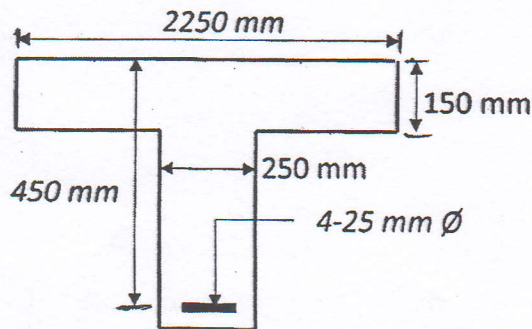


Exam.	New Back (2066 & Later Batch)		
Level	BE	Full Marks	80
Programme	BCE	Pass Marks	32
Year / Part	IV / I	Time	3 hrs.

Subject: - Design of RCC Structure (CE702)

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ Attempt All questions.
- ✓ The figures in the margin indicate Full Marks.
- ✓ Design codes IS 456, IS 1893, IS 13920 and SP 16 are allowed to use.
- ✓ Assume suitable data if necessary.

1. a) Find the moment of resistance of a RCC beam 250 mm wide and 500 mm effective depth if it is reinforced with 3-16 mm dia bars. The permissible stresses for concrete and steel are given as 7 MPa and 230 MPa. The value of modular ratio is taken as 13.33. [6]
- b) Find the ultimate moment resisting capacity of a beam as shown in figure. Consider M 20 and Fe415 grade of concrete and steel. [14]



2. a) Design and detail an interior pannel of a slab resting on RCC beams on all sides for a room having clear dimensions of 4.5m*6.5m. The slab is subjected to a super-imposed live load of 4 kN/m² and floor finishes load of 2.5 kN/m². Take M20 concrete and Fe415 steel. [15]
- b) What is ductility? What are the significances of ductility in RC structures? [2+3]
3. a) Design the longitudinal reinforcements to be provided for a short column 400×500 mm subjected to following forces: [15]

$$P_u = 1600 \text{ KN}$$

$$M_{ux} = 20.0 \text{ KN-m}$$

$$M_{uy} = 150 \text{ KN-m}$$

Use M25 concrete and Fe415 steel

Unsupported length = 3 m

- b) Discuss the methods of crack control as per IS456-2000 in RC structures. [5]
4. a) Design an isolated footing for a square column 450 mm × 450 mm, reinforcement with 8-20 dia bars and carrying a service load of 1600 KN. Assume bearing capacity of soil as 250 kN/m² and depth of foundation as 1.5 m. Adopt M20 concrete and Fe 500 steel. Also check the development length and bearing stress in concrete. [14]
- b) What do you understand by idealized stress-strain diagram of concrete and steel bar? Draw idealized stress-strain diagrams. Define characteristic strength of concrete and steel. [2+2+2]