

## Sample Question Paper

**Course Name : Civil Engineering Group**

**Course Code : CE/CS/CR/CV**

**9138**

**Semester : Sixth**

**Subject : Maintenance and Rehabilitation of Structures (Elective)**

**Marks : 80**

**Time: 3 Hrs.**

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**Instructions:**

1. All questions are compulsory.
2. Illustrate your answers with neat sketches wherever necessary.
3. Figures to the right indicate full marks.
4. Assume suitable data if necessary.
5. Preferably, write the answers in sequential order.

**Q.1 Attempt any FOUR of the following.**

**16 Marks**

- a) (i) Distinct between Operation, maintenance & repairs to buildings.  
(ii) Enlist any four normal routine maintenance items that are to be attended for upkeep of a building.
- b) State the damages caused by earthquake, fire hazards, flood hazards and dilapidation.
- c) State any eight causes of increase of moisture in walls and make them damp.
- d) Enlist the methods to improve the bearing capacity of the soil to build the safe foundation on made up soil.
- e) Describe how cover to main reinforcement and aggregates in concrete are the predominant factors in increasing fire resistivity of RCC.
- f) Describe how breakdown of sewerage, drainage, water supply & electrical installations, will render the building less useful.

**Q.2 Attempt any TWO of the following.****12 Marks**

- a) A dilapidated building is proposed for rehabilitation, explain the points to be examined for following items:
- i) Foundation    ii) Structural members
- b) A room vertical crack is found in a 300 mm brick wall of a building. Suggest your action to rectify the defect.
- c) How would you proceed to change the foundation of a brick built building? Answer with sketches.

**Q.3 Attempt any TWO of the following.****12 Marks**

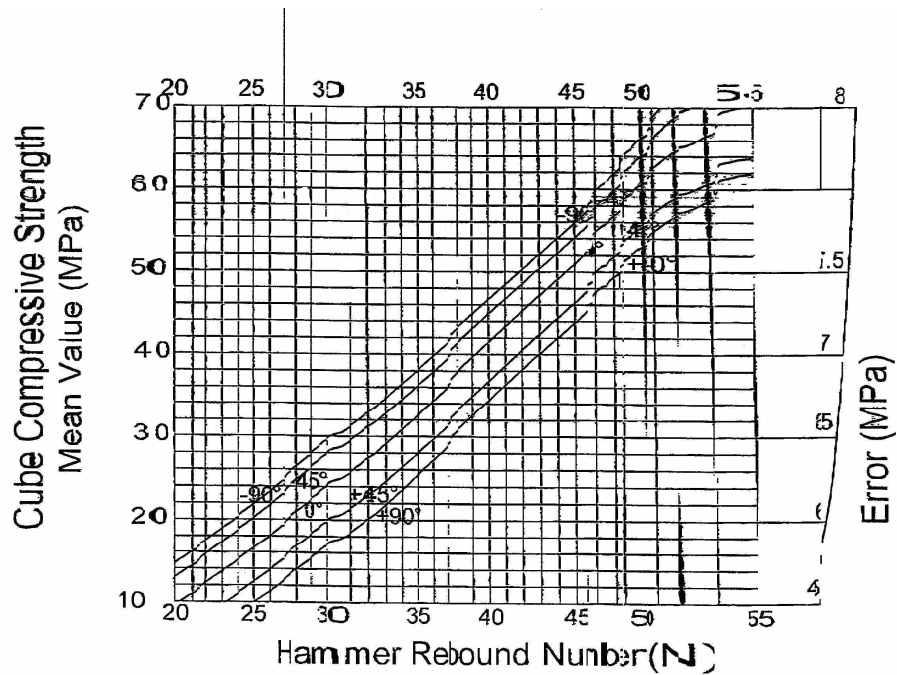
- a) Explain any six symptoms of defects to be ascertained by physical examination of a distructed structure.
- b) Explain how approximate strength of members of an old building could be determined.
- c) Prepare a notice to be published in a Newspaper, inviting tender for repairing a single storeyed masonry building with RCC roof. Assume necessary details for such repairs.

**Q.4 Attempt any TWO of the following.****16 Marks**

- a) In a non destructive testing the readings of rebound hammer for a 35 year old Beam-columns frame are shown below. Predict the grade of concrete from the readings.

Sr. No.	Members	Position of Point	Angle	Average readings of rebound number
1	Beam B1	Along depth at center of spam	0°	25
2	Beam B1	On top at support	90°	34
3	Beam B1	On bottom at support	-90°	40
4	Column C1	At mid height	0°	28
5	Column C1	At top height	0°	30
6	Slab S1	Mid span	-90°	40

