

**SUMMER – 2015 EXAMINATION****MODEL ANSWER****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
Q.1	A. a. Ans.	Define 'Tread'. Tread- It is the upper horizontal portion of each step on which the foot is placed while ascending or descending.	2	2
	b. Ans.	Enlist means of vertical communication. Following are the various means of vertical communication- i. Stairs ii. Lifts iii. Escalators iv. Ladders v. Ramps	½ marks each (any four)	2
	c. Ans.	Define Plastering. Plastering- Plastering is a process of Applying mortar coats on the surfaces of walls, columns; ceiling etc. to get smooth finish is termed as plastering. It must be durable such that it resists the penetration of moisture and should be able to weather uniformly.	2	2



Que. No.	Sub. Que.	Model Answers	Marks	Total Marks
Q.1	d. Ans.	State two purposes of termite proofing. Purpose of termite proofing- 1. To protect the substructure from white ants/termites. 2. To avoid damage of wooden material. (*Note-any other relevant purpose, give the marks)	1 mark each (any two)	2
	e. Ans.	Define Workability of concrete. Workability of concrete- This is defined as the ease with which concrete can be compacted fully without segregating and bleeding. or It can also be defined as the amount of internal work required to fully compact the concrete to optimum density.	2	2
	f. Ans.	What do you mean by Steel fibre reinforced concrete? Steel fibre reinforced concrete- A composite material consisting of mixtures of cement, mortar or concrete and discontinuous, discrete, uniformly spread steel fibres.	2	2
	g. Ans.	Define 'Scaffolding' Scaffolding- temporary platform made out of timber or steel, to facilitate construction, repairs, maintenance or demolition is called as scaffolding.	2	2
	h. Ans.	Suggest suitable size of door for i. WC ii. Living room. Suitable size of door for – i. WC - 0.75 x 2.0m / 0.9 x 2.0 m ii. Living room - 1.2 x 2.1m	1 1	2
	B. a. Ans.	What is necessity of Dewatering of foundation trenches? Necessity of Dewatering of foundation trenches- 1. To prevent the entry of seepage in the excavation pit. 2. To prevent the problem of piping through soil mass. 3. To remove excess water from saturated soil mass. 4. To prevent the problem of subsidence of soil surrounding the pit, in case of impervious soil due to piping.	1 mark each (any four)	4
	b. Ans.	What is DPC? What is its necessity? Damp proof course (DPC)- In order to render buildings damp proof, during construction a damp proof course (D.P.C.) is practically given to all the buildings. It is done by interposing a layer of damp proof material between sources of dampness and building.	2	



Que. No.	Sub. Que.	Model Answers	Marks	Total Marks
Q.1		Necessity of DPC- 1. To avoid effect of efflorescence. 2. To protect the basement from termites. 3. To protect wall from white patches. 4. To avoid damage of electrical fittings.	1 marks each (any two)	2
	c.	What are the various tools and plants used for excavation of foundation?		
	Ans.	Tools & plants used for excavation work- 1. Spade 2. Phawrah 3. Pick axe 4. Crow bar 5. Rammer 6. Wedge 7. Boning rod 8. Sledge hammer 9. Basket 10. Iron pan 11. Line and pins	½ marks each (any eight)	8
Q.2	a.	Explain the term Timbering & strutting foundation trench. 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 (i.e. shoring) and strutting It consist of timber planks and strut to give temporary support to the side of trench . it help to reduce width of foundation . Methods of timbering and strutting are: 1) Vertical sheeting 2)Box sheeting 3) Runner system 4)Sheet piling 5) stay bracing	1	
			4	
		Fig.: TIMBERING AND STRUTTING-	2	



