Important Instructions to examiners:

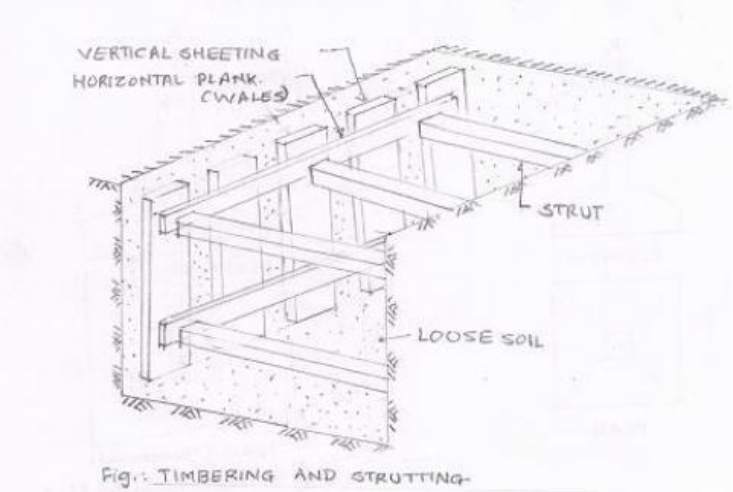
1) The answers should be examined by key words and not as word-to-word as given in the model answer scheme.
2) The model answer and the answer written by candidate may vary but the examiner may try to assess the understanding level of the candidate.
3) The language errors such as grammatical, spelling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

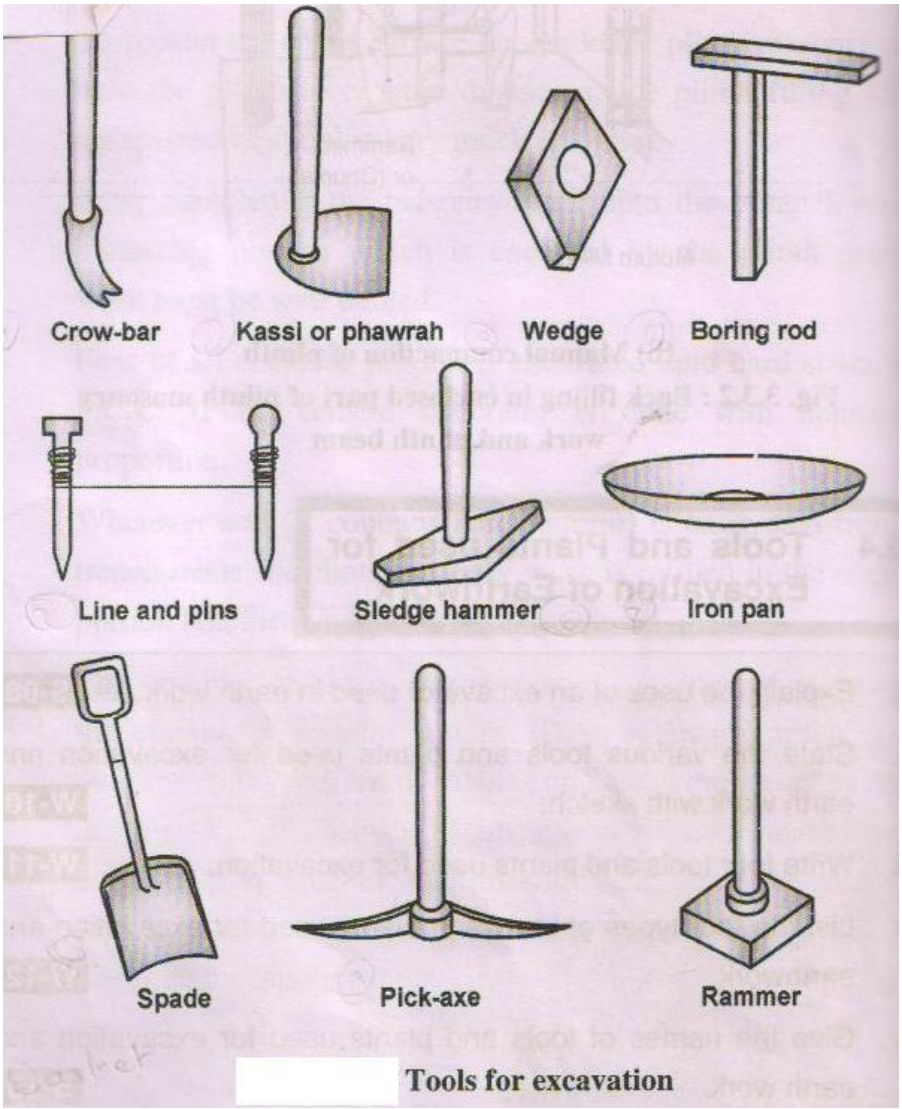
Que. No.	Sub. Que.	Model Answers	Marks	Total Marks
Q.1	**A)**	Attempt **any six** of the following:		**12**
	a)	**Define foundation. Give one purpose of it.** **Ans.** Foundation - It is lowest part of structure below ground level which provides a base for a building structure. Purpose of foundation – 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.	**1 mark** **1 mark (Any one)**	**2**
	b)	**Give four components of door.** **Ans.** Components of door – 1.Head 2.Horn 3.Style 4.Top rail 5.Lock rail 6.Bottom Rail 7.Panel 8.Hold fast 9.Post or jamb	**½ mark each (Any four)**	**2**
	c)	**State any two purposes of plastering.** **Ans.** Purposes of plastering – 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**

