



c16-c-401

6424

BOARD DIPLOMA EXAMINATION, (C-16)
JANUARY/FEBRUARY—2022
DCE - FOURTH SEMESTER EXAMINATION
REINFORCED CONCRETE STRUCTURES

Time : 3 hours]

[Total Marks : 80

PART—A

3×10=30

- Instructions :**
- (1) Answer **all** questions.
 - (2) Each question carries **three** marks.
 - (3) Answers should be brief and straight to the point and shall not exceed five simple sentences.

1. Explain any three functions of reinforcing steel in RCC members.
2. State the various limit states to be considered in the limit state design.
3. List any three assumptions made in the design of flexural members by limit state method.
4. State any three situations in which doubly reinforced sections are used.
5. Distinguish between one way slab and two way slab.
6. What are the functions of distribution bars in slabs?
7. What are the advantages of T-beam?
8. State any three conditions to be satisfied to adopt the bending moment and shear coefficients given in IS 456-2000 for continuous beams/slabs.
9. Sketch a three span continuous beam and mark the location where the tension reinforcement is provided.
10. Distinguish between long and short columns.

*

PART—B

10×5=50

- Instructions :** (1) Answer *any five* questions.
(2) Each question carries **ten** marks.
(3) Answers should be comprehensive and criterion for valuation is the content but not the length of the answer.

- 11.** A reinforced concrete beam 300 mm wide by 600 mm overall depth is reinforced with 4 bars of 16 mm diameter at an effective cover of 40 mm. Using M20 grade concrete and Fe415 grade steel, estimate the moment of resistance of the section using working stress method.
- 12.** Calculate the area of reinforcement required for a singly reinforced concrete beam 230 mm wide and 400 mm effective depth to resist an ultimate moment of 50 kN-m. Assume M20 and Fe415 combination of concrete and steel.
- 13.** A doubly reinforced beam of width 250 mm and 500 mm effective depth is reinforced with 2 bars of 20 mm diameter in compression and 6 bars of 20 mm diameter in tension zones. Find the ultimate moment of resistance of the beam section. Effective cover is 40 mm on both steels. Concrete grade is M25 and steel is Fe415.
- 14.** Design a simply supported RCC slab for a room of clear dimensions 3 m × 8 m, width of support is 230 mm. Superimposed load is 2 kN/m² and weight of finishes is 1 kN/m². Use M25 grade concrete and Fe415 grade steel. Check for deflection.
- 15.** A simply supported singly reinforced cement concrete T-beam has a flange of 750 mm width and 120 mm thickness is having area of steel 3500 mm² provided at an effective depth of 450 mm and width of the rib is 230 mm. Calculate the moment of resistance of the section using M20 grade concrete and Fe415 grade steel.
- 16.** A continuous RCC rectangular beam of size 250 mm × 500 mm overall is supported on 300 mm × 300 mm masonry columns at clear interval of 4 m. The beam carries a dead load of 20 kN/m including self weight and imposed load of 12 kN/m. Concrete is M20 grade and steel is Fe415 grade. Design the reinforcement at support next to end support section.

*

- 17.** Design a circular column to carry an axial load of 1600 kN using lateral ties. Use M20 grade concrete and Fe415 grade steel. Assume load factor as 1.5.
- 18.** An RC column of size 400 mm × 400 mm carries a load of 1000 kN. The SBC of soil is 150 kN/m². Design an isolated square column footing with uniform thickness. Use M20 grade concrete and Fe415 grade steel. Check for development length and check for bearing pressure are not required.

030 030 030 030

*

*