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Q.2	b. Ans.	<p>Draw flow diagram showing classification of foundation.</p> <p style="text-align: center;">Types of foundation</p> <pre>graph TD; A[Types of foundation] --> B[Shallow foundation]; A --> C[Deep foundation]; B --> D[1. Wall footing 2. Isolated footing 3. Combined footing 4. Cantilever footing 5. Inverted arch footing 6. Grillage footing 7. Raft or mat footing]; C --> E[1. Pile foundation 2. well foundation]</pre>	4	4
	c. Ans.	<p>Draw neat labeled sketch of Raft foundation.</p> <p>The top diagram shows a cross-section of a raft foundation. It features a central rectangular area labeled 'Mat or raft slab' with a thickness of 400 mm. Above it are three vertical columns labeled 'Columns'. Horizontal beams connect the columns, with one labeled 'Main beam'. The bottom diagram is a plan view of the raft foundation. It consists of a large rectangular slab with several vertical columns labeled 'C' (Column). Horizontal beams are labeled 'M.B.' (Main beam) and 'S.B.' (Secondary beam). Arrows point from the labels in the top diagram to their corresponding parts in the plan view.</p> <p>Fig. 4.3.7 : Mat or Raft foundation</p>	3 marks for sketch	1 marks For labelli ng



Que. No.	Sub. Que.	Model Answers	Marks	Total Marks
Q.2	d. Ans.	<p>Draw neat labeled sketch of pile foundation.</p> <p>Pile foundation</p> <p style="text-align: center;">Fig. Pile foundations</p>	<p>3 marks for diagram</p> <p>1 marks For labelling</p>	4
	e. Ans.	<p>Suggest suitable type of foundation for</p> <p>i) Marshy land. ii) Black cotton soil.</p> <p>suitable foundation for-</p> <p>i. marshy land- Mat/Raft foundation. ii. Black cotton soil- Pile foundation.</p> <p>In case the depth of black cotton soil is more, the following type of foundation may be provided</p> <ol style="list-style-type: none"> 1. Strip or pad foundation 2. Pier foundation with arches and 3. Under reamed pile foundation. 	2	2
	f. Ans.	<p>What are the 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. 	<p>1 marks each</p> <p>(any four)</p>	4



Que. No.	Sub. Que.	Model Answers	Marks	Total Marks																					
Q.3	a. Ans.	<p>Explain the expansion joint in SM with respect to purpose and procedure.</p> <p>Purpose:</p> <ul style="list-style-type: none">i. To avoid thermal stresses in stone masonry.ii. To avoid cracks in stone masonry. <p>Procedure:</p> <ul style="list-style-type: none">i. First of all the location of expansion joint should be pre-determined (every 15m) in the wall.ii. At that location the wall is finished with a vertical face.iii. A suitable expansion gap is provided (approximately 10mm- 20mm).iv. Next construction of wall is started again with a vertical face.	1 mark each	4																					
	b. Ans.	<p>Differentiate with respect to four points Brick masonry and stone masonry.</p> <table border="1"><thead><tr><th>Sr. No</th><th>Stone masonry</th><th>Brick masonry</th></tr></thead><tbody><tr><td>1</td><td>It is stronger than Brick masonry</td><td>It is cheaper 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 gives more aesthetic view than brickwork.</td><td>Brick masonry gives less aesthetic view.</td></tr><tr><td>4</td><td>Stone masonry offers less fire resistance.</td><td>Brick masonry offer better fire resistance than stone.</td></tr><tr><td>5</td><td>Mortar joint in stone work is more</td><td>Mortar joint in brick work is less</td></tr><tr><td>6</td><td>It is more watertight than brick masonry</td><td>It is more lightweight than stone masonry</td></tr></tbody></table>	Sr. No	Stone masonry	Brick masonry	1	It is stronger than Brick masonry	It is cheaper than stone masonry	2	It is cheaper in places where stone is available in abundance	It is cheaper in places where clay is available in abundance	3	Stone masonry gives more aesthetic view than brickwork.	Brick masonry gives less aesthetic view.	4	Stone masonry offers less fire resistance.	Brick masonry offer better fire resistance than stone.	5	Mortar joint in stone work is more	Mortar joint in brick work is less	6	It is more watertight than brick masonry	It is more lightweight than stone masonry	1 mark each (any four)	4
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Que. No.	Sub. Que.	Model Answers	Marks	Total Marks
Q.3	c. Ans.	<p>Draw a neat labeled sketch showing component parts of scaffolding.</p>	3 marks for diagram 1 marks for labeling	4
	d. Ans.	<p>Draw neat labeled sketch of flush door.</p>	3 marks for diagram 1 marks for labeling	4



