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Total No. of Questions : 09

Total No. of Pages : 02

36

B.Tech.(CE) (Sem.–6th)

DESIGN OF CONCRETE STRUCTURES-II

Subject Code : CE-310

Paper ID : [A0622]

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTION TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students has to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students has to attempt any TWO questions.

SECTION-A

1. Write briefly :

   a. Explain the type of stresses in symmetrical dome structures.

   b. Give two examples of curved beams and discuss the type of stress resultants encountered in these beams.

   c. Discuss 'Strap Footing' and under what conditions it is provided.

   d. How is the reinforcement provided in cylindrical beams resting on edge beams? Show diagrammatically.

   e. Outline the analysis and design conditions of an underground water tank.

   f. Discuss some of the common causes of failures in foundations.

   g. Explain the stability criteria of a retaining wall.

   h. Explain the analysis and design criteria of a counterfort in a retaining wall.

   i. Discuss minimum reinforcement criteria in floors and walls of water tanks.

   j. Discuss the main components of an Intze Tank.

SECTION - B

2. Design a semicircular beam supported on three equally spaced columns. The centres of columns are on a circular curve of diameter 9 m. The superimposed load on beam is 25 kN/m. Use M20 concrete and Fe415 steel. Show the design details.

3. Describe the design criteria for all the components of a counterfort retaining wall.

4. Design a square spread footing to carry a column load of 1000 kN from a 40 cm square tied column containing 20 mm bars as longitudinal steel. The bearing capacity of the soil is 150 kN/m². Consider base of the footing 1 meter below the ground level. The unit weight of earth is 20 kN/m³. Use M20 concrete and Fe415 steel and the load factor is 1.5.

5. Design a spherical dome for hall 10 metres in diameter. Rise of dome is 2 meters. Live load and finish load on the dome is 0.75 kN/m² and 0.25 kN/m² respectively. Use M20 and Fe250 steel.

6. Discuss in detail, the design and construction criteria to be followed for roofs, walls and joints of water tanks as per IS codal provisions.

SECTION - C

7. Design a rectangular combined footing for two columns 450mm × 450mm and 600mm × 600mm carrying 1000 kN and 1200 kN respectively. The columns are located 4.0 m apart. The safe bearing capacity of the soil is 150 kN/m². Use M20 concrete & Fe 250 steel.

8. Design a cantilever retaining wall to retain a level earthfill of 4 m above ground level. The surcharge on the earth fill is 18 kN/m². The angle of repose of soil is 30°, unit weight of the soil is 16 kN/m³, coefficient of friction between soil and concrete is 0.6 and the safe bearing capacity of soil is 200 kN/m². Use M20 concrete and Fe250 steel.

9. Design a circular tank for a capacity of 40,000 litres of water with flexible base *i.e.* walls and base slab are not monolithic with each other. Use depth of tank as 4 meters. Use M20 and tor steel as reinforcement.

[N-2-471   ]