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Question Paper Code	12578
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B.E. / B.Tech. - DEGREE EXAMINATIONS, APRIL / MAY 2024

Seventh Semester

Civil Engineering

20CEPC702 - ADVANCED REINFORCED CONCRETE STRUCTURES

Regulations - 2020

(Use of IS 456:2000, IS 800:2007, IS 3370, Steel Table are permitted.)

Duration: 3 Hours

Max. Marks: 100

PART - A (10 × 2 = 20 Marks)

Answer ALL Questions

- | | Marks | K-
Level | CO |
|---|-------|-------------|-----|
| 1. Define characteristic strength of concrete. | 2 | K1 | CO1 |
| 2. Summarize active earth pressure & passive earth pressure. | 2 | K2 | CO1 |
| 3. What are the types of joints in water tanks? | 2 | K1 | CO2 |
| 4. Mention the three factors that must be considered while designing a RCC tank. | 2 | K2 | CO2 |
| 5. Define flat slab. | 2 | K1 | CO3 |
| 6. List the types of mat foundations. | 2 | K1 | CO4 |
| 7. State the assumption of yield line theory. | 2 | K1 | CO5 |
| 8. What are the two methods of determining the ultimate load capacity of reinforced concrete slabs? | 2 | K1 | CO5 |
| 9. Summarize what type of structures requires shear wall construction. | 2 | K2 | CO6 |
| 10. List the types of shear wall. | 2 | K1 | CO6 |

PART - B (5 × 13 = 65 Marks)

Answer ALL Questions

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|--|----|----|-----|
| 11. a) Design the stem of a cantilever retaining wall to retain earth embankment 4m high above ground level. The unit weight of earth is 16kN/m ² and its angle of repose is 30 degree. The embankment is horizontal at its top. The safe bearing capacity of soil is 100KN/m ² and the co-efficient of friction between soil and concrete is 0.6. Adopt M20 concrete and Fe415 steel. | 13 | K2 | CO1 |
|--|----|----|-----|

OR

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|--|----|----|-----|
| b) Design a counter fort type retaining wall to suit the following data: Safe bearing capacity of soil = 200kN/m ² , Height of the soil above GL = 7m, Unit weight of soil = 18 KN/m ² , Angle of internal friction = 30 degree, Spacing of counter fort = 3m centers, Grade of concrete = M20, Grade of steel = Fe 415 HYSD bars. | 13 | K2 | CO1 |
|--|----|----|-----|

12. a) Design a circular water tank with fixed base for capacity of 400000 litres. The depth of water is to be 4m. Free board = 200 mm. Use M₂₀ concrete and Grade I mild steel. Permissible stress in concrete and steel are 1.2 N/mm² and steel 100 N/mm² respectively. Sketch the details of reinforcement. 13 K2 CO2

OR

- b) Design a circular tank with flexible base for capacity of 400000 liters. The depth of water is to be 4.5m; including a free board of 200mm. Overall height of the tank is restricted to 4m. Use M₂₅ grade concrete and Fe415 grade steel. 13 K2 CO2
13. a) Design an interior panel flat slab with panel size 5.5m x 5.5m and size of the floor 30m x 30m. Provide suitable drops. Take live load as 4.5 KN/m². Use M20 grade of concrete Fe415 steel. 13 K2 CO3

OR

- b) Explain briefly about the different types of staircases with neat sketches. 13 K3 CO3
14. a) Explain the step by step design principles & load considered in reinforced concrete road bridges. 13 K2 CO4

OR

- b) Explain the step by step design principles of Mat foundation. 13 K2 CO4
15. a) A square interior panel of an intermediate floor is of effective dimension 5m×5m. The live load on the floor is 2.5KN/m². Finishes is 1 KN/m². Analyze the slab using yield line approach and design the slab. Use M20 grade Concrete and Fe415 Steel. 13 K2 CO5

OR

- b) Design a circular slab of 5m diameter, simply supported along the edges to carry a service load of 4.5KN/m². Adopt M₂₀ grade concrete and Fe₄₁₅ steel. Use equilibrium method for analysis. 13 K2 CO5

PART - C (1 × 15 = 15 Marks)

16. a) Design a reinforced concrete wall with height of 4m and thickness of 250mm. The loads applied to wall is 250KN/mm² length of the wall is 3.5m. Adopt M20 grade of concrete and Fe415 steel. 15 K3 CO6

OR

- b) Explain briefly about bar bell type (simple rectangular type) shear wall with sketches. 15 K2 CO6