointing is the art of finishing the mortar joints in the exposed masonry.</td></tr>
<tr><td>2.</td><td>Plastering is done on both external as well as internal surface.</td><td>Generally done in external surface.</td></tr>
<tr><td>3</td><td>Plastering is strong as compared to pointing.</td><td>Mortar joints are weak part of masonry.</td></tr>
<tr><td>4</td><td>It is costly.</td><td>It is cheaper.</td></tr>
<tr><td>5</td><td>Types of plaster-
1.Single coat
2.Neeru Finish
3.POP
4.Stucco plaster</td><td>Types of pointing
1.Beaded pointing
2.Flush pointing
3.Recessed pointing
4.Rubbed or grooved pointing
5. tuck pointing
6.Struct pointing</td></tr>
</table>
</td><td>(1 mark each any four)</td><td>4</td></tr>
</table>

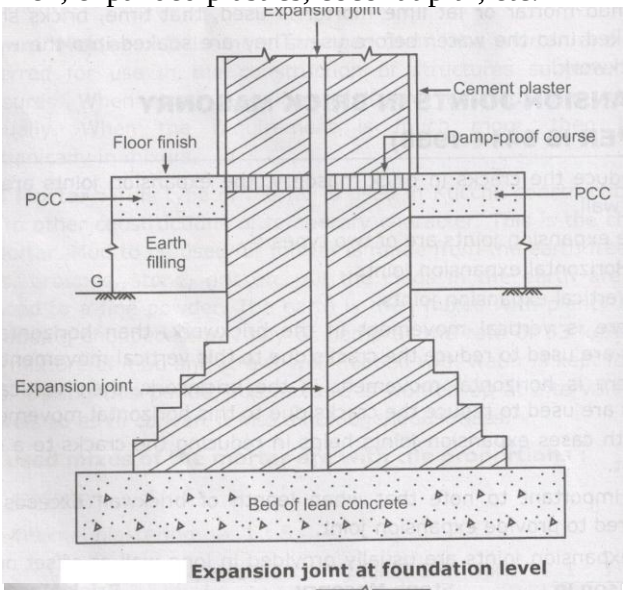
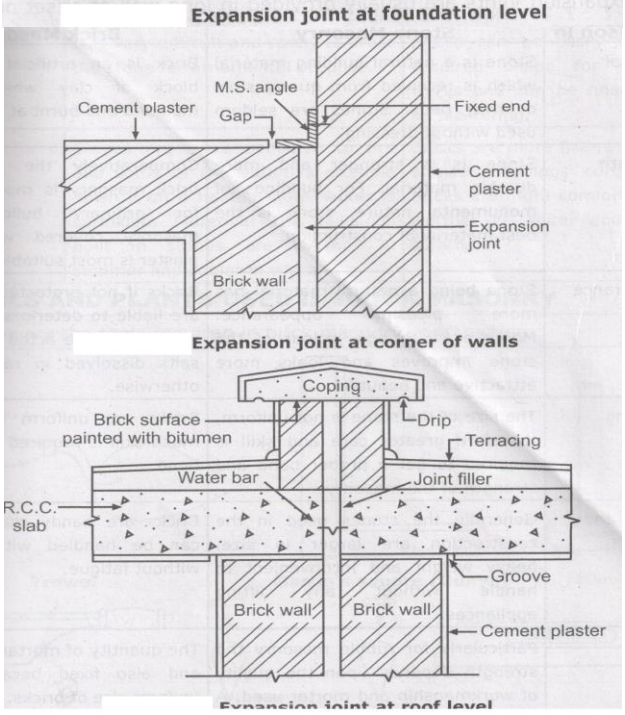
Que. No.	Sub. Que.	Model Answers	Marks	Total Marks
4)	**e)**	**State the causes of settlement of foundation**		
	Ans:	**The causes of settlement of foundation are-** 1. Uneven bearing capacity of soil at foundation level 2. Different loads on different parts of foundation 3. Varying ground water table height 4. Compressible foundation soil 5. Pockets of different type of soil under the foundation level 6. Expansive soils such as black cotton soil 7. Vibrations, if it is factory foundation, or a building vary near to railway tracks 8. Liquefaction during Earthquakes and floods 9. Elastic compression, plastic flow or consolidation under static load 10. Excessive expansion and contraction of swelling soils. 11. Excavation expansion and contraction of swelling soils	**(1 mark each any four)**	**4**
	f)	**Mention the purpose of Guniting and grouting.**		
	Ans:	**Purpose of Guniting -** 1.To make the structure waterproof 2.To Restore structure's, stability and strength	***2***	**4**
		Purpose of grouting- 1.To strengthen the structure 2.To correct faults in concrete and masonry structures 3. To fill voids and seal joints 4. To reduce water flow through a formation	***1 mark each (Any two)***	

