Design of Reinforced Concrete Elements

Important 13mark questions

Unit I

1. Explain the codal recommendations for limit states design? State their significance.
2. Design a simply supported reinforced concrete beam to carry a bending moment of 50 kNm as doubly reinforced section by working stress design. Keep the width is equal to half the effective depth.

Unit II

1. Design the reinforcement for a T-beam for the following data:
   Effective span: 8m
   Spacing of beams = 3m, Thickness of slab = 130 mm
   Total depth = 450 mm, Live load = 10kN/m^2
2. 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 4kN/m^2. Using M20 grade concrete and Fe 415 HYSD bars, design one of the intermediate T beams.

Unit III

1. Explain the terms Diagonal tension and bond stress with reference to R. C beams.
2. Design the reinforcement required for the section 300 mm × 500 mm for the following data:
   Bending moment = 65 kNm, Torsional moment = 40 kNm, Shear force = 70 kN.

Unit IV

1. Design a short column to carry an axial load of 1200 kN and moment of 60 kNm about the major axis. The effective height of column is 3 m.
2. Design the reinforcement for a column of size 250 mm × 300 mm if it is subjected Pu = 500 kN, Mux = 50 kNm and Muy = 30kNm. Provide effective cover of 50 mm.

Unit V

1. A rectangular RCC column of size 400 mm × 600 mm carrying an axial load of 1800 kN. If the safe bearing capacity of the soil is 150 kN/m^2. Design a suitable footing. Use M20 concrete and Fe 415 steel.
2. Design a combined footing for two columns 300 mm × 300 mm, 4m apart to transfer an axial load of 1500 kN each. The width is restricted to 2.5 m. The safe bearing capacity of soil is 200 kN/m^2.