Que. No.	Sub. Que.	Model Answers	Marks	Total Marks															
Q.3	e. Ans.	Explain procedure for replacing glass of existing sliding window <ol style="list-style-type: none">i. First the broken glass is removed from the panel.ii. Track is cleaned and rollers are checked for proper functioning.iii. New glass which is to be fixed is cut into proper shape and size.iv. The glass is fixed into the panel with rubber packing on all sides and on both faces.	1 mark each	4															
	f. Ans-	List various components of building and define composite structure. Component part of building are--- <table><tbody><tr><td>1. Foundation</td><td>2. Plinth</td><td>3. Wall</td><td>4. Sill</td><td>5. Lintel</td></tr><tr><td>5. Doors</td><td>6. Windows</td><td>7. Floor</td><td>8. Roof</td><td>9. Parapet</td></tr><tr><td>10. Slab</td><td>11. Column</td><td>12. Beam</td><td></td><td></td></tr></tbody></table> Composite structure- It is the combination of load bearing and framed structure.	1. Foundation	2. Plinth	3. Wall	4. Sill	5. Lintel	5. Doors	6. Windows	7. Floor	8. Roof	9. Parapet	10. Slab	11. Column	12. Beam			3 (any six) 1	4
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Q.4	a. Ans-	List four precautions to be taken while marking layout on ground. The necessary precaution to be taken while marking layout on ground are as follows-- <ol style="list-style-type: none">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 level5. 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.	1 mark each (Any four)																



Que. No.	Sub. Que.	Model Answers	Marks	Total Marks
Q.4		<p>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</p> <p>8. A diagonal check should be done for every day work while locating the centre of column.</p> <p>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</p> <p>10. Periodical checking should be done by measuring distances of each rail from the face marking or origin</p> <p>11. Position of nails on the horizontal railing should not be distributed till the completion of the plinth work</p> <p>12. All column number i.e C₁, C₂, C₃ etc. marked on wooden railing should be visible.</p> <p>13. All the work should be certified by RCC consultant and Architect</p>		
b.		<p>Define foundation and enlist two requirements of good foundation.</p> <p>Definition: It is lowest part of structure below ground level which provides a base for a building structure.</p> <p>Requirements-</p> <ol style="list-style-type: none">1. To distribute the weight of the structure over large area. So as to avoid overloading of the soil beneath2. Avoids unequal settlement of the structure.3. To provide a leveled surface for building operation4. The foundation takes the structure deep into the ground, thus increasing the stability of building and prevents overturning	1	4
Ans-	c.	<p>Mention the suitability and draw neat labeled sketch of bifurcated staircase.</p>	3	4
Ans-			3	4
		<p>Suitability-</p> <p>In public buildings and where space is more</p>	1	4