Que. No.	Sub. Que.	Model Answers	Marks	Total Marks
5)		**Attempt any <u>FOUR</u> of the following:**		**16**
	a)	**Suggest construction places recommended for epoxy and crack fills.**		
	Ans.	1. Damp Proof Course. 2. Superficial cracks in plaster and surface finishes. 3. Loose rock strata. 4. Land slide prone zones. 5. Tunnel lining. 6. Water proofing Storage tanks. 7. Geo-morphological formations like Dykes (E.g. Dam reservoir)	**1 mark each (Any four)**	**4**
	b)	**State the methods of pre-tensioning and post tensioning.**		
	Ans.	**Pre-tensioning:** In this system, wire/cables are tensioned before casting the concrete. One end of reinforcement is secured to an abutment while the other end of reinforcement is pulled by using a jack and this end is then fixed to another abutment. The concrete is then poured. After the curing and hardening, the ends of reinforcement are released from the abutments. The reinforcement which tends to resume its original length will compress the concrete surrounding it by bend action. Thus pre-stress is transmitted to concrete.	**2**	**4**
		Post tensioning: In this system, reinforcement is tensioned after the concrete has hardened. The beam is first cast leaving ducts for placing cables. The ducts are made in a number of ways by leaving corrugated steel tubes in the concrete by providing steel spirals. When concrete is hardened and developed its strength, cable is passed through ducts; one end is fixed to anchor, which is on end of member. Then other end of cables is pulled by jack. The jack pulls the cable and at the same time compresses the concrete.	**2**	
	c)	**State all methods of dewatering.**		
	Ans.	Methods of dewatering are as follows; 1. Ditches or sumps 2. Deep well system 3. Vacuum method 4. Shallow well system 5. Electro-osmosis method 6. Well point system	**4**	**4**

Que. No.	Sub. Que.	Model Answers	Marks	Total Marks
5)	**d)**	**Explain Tremy method for under water concreting.**		
	Ans.	1. This is an effective method of placing concrete under water. In this method, a tremie pipe is used to transport the concrete; diameter of this pipe is 20 cm and is easy to adjust its length. 2. A funnel is fitted to top end for easy pouring of concrete. The bottom end closed with plug and taken below water and made to rest at appoint where concrete is to be placed. 3. Concrete having slump about 15 to 20 cm is poured into funnel, when whole length of pipe is filled with concrete tremie pipe is lifted up using power hoist. 4. Because of jerk on pipe and weight on concrete in tremie pipe bottom plug fall and concrete gets discharged. 5. Precaution must be taken at this stage to see that bottom of tremie pipe lies inside the concrete so that there will be no entry of water inside the pipe. 6. Same procedure is repeated continuously till concrete comes above water level.  	***2*** ***2***	**4**