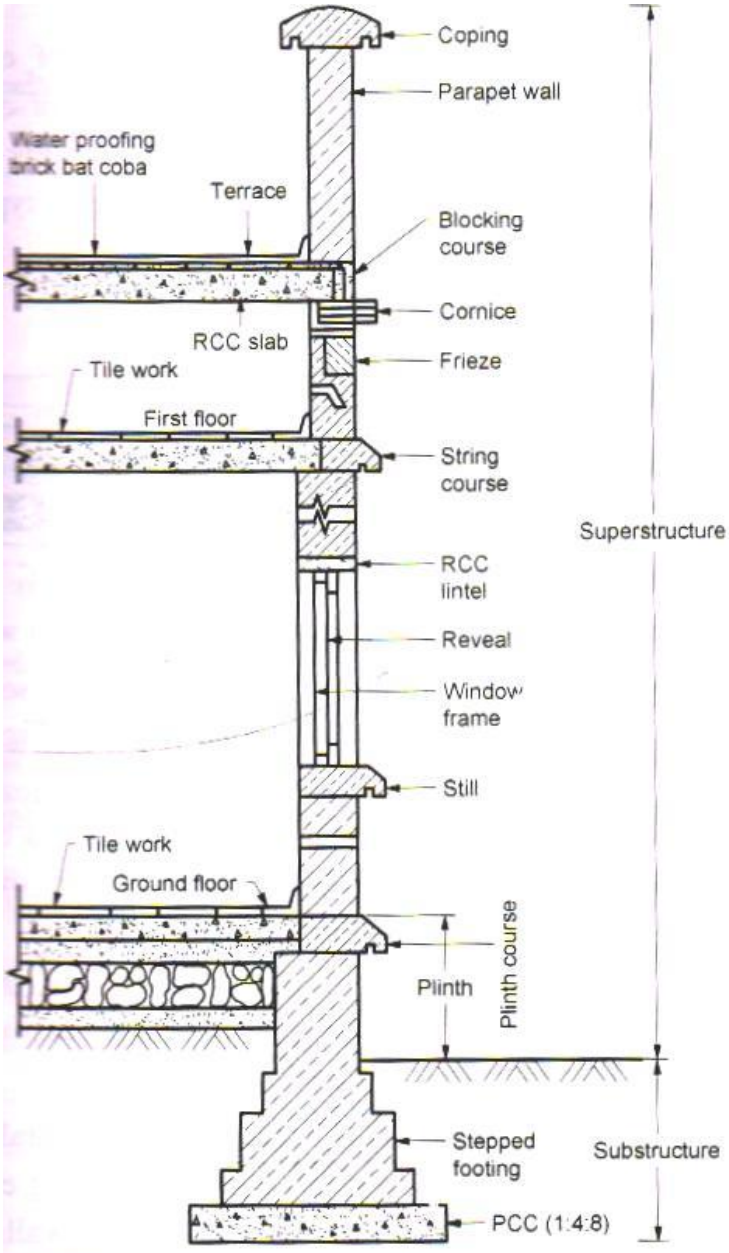
Que. No.	Sub. Que.	Model Answers	Marks	Total Marks
Q.1	**A)**			
	d)	**State two advantages of prefabrication.** **Ans.** 1. Mass production of units – Automation of the manufacturing process can save labour and reduce cost. 2. Reduction of costs and construction time on site – Less work to be done on site. 3. Effective use of formwork – Steel formwork can be used for 200 times. 4. Improved quality of units – Precast units can be closely checked after manufacture. 5. Special shapes and surface finishes – Units can be cast in any position, such as upside down, etc. 6. Casting under cover – Protection from hot or drying winds. 7. Demountable structures – Bolted connections can be easily dismantled and re-erected in other places.	**1 mark each (Any two)**	**2**
	e)	**Define masonry.** **Ans.** Masonry – It is the art of building the structures with wall materials such as stone, brick, concrete blocks, hollow blocks, etc laid in horizontal courses connected together with some form of binding material called mortar.	**2 marks**	**2**
	f)	**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**
	g)	**List any four component part of staircase.** **Ans.** Component part of staircase – 1. Step 2. Rise 3. Tread 4. Flight 5. Landing 6. Pitch or slope 7. Newel post 8. Hand rail 9. Baluster 10. Balustrade 11. Head room 12. Going 13. Nosing 14. Strings 15. Scotia 16. Waist 17. Run 18. Header	**½ mark each (Any four)**	**2**

Que. No.	Sub. Que.	Model Answers	Marks	Total Marks
Q.1	**h)**	**State the 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**
	B)	Attempt **any two** of the following:		**8**
	a)	**List any four components of super structure with their function.** **Ans.** Components of superstructure of residential building – 1. Plinth – a) It provides protection from rainwater and crawling animals and insect. b) It also provides space for course which finally supports the flooring tiles. 2. Floor – a) It provides good resistance to wear and tear occurring to its daily use. 3. Walls – a) Wall form the outer limits of the building and separate the rooms from each other. 4. Roofs – a) Roof protect from the elements like rain, sun, wind, frost, snowfall, etc. 5. Windows – a) Windows are provided for admission of light and free circulation of air into the building. 6. Doors – a) Doors are used for free movement of occupants in and out of the house. b) The outer doors are means of isolating the house from the surroundings from privacy and security point of view. 7. Beams – a) It supports the transverse load of building structure. b) It takes tensile load of a structure.	**1 mark each (Any four)**	**4**