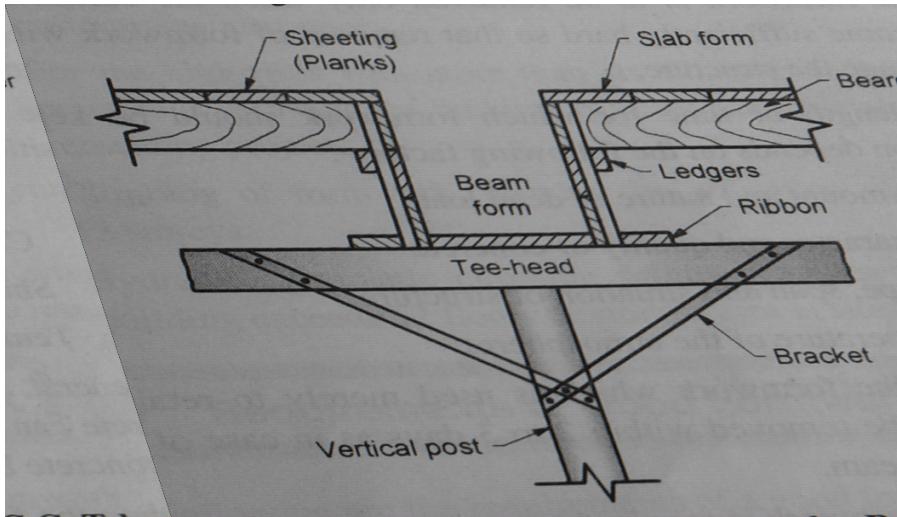


Que. No.	Sub. Que.	Model Answers	Marks	Total Marks
Q.4	d.	<p>Mention suitability of each type of floor finish with reason-</p> <p>1. chequered tiles 2. Kadappa</p>		
	Ans-	<p>1. Chequered tiles – It is commonly used in nursery, primary school, in making footpath.</p> <p>Reason- To prevent the skidding of person walking on it.</p> <p>2. Kadappa- It is used in window sill, covering the RCC concrete base in case of stairs, for making kitchen platform, paving the floor of bathroom.</p> <p>Reason- both side smooth surface</p>	1 1 1 1	4
	e.	<p>Draw neat labeled sketch of lean to roof.</p>	3 marks for diagram	4
	Ans-		1 marks for labeling	



Que. No.	Sub. Que.	Model Answers	Marks	Total Marks
Q.4	f.	<p>Explain concrete floor with respect to construction and suitability.</p> <p>Suitability: This type of flooring is commonly used in residential, public buildings, industrial floorings, go-downs and workshops, etc. Concrete floors are strong and durable.</p> <p>Construction: Concrete floor consist two components- 1. Base concrete 2. Wearing concrete The base concrete is laid over leveled and well compacted soil 7.5 to 10 cm thick in cement concrete (1:3:6). The wearing coat is laid over base concrete in cement concrete (1:2:4) 5 mm thick.</p>	2 marks	4
Q.5	a. Ans.	<p>Explain procedure of repainting after repairs.</p> <p>Procedure of repainting after repairs:</p> <ul style="list-style-type: none">• In case of painting old surface all dust, loose materials, scalers etc. are removed by wire brushes.• Holes, patches, cracks and surface irregularities should be filled with lime putty or gypsum plaster and allowed to get hard before application of paint.• The surface should be thoroughly rubbed with sand paper, washed clean and allowed to dry before applying the paint.• After preparing the surface, the white wash is applied in one coat, two coats or three coats. And then new colour paint is applied as per requirement. <p>b. Ans.</p> <p>Explain pointing with respect to necessity, types and procedure.</p> <p>Necessity of pointing:</p> <ul style="list-style-type: none">• To protect joints from weather effect• To improve the appearance of building structure. <p>Types of Pointing:</p> <ul style="list-style-type: none">• Beaded pointing• Flush pointing• Recessed pointing• Rubbed or grooved pointing <p>Procedure :</p> <ul style="list-style-type: none">• All the mortar joints raked out a depth of 10-15 mm with the help of pointing tool• Dust and loose motor are cleaned• Joints are washed with clean water and kept wet for sometimes• Joints are filled up with small trowel by pressing it into the joints to form a close contact with the old mortar joints. Excess mortar is scrapped away. Finished work is cured.	1 mark for each	4