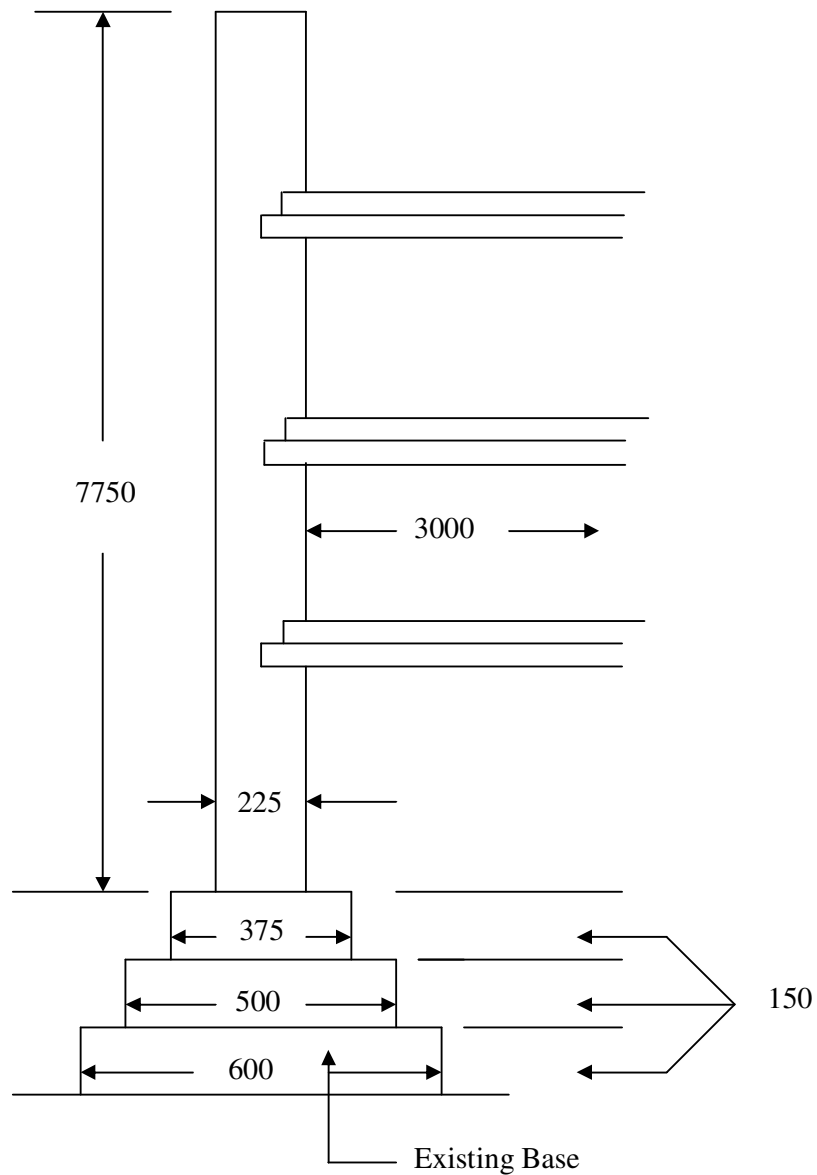
Use the following graph for strength of concrete in member



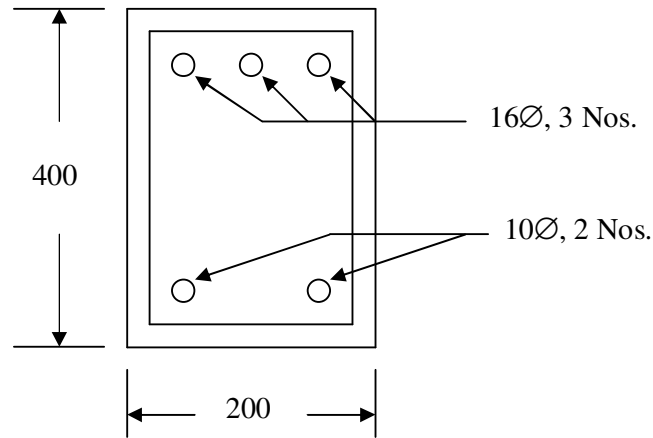
All Dimensions in mm

**Fig. 1 Q. 4 b)**

- b) An additional floor is proposed to be constructed on a two storey masonry building. Calculate the new width of foundation. Suitable data for bearing pressure of soil, weight of brickwork, weight of RCC, weight of floor finishing, live load on normal floor, live load on accessible roof, angle of response, weight of soil may be assumed.



- c) A cantilever RCC beam of length 2 m carrying UDL 8 KN/m & 300 load at free end, is proposed to carry an additional UDL of 2.5 KN/m. The beam is proposed to be strengthened by a support at the end. Suggest the strengthening of the cantilever, it required. The existing section of the beam is as shown in the figure.



**Fig. 2 Q. 4 c)**

**Q.5 Attempt any THREE of the following.**

**12 Marks**

- a) Define rehabilitation and give detailed classification of maintenance.
- b) Differentiate the characteristics of
  1. Epoxy resin & epoxy mortar
  2. Gypsum cement mortar & quick setting cement mortar.
- c) Suggest the situations where following materials are used for repairs.
  - 1) Shotcreting
  - 2) Mechanical anchors.
- d) State two causes of cracks in wall and suggest the remedial measures for them.

**Q.6 Attempt any THREE of following**

**12 Marks**

- a) Explain the concept of repair of RCC structure
- b) Define the term 'cost' in use and write two factors affecting it.
- c) Explain the procedure for maintenance of water supply leaking pipe joints.
- d) Differentiate between annual repairs and special repairs estimate.