cont…

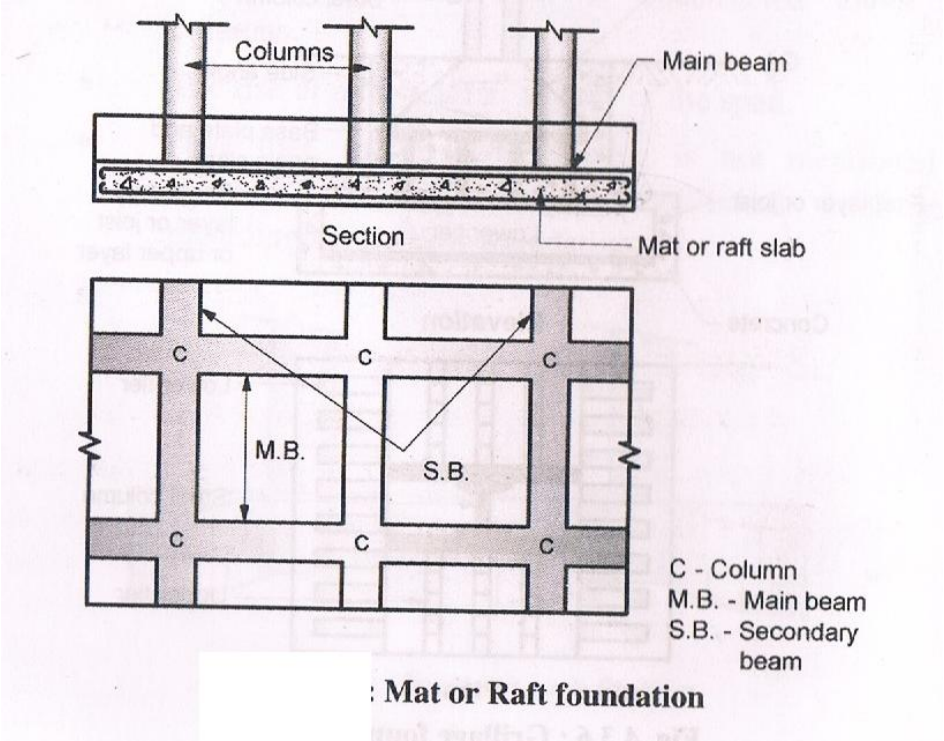
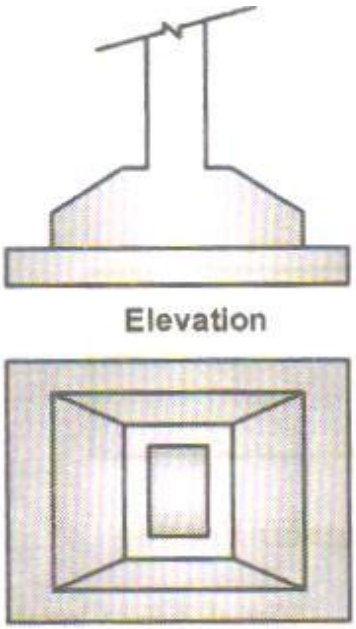
Que. No.	Sub. Que.	Model Answers	Marks	Total Marks
Q.1	**B) a)**	8. Columns – a) It gives the support to the floors at various levels in framed structure or RCC structures. b) It takes compressive load of structure. 9. Sill – a) It provides a suitable finish to window opening. b) It also affords a protection to the wall below the window. c) It also provides the support to the vertical members of the openings and it also shed off rain water from the face of wall immediately below the opening. 10. Staircase – a) It provides an easy access from one floor to other. 11. Parapet – a) Parapet acts as a protective solid balustrade for the users. b) It acts as a safe guard wall for small children on terrace. 12. Lintels – a) It supports the portion of wall over the opening.		
	b)	**Explain term "timbering and strutting" in excavation.** **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. 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.  Fig.: TIMBERING AND STRUTTING.	**1 mark** **2 marks** **1 mark**	**4**

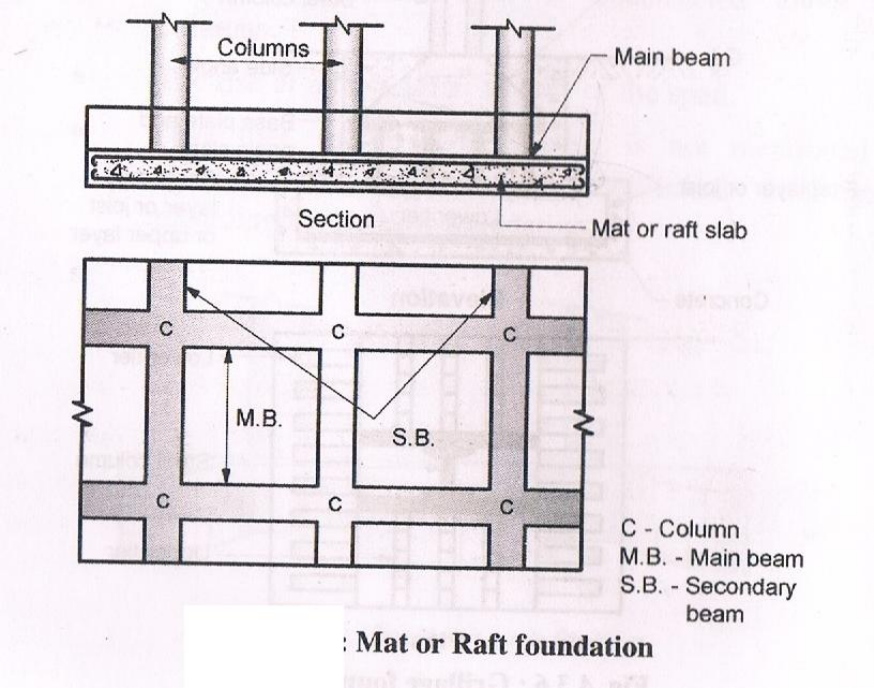
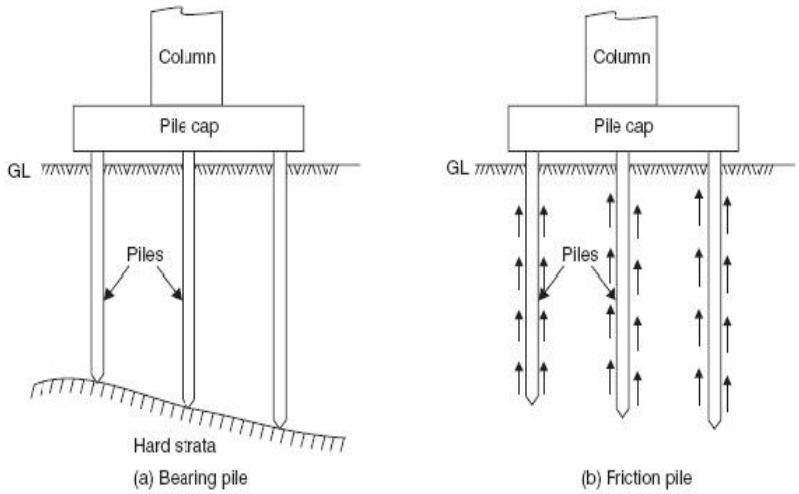
Que. No.	Sub. Que.	Model Answers	Marks	Total Marks
Q.1	**B) c)**	**State four types of tools used for excavation with sketch of each.** **Ans.**  Tools for excavation	**1 mark each (Any four)**	**4**