Que. No.	Sub. Que.	Model Answers	Marks	Total Marks
5)	**e)**	**State four advantages of RMC.**		
	Ans:	Advantages of Ready Mix Concrete(RMC) are as follows; 1. Bulk amount of concrete can be produced at a time to avoid delay in construction. 2. Wastage of materials can be avoided due to mechanized operations at plants. 3. RMC give higher quality mix than ordinary concrete due to computerized working of plant. 4. It can be easily transported longer distance without hardening, hence suitable even in congested urban area. 5. Easy to operate. 6. Economical in cost. 7. Less number of labours are required.	**1 mark each (Any four)**	**4**
	f)	**Suggest the places where soil reinforcing technique is adopted now days.**		
	Ans.	1. Land slide prone area 2. U/s and d/s of core of earthen dams 3. Drainage behind retaining wall 4. Unpaved roads 5. Places where SBC of soil is to be increased 6. Exposed vertical face of earth mass 7. Slope stabilizing in cutting	**1 mark each (Any four)**	**4**
6)		Attempt **any two:**		**16**
	a)	**Define Cofferdam. Give the classification of Cofferdam. Explain single walled cofferdam construction with neat sketch.**		
	Ans.	**Cofferdam –** Cofferdam is a temporary structure constructed in the river or lake so as to make the area on d/s side completely free from water such that it is possible to carry the construction work under reasonably dry conditions.	**1**	
		Classification of Cofferdam – 1. Earth-filled Cofferdam 2. Rock-filled Cofferdam 3. Single wall Cofferdam 4. Double wall Cofferdam 5. Cellular Cofferdam	**½ mark each (Any four)**	
		Single wall Cofferdam – 1. If the available working space is limited and area to be enclosed is very small, then single wall cofferdam is preferably constructed. 2. It can be constructed for the depth of water of about 4.5 m to 6 m.		

Que. No.	Sub. Que.	Model Answers	Marks	Total Marks
6)		3. Timber pile which are called as guide piles are first driven into the firmly in ground of river bed. 4. The distance between guide piles may vary from 1.7 to 3.5 m depending upon the velocity of the flow. Then wales which are also called as longitudinal runners are bolted to the guide piles at suitable distance. Then wooden or steel sheet piles are driven into river bed along the longitudinal runners. 5. In this way. The area can be enclosed by sheet piles and guide piles and then water is pumped out which make the enclosed area free from water such that construction work can now be done in day condition.	***3***	**8**
			***2***	
	b)	**Why expansion joints are provided in brick masonry? Describe the procedure for construction of expansion joint in brick masonry.**		
	Ans.	**Purpose of provision of expansion joints in brick masonry;** 1. It helps in reducing the cracks to a considerable extent. 2. Vertical movements are absorbed by horizontal expansion joints and horizontal movements are absorbed by vertical expansion joints.	***2***	

Que. No.	Sub. Que.	Model Answers	Marks	Total Marks
6)	**b)**	**Procedure for construction of expansion joint in brick masonry:** 1. Expansion joint in brick masonry is kept for wall having length more than 15 m. 2. Brick masonry work is done up to the pre located distance that is offset, junction and corners between previous and next brick work 3. The gap is kept before starting the new face of work. 4. The gap is filled with sealant e.g. natural or cellular rubble, bitumen, expanded plastics, coconut pith, etc.	***4***	**8**
		 **Expansion joint at foundation level**  **Expansion joint at corner of walls** **Expansion joint at roof level** **(Note- Any one diagram from above should be considered.)**	***2***	

Que. No.	Sub. Que.	Model Answers	Marks	Total Marks
6)	**c)**	**State the methods of pre- fabrication. Give four advantages and dis-advantages of pre- fabrication.**		
	Ans.	**Methods of pre- fabrication:** **1. Plant pre- fabrication** When the process in which various precast concrete components are manufacture in factory itself, then it is called as Plant pre-fabrication **2. Site pre- fabrication-** When the process in which various precast concrete components are manufacture on site itself but not in factory, then it is called as Site pre- fabrication	**2** **2**	**8**
		Advantages: 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	**1/2 mark each (Any four)**	
		Disadvantages: 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.	**1/2 mark each (Any four)**	