

Exam.	Regular/Back		
Level	BE	Full Marks	80
Programme	BCE	Pass Marks	32
Year / Part	IV / I	Time	3 hrs.

Subject: - Design of Reinforced Concrete Structure

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ Attempt any **Four** questions.
- ✓ The figures in the margin indicate **Full Marks**.
- ✓ Use of IS: 456, IS 1343 are allowed. IS 456 SP-16 is allowed to design column only.
- ✓ Assume suitable data if necessary.

1. a) What is the difference between the limit state method fro working stress method of design. [7]
- b) A RC beam has an effective depth of 45cm and breadth of 30cm. It contains 5-20mm dia mild steel bars, out of which 2-20mm dia bars are curtailed at a section where shear force at service load is 100KN. Design the shear reinforcement if the concrete is M20. [13]
2. a) How the deflection can be controlled in a beam, explain it in brief. [7]
- b) A beam is simply supported on two walls of width 250mm with a clear span of 6m. If the beam have to support 150mm deep slab and live load of intensity 3 KN/m², design a T-beam. The beam is spaced at 4 m c/c. Take M20 concrete and Fe415 steel. Design for shear is not required. [13]
3. a) How the bent-up bars contribute in shear strength of beam, explain it. [4]
- b) Design a roof slab for a room 6m×3.5m restrained on all four sides by beams. It has to support super imposed load of 4 KN/m². Take M20 concrete and Fe250 steel. [16]
4. a) Describe the steps for design of a rectangular RC footing. Why shear reinforcement is not provided in footing? [7]
- b) Design a rectangular column supporting an axial load of 1200KN along with a bending moment of 150 KN-m at working loads. Use M25 concrete mix, Fe415 steel and the section reinforced equally distributed on two sides only. [13]
5. a) What are the differences between load balancing approach and homogeneous beam concept? Explain it. [4]
- b) Compute the net initial and final concrete stresses in the extreme top and bottom fibres at the mid span of a beam, which are 25cm wide and 30cm deep on a span of 8m. The beam is to support a dead load of 8 KN/m and live load of 6 KN/m. The beam is prestressed with a final force of 700 KN at an eccentricity of 7.5cm. Loss may be assumed as 15%. [16]