Que. No.	Sub. Que.	Model Answers	Marks	Total Marks
Q.2		Attempt **any four** of the following:		**16**
	a)	**Draw a neat sketch of section of load bearing wall from foundation to parapet.** **Ans.**  **Typical section of wall showing various building component** ***Note: 3 marks – Sketch and 1 mark – Labeling.***	**4 marks**	**4**

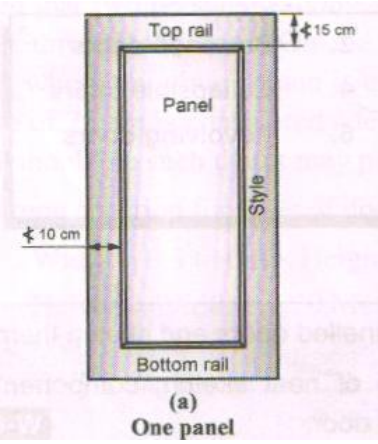
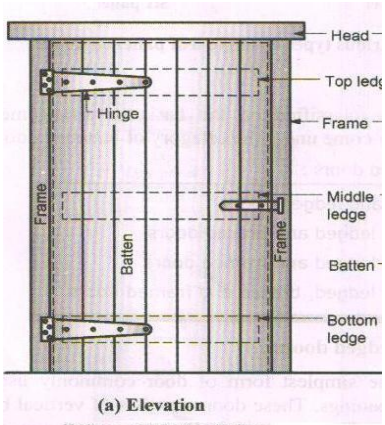
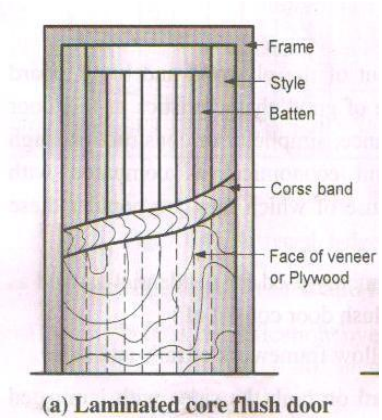
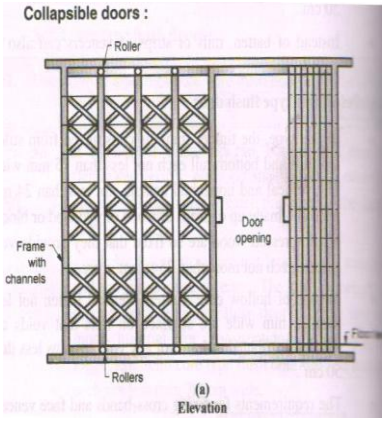
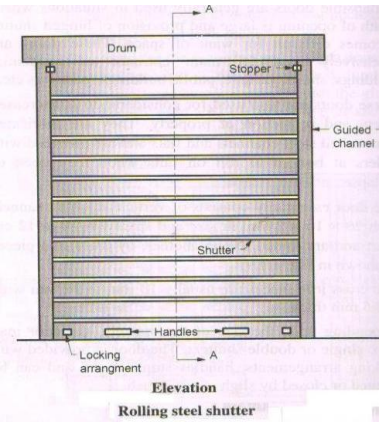
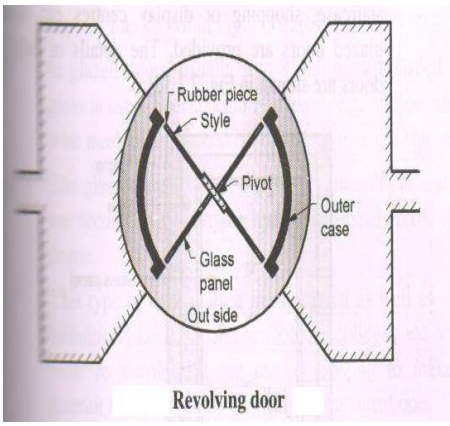
Que. No.	Sub. Que.	Model Answers	Marks	Total Marks
Q.2	**b)**	**Explain four general design principles of earthquake resistant building.** **Ans.** The building or structures which come under seismic or earthquake zones are required to resist the earthquake or seismic forces. There are some design principles generally considered while constructing the structures in earthquake zones. 1. Continuity in the construction of a structure: The structures come 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. Shape of structure plays very important role while resisting the earthquake forces. b. Simple rectangular structure is considered good in this case. c. Also some ratio of length to width is required to maintain. The length of the building should not exceed three times its width. d. Symmetrical designed structure with respect to mass and rigidity is also preferred. Because of this, centre mass of rigidity of building coincide with each other in which case no separate sections other than expansion joints are necessary. 6. Structural design: Proper design considering the earthquake design parameters plays the important role. The design should be such that there should not be sudden collapse of a structure. 7. Weight of structure: The light weight structures are preferred to resist the seismic forces. The building should be as light as possible. This practice is adopted in Japan since the earthquake is frequent there. 8. Avoid addition and alteration: Addition and alteration in the structure is not recommended if the structure come in the seismic region.	**1 mark each (Any four)** **Cont..**	**4**

