Reg. No. :

Question Paper Code : X60257

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2020
Fifth Semester
Civil Engineering
CE 2306/CE 1302/10111 CE 506/CE 55 – DESIGN OF REINFORCED CONCRETE ELEMENTS
(Regulations 2008/2010)

Time : Three Hours | Maximum : 100 Marks

(IS 456 – 2000 and SP 16 – 1980, 459 – 1978 Design Charts Tables are Permitted)
Use of relevant BIS standards and Handbook is permitted.
Answer ALL questions

PART – A **(10×2=20 Marks)**

1. Compare the stress strain curves of mild steel and Fe415 HYSD bar.
2. What is meant by partial safety factor ?
3. Why corner reinforcements are provided in a two way slab ?
4. What is meant by doubly reinforced beam ?
5. Write down the effect of torsion in RC beams.
6. Write about local bond and anchorage length.
7. Define overturning on columns.
8. On what condition intermediate column is more suitable.
9. Give the general steps involved in the design of combined footing.
10. Name any four loads you would consider in the design of masonry walls.

PART – B **(5×16=80 Marks)**

11. a) i) What are the advantages of limit state method ? **(5)**

ii) A reinforced concrete slab has an effective span of 5 m, and carries a uniformly distributed load of 6 kN/m^2 inclusive of its own weight. Determine 1) effective depth of the slab 2) steel reinforcement. Use M20 concrete and Fe 415 steel. **(11)**

(OR)

b) A rectangular beam of breadth 300 mm and effective depth 800 mm with cover of 40 mm to centre of steel is to be designed for M 20 concrete and Fe 415 grade steel. Use working stress method. Determine the area of steel required if the moment due to characteristic load is 160 kNm. **(16)**

12. a) Design the interior panel of flat slab with drops for an office floor to suit the following data :
Size of floor = 25 m × 23 m
Size of panels = 5 m × 5 m
Loading class 4 kN/m^2
Materials M 20 grade concrete and Fe 415 HYSD bars. **(16)**

(OR)

b) A T beam slab floor of an office comprises of a slab 150 mm thick spanning between ribs spaced at 3 m centres. The effective span of the beam is 8 m. Live load on floor is 4 kN/m^2. Using M 20 grade concrete and Fe 415 HYSD bars, design one of the intermediate T beams. **(16)**

13. a) A simply supported beam is 5 m in span and carries a load of 75 kN/m. If 6 Nos. of 20 mm bars are continued into the supports, check the development length at the supports assuming M-20 grade concrete and Fe-415 grade steel. **(16)**

(OR)

b) Determine the reinforcement required for a rectangular beam section with the following data :
Size of the beam = 300 mm × 500 mm
Factored bending moment = 80 kNm
Factored torsional moment = 40 kNm
Factored shear force = 70 kN **(16)**

14. a) Design the longitudinal, and lateral reinforcements in a rectangular reinforced column of size 300 mm × 400 mm subjected to a design ultimate load of 1200 kN and a ultimate moment of 200 kN/m with respect to the major axis. Adopt M20 concrete and Fe415 grade reinforcements. **(16)**

(OR)

b) Design a column to carry an axial load of 1500 kN and bending moment about major axis as 150 kNm. The height of column is 5m. **(16)**

15. a) Design a reinforced concrete footing for rectangular column of section 300 mm × 500 mm supporting an axial factored load of 1500 kN. The safe bearing capacity of soil at site is 185 kN/m^2. Adopt M-20 grade concrete and Fe-415 HYSD bars. **(16)**

(OR)

b) Design a RCC footing for a wall to carry a load of 5 kN/m. The thickness of brick wall is 200 mm. The safe bearing capacity of soil at site is 200 kN/m^2. Adopt M-20 grade concrete and Fe-415 HYSD bars. **(16)**

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