

19 DEC 2022

Reg. No.

Question Paper Code

11480

B.E. / B.Tech. - DEGREE EXAMINATIONS, NOV/DEC 2022

Seventh Semester

Civil Engineering

CE8703 - STRUCTURAL DESIGN AND DRAWING

(Regulations 2017)

(Use of IS 456: 2000, SP 16, IS800:2007, SP 6, IS 875 (Part -III), IS 3370 and relevant IRC codes are permitted)

Duration: 3 Hours

Max. Marks: 100

PART - A (10 × 2 = 20 Marks)

Answer ALL Questions

- | | <i>Marks,</i>
<i>K-Level,CO</i> |
|--|------------------------------------|
| 1. List the loads considered for design of RC solid slab bridge. | 2,K1,CO1 |
| 2. Define characteristic strength of concrete. | 2,K1,CO1 |
| 3. Define backfill. | 2,K1,CO2 |
| 4. Distinguish between active earth pressure and passive earth pressure. | 2,K1,CO2 |
| 5. Under what circumstances, flat slab will be preferred? | 2,K1,CO3 |
| 6. List out the different types of flat slab. | 2,K1,CO3 |
| 7. What are the IS code books used in design of a RC bridge? | 2,K1,CO4 |
| 8. List out the types of RCC bridges. | 2,K1,CO4 |
| 9. Give the formula to calculate water pressure and earth pressure. | 2,K1,CO5 |
| 10. Write the minimum reinforcement criteria for tank walls. | 2,K1,CO5 |

PART - B (5 × 13 = 65 Marks)

Answer ALL Questions

11. a) Design a cantilever retaining wall to retain an earth embankment with a horizontal top to suit the following data. 13, K3,CO2
Height of soil above the ground level = 3.5 m.
Density of earth = 16 kN/m³, Angle of internal friction = 30°,
SBC of soil = 200 kN/m², Co-efficient of friction between soil and concrete = 0.5. Adopt M 25 grade concrete and Fe 415 HYSD bars.
Determine (i) Dimensions of retaining wall
(ii) Stability calculations

OR

- b) Explain the design procedure of counter-fort retaining wall with necessary formulas. 13, K3,CO2
12. a) Design an interior panel of a flat slab of size 5 m x 5 m. The live load on slab may be taken as 4 kN/m². Adopt M 20 grade concrete and Fe 415 HYSD bars. 13, K3,CO3

OR

- b) Explain the design procedure of RC Flat slab with necessary formulas. 13, K3,CO3

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate; K6 – Create

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13. a) Design the side walls of a rectangular RC water tank resting on ground for a capacity of 80,000 liters. The inside dimensions of tank may be taken as 6 m x 4 m. Use M 30 grade concrete and Fe 415 HYSD bars. 13, K3,CO5

OR

- b) Explain the design procedure of underground rectangular Water tank with necessary formulas. 13, K3,CO5

14. a) Explain the step by step procedure involved in design of a RC solid slab bridge. 13, K3,CO4

OR

- b) Design a RC bridge for the following data. 13, K3,CO4
Clear span = 3.5 m , Loading = IRC class A, No. of Lanes = 1, Road width = 3.8 m, Safety kerbs = 60 cm wide, Wearing coat = 80mm. Use M20, Grade I steel.

15. a) Design a reinforced concrete circular tank with flexible base for capacity of 500000 liters. The depth of water is to be 4m, including a free board of 300mm. Overall height of the tank is restricted to 5m. Use M20 grade concrete and Fe415 grade steel. 13, K3,CO5

OR

- b) Explain briefly about the different types of retaining walls with neat sketches. 13, K3,CO1

PART - C (1 × 15 = 15 Marks)

16. a) A column ISHB 250 @ 54.7 kg/m in framed buildings supports spandrel beams both at top and bottom. The effective length of the column is 4 m about both the axes and subjected to following forces and moments. 15, K3,CO6
(i) Maximum axial load = 1250 kN
(ii) Maximum bending moments at top and bottom of the column = 30 kNm. Classify the section and check its adequacy for local capacity.

OR

- b) Design an I-section purlin, for an industrial building situated in the outskirts of New Delhi, to support a galvanized iron sheet roof for the following data: 15, K3,CO6
(i) Spacing of the truss C/C = 6 m
(ii) Span of truss = 12 m
(iii) Slope of truss = 30°
(iv) Spacing of purlins C/C = 1.5 m
(v) Intensity of wind pressure = 2000 N/m²
(vi) Weight of galvanized sheets = 130 N/m²
(vii) Grade of steel = Fe 410