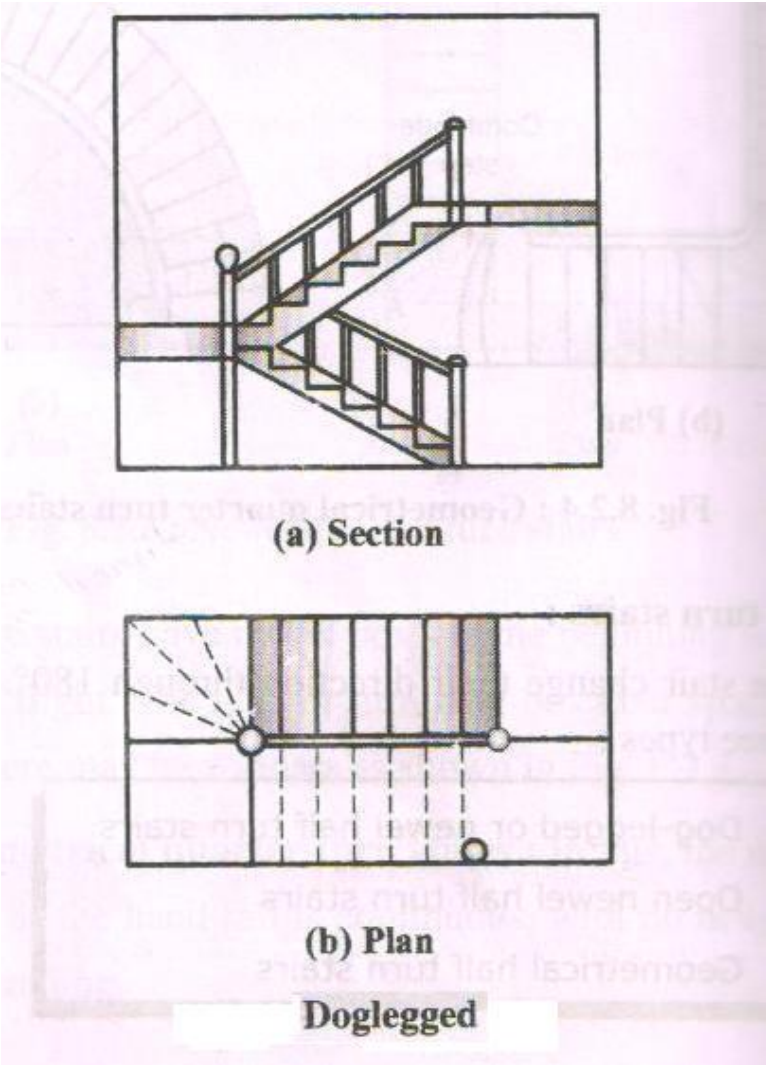
Que. No.	Sub. Que.	Model Answers	Marks	Total Marks
Q.2	**b)**	9. Strength in various directions: The structures should be designed to have adequate strength against earthquake effect along both the horizontal axes. 10. Ductility: Provide reinforcing steel in masonry to increase the strength and stability. 11. Fire safety: Building should be constructed to make it fire resistance.		
	c)	**What is meant by site clearance and give four points to be considered while preparing job layout?** **Ans.** Site Clearance: Site clearance is very important factor to be considered in the job layout plans, before commencement of project work. There should not be any obstructions like trees, plants, shrubs, bigger size stones, etc. Approach road should be wide so as to allow the truck for loading and unloading the constructional material. If site ground is uneven, then it should be made plain. For this, contouring is done in advance. Points to be considered while preparing job layout are as follows: 1. A plan in which the arrangements for placing site office, store room, labour quarter, medical aid center, godowns for keeping construction materials and other facilities are properly prepared or chalkout, is called as job layout or site layout. 2. The arrangements for processes should be proper co-relation and co-ordination among the different units, in such a way that, site office and ware house are placed close to the entrance of the site so as to have a better contact to the visitors. 3. The areas should be properly allotted in such a way that time required in carrying materials is minimum, which reflects on increase in efficiency. 4. Job layout depends upon three factors; • Location, area and topography of the site • Method of construction • Nature and type of work	**2 marks** **½ mark each**	**4**

Que. No.	Sub. Que.	Model Answers	Marks	Total Marks
Q.2	**d)**	**Draw a labeled sketch of:** **i. Raft and** **ii. Isolated Footing** **Ans.**		
			**2 marks**	**4**
		: **Mat or Raft foundation**		
			**2 marks**	
		(b)		
		Isolated footings		

Que. No.	Sub. Que.	Model Answers	Marks	Total Marks
Q.2	**e)**	**Suggest the suitable foundation with neat sketch for:** **1) Marshy land** **2) Black cotton soil** **Ans.** **1) Marshy land-** Mat/Raft foundation.  : Mat or Raft foundation **2) Black cotton soil-** Pile foundation. In case the depth of black cotton soil is more, the following type of foundation may be provided 1. Strip or pad foundation 2. Pier foundation with arches and 3. Under reamed pile foundation.  **Fig.** Pile foundations	**1 mark** **1 mark** **1 mark** **1 mark**	**4**

Que. No.	Sub. Que.	Model Answers	Marks	Total Marks
Q.2	**f)**	**What are the requirements of good stone masonry?** **Ans**. The requirements of good stone masonry are as follows- 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.	**1 mark each (Any four)**	**4**
Q.3		Attempt **any four** of the following:		**16**
	a)	**Why English bond is stronger than Flemish bond? Give four reasons.** **Ans.** 1. The English bond is stronger than Flemish bond as the wall thickness is 1 ½ bricks. 2. It contains a larger proportion of headers, therefore it is stronger. 3. Each course is well bonded in itself. 4. It is more compact and less number of brick bats are used.	**1 mark each**	**4**

