

Reg. No. _____

Karunya University

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End Semester Examination – November / December 2008

Subject Title: **REINFORCED CONCRETE STRUCTURES - II**

Time : 3 hours

Subject Code: **CE250**

Maximum Marks: 100

Use of IS: 3370, IS: 456 and IS:1893 codes may be permitted

Answer ALL questions

PART – A (10 x 1 = 10 MARKS)

1. For the economic utilization of available space, the _____ type of staircase is recommended.
2. What is a shear key?
3. For an underground water tank, the active earth pressure varies _____ along the depth of the tank.
4. What type of thrust does a conical dome in a circular tank is subjected to?
5. When a solid slab bridge is recommended?
6. For IRC Class AA loading, the nose to tail spacing between two successive vehicles shall not be less than _____ m.
7. What is ductility in reinforced concrete members?
8. One of the methods used for analyzing wind loads is _____.
9. For complete yield line pattern to develop, the slab must be _____ reinforced.
10. Write the expression for the ultimate moment along the yield line for a square slab simply supported and supporting uniformly distributed load.

PART – B (5 x 3 = 15 MARKS)

11. Why counterforts are provided in retaining walls? Draw a counterfort retaining wall and mark its components.
12. Briefly explain with a neat sketch, (i) Contraction joint and (ii) Expansion joint. List the commonly used joint sealing compounds.
13. What provision is made in an RC bridge against impact effect for class A or Class B loading? Write the formula to determine the impact factor.
14. What is a substitute frame? Give an example.
15. List the characteristic features of yield lines.

PART – C (5 x 15 = 75 MARKS)

16. The details of a doglegged staircase of a multi-storied building are given below:
Number of steps in the going = 10
Tread, T = 300 mm, Rise, R = 150 mm
Width of landing slab on either side = 1m
M-20 grade concrete and Fe-415 HYSD bars.
Design and detail any one of the flights of the staircase.
(OR)
17. A cantilever retaining wall to retain earth embankment is 4m above ground level. The density of earth is 18 kN/m^3 and its angle of repose is 30° . The embankment is horizontal at top. The safe bearing capacity of the soil may be taken as 200 kN/m^2 and the coefficient of friction between soil and concrete is 0.5. Using M-20 grade concrete and Fe-415 HYSD bars, design and detail the retaining wall.
18. A rectangular water tank placed on ground is of size 6m x 2m and a maximum depth of 2.5 m. Design the side walls of the tank using M-20 grade concrete and Fe-415 HYSD bars. Sketch the details of reinforcement neatly.

(OR)

[P.T.O]

19. An R.C.C. circular water tank, which is resting on ground with a flexible base and spherical dome for storing 500,000 litres of water. The depth of the storage is to be 4m. Free board = 200 mm. Using M-20 grade concrete and Fe-415 HYSD bars, design the tank. The permissible stresses should comply with the values recommended in IS: 3370 and IS: 456-2000 codes. Sketch the details of reinforcements in the dome and the tank walls.

20. The details of a solid slab bridge is given below:

- Clear span : 4.5 m
- Clear width of roadways : 7 m
- Average thickness of wearing coat : 80 mm
- Unit weight of concrete : 24000 N/m³

Design the bridge for class A loading adopting M 20 grade concrete.

(OR)

21. a. Explain Courbon's method of load distribution in interconnected girders. When this method is applicable? (7)
- b. With a neat sketch explain the components of a T-beam bridge. Briefly explain how the main components are designed. (8)

22. Analyse the building frame shown in fig. 1 subjected to horizontal forces by Portal method.

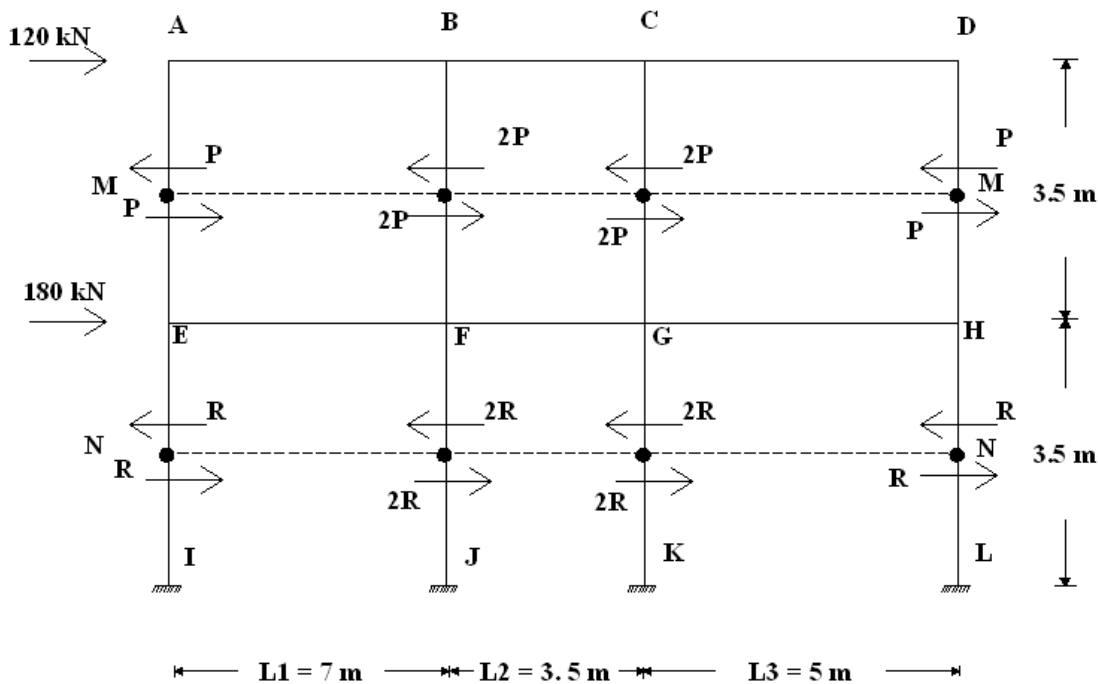


FIG. 1

(OR)

23. a. What are the assumptions made in the earthquake resistant design of structures? (3)
- b. Discuss briefly the various codal provisions for the dynamic analysis of a building as per IS : 1893-2002. (12)

24. A rectangular slab is of size 6 m x 4 m and simply supported at the edges for a service load of 4 kN/m². Assume coefficient of orthotropy (μ) as 0.7, M-20 grade concrete and Fe-415 HYSD bars. Design the slab.

(OR)

25. Design a circular slab of diameter 5m, which is simply supported at the edges. Let live load = 4 kN/m². Adopt M-20 grade concrete and Fe-45 HYSD bars. Assume load factors according to IS: 456-2000.