Que. No.	Sub. Que.	Model Answers	Marks	Total Marks
Q.5	c. Ans.	<p>Enlist types of painting with suitability of each type.</p> <p>White wash- It is suitable for new plastered wall.</p> <p>Colour wash- It is suitable for internal and external surfaces of houses.</p> <p>Oil bound distemper- This type paint is suitable for houses.</p> <p>Plastic emulsion- These paints are used where water resistance is required.</p> <p>Oil paint – It is use to paint wall of living room, steel hand rail etc.</p> <p>Cement paint – It is waterproof and durable. It exhibits excellent decorative appearance. Mainly suitable for external walls of houses</p>	1 Mark each (any four)	4
	d. Ans.	<p>Draw neat labeled sketch of formwork for beam.</p> 	3 marks for sketch	4
	e. Ans.	<p>Explain waterproofing with respect to necessity and importance.</p> <p>Resistance of construction to the leakage of water is known as waterproofing.</p>	1	
	f. Ans.	<p>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 uninhabitable 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>Suggest suitable maintenance procedure for the following:</p> <ol style="list-style-type: none">Leakage in slabAnt attack in door frameCracks in wallSettlement of building	3	4
	Ans.	<p>Leakage in slab – water proofing</p> <p>Ant attack in door frame- Termite Proofing</p>	1 marks each	4



Cracks in wall - Guniting
Settlement of building – deep foundation should be provided.

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Que. No.	Sub. Que.	Model Answers	Marks	Total Mark s
Q.6	a. Ans.	<p>Define prefabricated structures. Mention any four advantages and disadvantages.</p> <p>Definition: The method in which the various components of building structure such as linear member such beam, column, lintel etc., rigid frames ,roofing and flooring member, R.C. door and window , all panels, etc. are casted in the factory and then transported to the site where they are assembled is called as prefabrication</p> <p>Advantages:</p> <ul 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:</p> <ul 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. 	2 1 marks each (any three)	
	b. Ans.	<p>Explain Tremix concrete method w.r.t. 1. Definition 2.Procedure 3.Application 4.Equipments used</p> <p>1.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.</p> <p>2. Procedure:</p> <p>a. 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 restricks the particles in concrete to enter in pump.</p> <p>b. 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</p>	8 1 marks each (any three) 2 3	



	concrete. 3. Application: a. Using in parking decks b. Used in bridges	2	
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Que. No.	Sub. Que.	Model Answers	Marks	Total Marks
Q.6		c. Used in industrial flooring Places, where the surface is in contact with impact loading. 4. Equipments used: vacuum pump, a top cover, Filter pads, Power trowel	1	8
c i. Ans.		Enlist soil reinforcing system and explain any one. Soil is reinforced by geo-synthetic materials like geo-grids, geotextiles or geo composites, wire mesh rod of metals, wire grid, horizontal strip of metal etc. Wire mesh or geonet : wire mesh or geonet is used as drapery system to prevent rocks or debris from falling down onto roads and railways especially in hilly areas. The mesh consists of galfan coated twisted steel woven wire. Due to characteristic of double twist, the steel wire mesh can withstand the force of falling rocks and without unraveling in the vent of wire breakage. In case of heavy rain and cyclone or storm, there are more chances of rock falling over the hill or mountainous area, in such condition, a wire mesh or geonet plays an important role. It stops loose stone pieces from falling down over the road surfaces and prevents any severe accidents.	2	4
ii. Ans.		'Roller compacted concrete' is a special type of concrete. Justify the statement. Recent and innovative development in the construction field is a 'Roller compacted concrete'. It is advanced type of concrete which is vitally used in dam construction. It is lean and almost dry concrete which is compacted with use of vibratory roller. Ingredients like coarse aggregates, cement and water taken in appropriate proportion are thoroughly mixed together in a conventional batch mixer or in other suitable concrete mixers. Note that, a supplementary cementing material like fly ash can also be used in concrete mix.	2	4



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Model Solution: Summer 2015