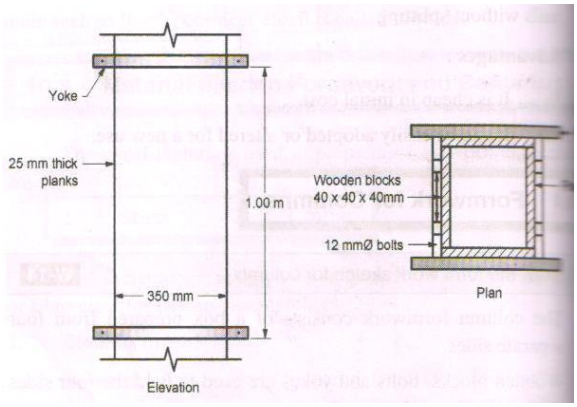
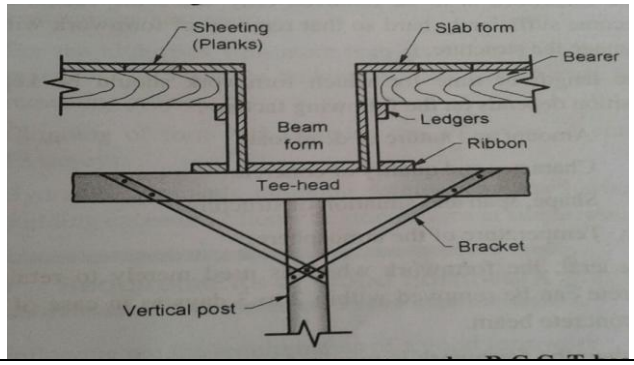
Que. No.	Sub. Que.	Model Answers	Marks	Total Marks
Q.3	**b)**	**Mention four types of doors and draw a sketch of any one.** **Ans.** Types of doors: 1. Paneled Doors 2. Battened Doors 3. Flush Doors 4. Collapsible Doors 5. Rolling Shutters 6. Revolving Doors 7. Glazed Doors	**½ mark each (Any four)**	**4**
		 (a) One panel  (a) Elevation Batten and ledged door  (a) Laminated core flush door  (a) Elevation **2 marks (Any one sketch)**  Elevation Rolling steel shutter  Revolving door		

Que. No.	Sub. Que.	Model Answers	Marks	Total Marks
Q.3	**c)**	**Explain doglegged stair with neat sketch.** **Ans.** Dog-legged stairs – It consists of two straight flights of steps with abrupt turn between them. The flights run in opposite direction and there is no space between them. Usually, a level landing is placed across the two flights at the change of direction. These stairs are useful where total width of space available for staircase is equal to twice the width of steps.  **(a) Section** **(b) Plan** **Doglegged**	**2 marks** **2 marks**	**4**

Que. No.	Sub. Que.	Model Answers	Marks	Total Marks
Q.3	**d)**	**Explain the term:** **1) Mezzanine floor** **2) Tremix floors** **3) Dado** **4) Skirting** **Ans.** 1) 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. 2) Tremix floors – The tremix vacuum system is a method for laying high quality concrete floors at an acceptable cost. Through vacuum dewatering, the surplus water is removed from the concrete, which means that the w/c ratio automatically leads to a noticeable improvement of almost each of the concrete properties. Tremix vacuum system reuces the water content in concrete by 20 – 25 %. 3) Dado – If the glazed tiles or any other tiles are placed and fixed to the vertical wall in between window sill and floor of bathroom and W.C. and in kitchen then it is termed as dado. Dado protects the painted wall surface from sprinkling water at the time of bath. 4) Skirting – It is half or full tile as a finish to the wall, held in between bottom of wall and floor. It is helpful at the time of washing and cleaning the floor and not allowing the water on painted surface of wall and thus it protects the painted wall.	**1 mark** **1 mark** **1 mark** **1 mark**	**4**
	e)	**Explain King Post truss and Queen Post truss with its suitability of each.** **Ans.** King Post truss – When the central post known as a king post, forms a support for the tie beam it is known as king – post truss. The incline member is known as the struts, which help to prevent the principal rafters from bending in the middle. Suitability: A King Post truss is suitable for roofs of span varying from 5 m to 8m. Queen Post truss – The truss which have two vertical members known as the queen post. The upper ends of the queen-posts are kept in position by means of a horizontal member known as a straining beam. Suitability: A queen post truss is suitable for roof of spans varying from 8m to 12m.	**1 mark** **1 mark** **1 mark** **1 mark**	**4**

Que. No.	Sub. Que.	Model Answers	Marks	Total Marks
Q.3	**f)**	**Suggest a type of window for following building:** **1) Residential bungalow** **2) Cinema hall** **3) School** **4) Enclosed R.C.C. staircase** **Ans.** 1) Residential bungalow – Panelled window / Casement windows / Sliding window 2) Cinema hall – Fixed window 3) School – Metal window / Sliding window 4) Enclosed R.C.C. staircase – Fixed window / Metal window	**1 mark** **1 mark** **1 mark** **1 mark**	**4**
Q.4		Attempt **any four** of the following:		**16**
	a)	**In which situation where pitched roof is more suitable than flat roof give any four points.** **Ans.** 1. Pitched roof is suitable at the places where there is heavy rainfall. 2. Initial cost is less than flat roof. 3. Progress of work is fast as compared to flat roof 4. Pitched roof is suitable for single storey.	**1 mark each**	**4**
	b)	**Describe the method of application of point of new- wooden surface**. **Ans.** **1. Surface preparation-**Before paint is applied to unpainted wood, the surface should be free of dirt and dust. All rough spots in the wood should be sanded smooth and knots and sappy spots should be coated with orange shellac to prevent the sap from discoloring the paint. **2. First coat-**Dip the brush into the paint so that about two inches of the bristles are covered. Remove the brush and wipe off the excess paint by drawing the brush across the edge of the container; Brush the first coat of the paint into wood vigorously, so that not only entire surface covered with an even coat but the paint is forced down into the wood forces by brushing action. After the first coat is dry, fill all cracks and nail holes in wood with putty. **3. Second coat-**The first coat was to penetrate the wood, the second coat must make a tight bond with the first and present a hard and non- glass surface for the final coat. The second coat should completely cover the first and must therefore be somewhat thicker. 4. **Third coat-** The final coat can be generally is applied without thinning. It should contain plenty of oil and no turpentine, and if will dry to a glossy finish. Three coats of paint should be used on unpainted wood to provide maximum protection.	**1 mark** **1 mark** **1 mark** **1 mark**	**4**

