



- (g) Define one way slab and two way slab.
- (h) Explain main steel and distribution steel in slab.
- (i) Enumerate different types of column.
- (j) Explain the codal provisions used in compression members with helical reinforcement.

### Section - B

Note : Attempt **any five** questions from this section:

(10x5=50)

2. The moment of resistance of rectangular reinforced concrete beam of breadth 'b' and effective depth 'd' cm is " $0.9b.d^2$ ". If the stress in the outside fibre of concrete and in the steel do not exceed  $5 \text{ N/mm}^2$  and  $140 \text{ N/mm}^2$  respectively. And the modular ratio equals 18, determine the ratio of depth of the neutral axis from the outside compression fibre to the effective depth of the beam and the ratio of area of tension steel to the effective area of the beam. The beam is reinforced for tension only.
3. Design a reinforced concrete beam subjected to a B.M. of  $20 \text{ KN-m}$ . Use M20 concrete Fe 415 reinforcement. Keep the width of the beam equal to half the effective depth.

4. What are the assumptions for the design of reinforced concrete section for limit state of collapse in bending? Derive the stress block parameters for a rectangular cross section.
5. Design a rectangular beam for an effective span 6m. The superimposed load or live load  $80 \text{ KN/m}$  and the size is limited to 300 mm width and 700 mm overall depth. Use M20 concrete mix and Fe 415 steel.
6. A.R.C. beam has an effective depth of 400 mm and breadth of 300 mm. It contains 3-25 mm Fe 500 grade bars in tension. Determine the shear reinforcement needed for a factored S.F. of 250 kN if M30 mix is used.
7. Design a one way slab, with a clear span of 4.0 m, simply supported on 230 mm thick masonry walls and subjected to a live load of  $4 \text{ kN/m}^2$  and a surface finish of  $1 \text{ kN/m}^2$ . Assume M15 mix and Fe 415 grade steel.
8. Design a short axially loaded square column  $500 \times 500 \text{ mm}$  for a working load of 2000 kN. Use M20 concrete and Fe 415 grade steel.
9. Design a circular column to carry an axial load of 1000 kN. Use M20 mix and Fe 415 grade steel.