Que. No.	Sub. Que.	Model Answers	Marks	Total Marks
Q.4	**c)**	**What is pointing? Explain procedure of pointing.** **Ans.** **Pointing-** Pointing is art of finishing mortar joints in the exposed masonry with suitable cement or lime mortar, to protect the joints from weather effects and also to improve the appearance of building structure. **Procedure of pointing-** • 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** **3 marks**	**4**
	d)	**Write any four defects in plastering work and give remedies on it.** **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 **Remedies-** 1. All the projections which extend by more than 13 mm from the general surface of the wall face are knocked off to obtain a uniform surface 2. The surface are brushed and well maintained with clear water to reduce the absorption of water 3. Care is taken that all surface and joints are free from oil, grease, soot, etc. 4. The holes and hollows if any are properly filled up in advanced.	**½ marks each (any four)** **1 mark each (Any two)**	**4**

Que. No.	Sub. Que.	Model Answers	Marks	Total Marks
Q.4	**e)**	**Explain termite proofing with its necessity and importance.** **Ans.** Termites, are popularly known as 'white ants' are found in abundance in tropical and sub-tropical regions. They are capable of survival under most adverse conditions and environments and are very fast in eating wood and other cellulosic materials such as food, etc. Subterranean termites are mainly responsible for causing damage to the buildings and its contents. These termites build as their nests underground and form mud walls tunnels which serve as protected shelter for their movements. **Necessity and Importance of termite proofing:** • To protect the substructure from white ants/ termites. • To avoid damage of wooden structure. • Dry wood termites cause great damage to buildings in coastal areas. They live in dry wood by building nests and destroy the wood gradually. • The termites enter the building through foundations on floors, destroying everything that comes within their reach. • Termites may also enter the building through the joints in contact with the ground. These termites require adequate moisture and it is supplied either from soil through tunnels or through wet spots in building or through among other available source.	**1 mark** **1 mark each (Any three)**	**4**
	f)	**Draw the formwork sketches for column and beam.** **Ans.** **Formwork of column**  **Formwork of beam**  	**2 marks** **2 marks**	**4**

Que. No.	Sub. Que.	Model Answers	Marks	Total Marks
Q.5		**Attempt any four of the following:**		**16**
	a)	**State any three causes of settlement of structure and remedial measures for it.** **Ans.** **The causes of settlement of structure 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 **Remedial measures-** 1. Soil strata should be hard to withstand the load of structure 2. The structure will be safe if the underlying soil carries load safely i.e not falling under shear 3. The shear failure may result in sinking or tilting of the loaded mass. i.e. the transmitting medium and in turn the entire structure may collapse due to unequal settlement. 4. Thus it is important to know the maximum load carrying capacity of underlying soil.	**1 mark each (Any three)** **1 mark (Any one)**	**4**
	b)	**State the four uses of wire mesh and geo synthetics.** **Ans.** **Uses of wire mesh-** 1. It is used as drapery system to prevent rocks or debris from falling down onto roads and railways especially in hilly areas 2. It is used in case of heavy rainfall and cyclone or storm 3. It stops loose stone pieces from falling down over the road surfaces and prevents any severe accidents. **Uses of geo synthetics -** 1. Improvement the mechanical properties of soils 2. Expensive structural designs are avoided 3. Undesirable mixing of soil and demands for earth moving are minimized 4. Construction time is shorted 5. Embankment safety and stability is increased 6. Natural appearance of landscape is maintained 7. Cost of construction is optimized	**2 marks** **½ marks each (any four)**	**4**

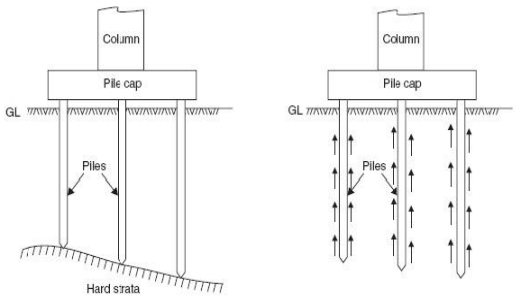
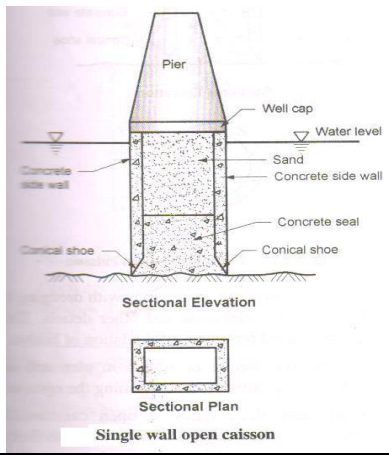
Que. No.	Sub. Que.	Model Answers	Marks	Total Marks
Q.5	**c)**	**Explain any four requirements of good foundation.** **Ans.** **Requirements-** 1. Location of foundation - Location should be such that it can able to resist any unexpected influence likely to appear in future 2. Stability of foundation - Foundation of structure be stable and safe to resist any possible failure. It should be more rigid to take the superimposed loads which may unevenly distributed 3. Settlement of foundation - The settlement of foundation depends upon the soil strata hence soil strata should be rigid and compact to avoid settlement of foundation 4. Durability of foundation - Foundation structure should be durable for many years	**1 marks each**	**4**
	d)	**Define RMC and enlist any four equipments of RMC.** **Ans.** **Ready mix concrete-** Concrete which is mixed at central batching plant and transported at the site by suitable means like conveyor belt , transit mixer , chute is called ready mix concrete **Equipments of RMC-** 1. Concrete mixing plants (Mixer and batchers) 2. Transporataion equipments a. Mortar pan b. Crane c. bucket d. ropeway e. Belt conveyor f. Pump and pipeline g. Wheel barrow h. Chute i. Transit mixer j. Helicopter	**2 mark** **½ mark each (Any four)**	**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>Q.5</td><td>e)</td><td>Distinguish between roller compacted concrete and high impact resisting concrete on four points.
Ans.

<table>
<tr><th>Sr. No</th><th>Roller compacted concrete</th><th>High impact resisting concrete</th></tr>
<tr><td>1</td><td>This type of concrete is used as a base concrete in the road construction.</td><td>This type of concrete is used in constructing the industrial floor and railway platform</td></tr>
<tr><td>2</td><td>It has less resistance to the continuous deformation as compared to high impact resisting concrete</td><td>It has great resistance to the continuous deformation</td></tr>
<tr><td>3</td><td>It has less creep</td><td>It has more creep</td></tr>
<tr><td>4</td><td>It is less hard as compared to high impact resisting concrete</td><td>It is hard.</td></tr>
<tr><td>5</td><td>It is lean no slump concrete, it is compacted by vibratory roller</td><td>It is tougher than roller compacted concrete</td></tr>
</table></td><td>1 marks each (Any four)</td><td>4</td></tr>
<tr><td></td><td>f)</td><td>Write procedure of vacuum dewatering concreting for construction of floors.
Ans.
Procedure:
1. This process is equipment oriented. It requires form work in the form of channels , internal vibrators , double beam screed board vibrator for full width , bull float , filter pads , vacuum pump, disc floater and power trowel
2. First concrete with relatively higher water cement ratio to facilitate full compaction with needle vibrator is poured then concrete is further compacted by double beam screed vibrator. This makes the surface smooth
3. Filter map is placed and it is pressed on all the four sides and effectively sealed. Within about 30 minutes, the vacuum pumps are started which sucks the unwanted water
4. Vacuum pump is run for about 20 to 30 minutes depending upon thickness of concrete floor. Vacuum dewatered become stiff and workable. The top surface may undergo a depression of about 3% , with loss of about 20% of original water.
5. Then the concrete is skim floated and further power troweled and finished. Often surface hardeners are used in conjunction with dewatering process
6. After vacuum dewatering , it gives the ideal condition for application of surface hardeners in power form
7. The application of disc float and power trowelling may act like reverberation of concrete to eliminate or segment the continuous capillaries of channels formed in suction of water.</td><td>4 marks</td><td>4</td></tr>
</table>

Que. No.	Sub. Que.	Model Answers	Marks	Total Marks
Q.6	**a)**	**Attempt any two of the following:** **Distinguish between stone masonry and brick masonry.** **Ans.**	**1 mark each (Any eight)**	**16** **8**

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
7	The size of stone is not uniform therefore greater care and skill should be required	Bricks are uniform in size so not much skill is required for proper bond
8	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.
9	Stone masonry is heavier.	Brick masonry is light weight.
10	It is difficult to apply any finishing to stone surface.	It is easy to apply any finishing to stone surface.

Que. No.	Sub. Que.	Model Answers	Marks	Total Marks
Q.6	**b) 1)**	**Explain pile foundation and well foundation with neat sketch.** **Ans.** **Pile foundation-**  **Fig.** Pile foundations • It is a foundation system that transfers loads to a deeper and competent soil layer. • When to use Pile Foundations 1. Inadequate Bearing Capacity of Shallow Foundations 2. To Prevent Uplift Forces 3. To Reduce Excessive Settlement • <u>Pile classification</u>- Friction Pile – Load Bearing Resistance derived mainly from skin friction End Bearing Pile – Load Bearing Resistance derived mainly from base **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- Single wall open caisson , cylindrical open caisson, open caisson with dredging wells 2. Box caisson 3. Pneumatic caisson  **Single wall open caisson**	**1 mark** **1 mark** **1 mark** **1 mark**	**4**

Que. No.	Sub. Que.	Model Answers	Marks	Total Marks
Q.6	**b) 2)**	**Explain workability and W/C ratio of ready mix concrete.** **Ans.** **Workability –** • Workability is defined as the ease with which it can be placed, compacted and filled in the formwork. • It depends on w/c ratio, size of aggregate, size and shape of aggregate, mix proportions, grading of aggregate, surface texture of aggregate, admixtures used and temperature. • Field and laboratory methods are available to determine the workability of concrete • It can be measured by slump cone test, compacting factor test, flow test and vee-bee consistometer test. • The workability shall be within following limits- Slump: ±25 mm or 1/3 of the specified value whichever is less. **W/C ratio-** • The water–cement ratio is the ratio of the weight of water to the weight of cement used in a concrete mix. • A lower water-cement ratio leads to higher strength and durability, but may make the mix more difficult to place. • Placement difficulties can be resolved by using plasticizers or super-plasticizers. • Maximum 0.50 water-to-cement ratio (1:2) when concrete is exposed to freezing and thawing in a moist condition or to de-icing chemicals, and a maximum 0.45 water to cement ratio for concrete in severe or very severe sulphate conditions.	**2 marks** **2 marks**	**4**
	c)	**Explain pre-tensioning and post tensioning prestressed concrete** **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. **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.	**4 marks** **4 marks**	**8**