

Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech.(CE) (Sem.-5<sup>th</sup>)

**DESIGN OF CONCRETE STRUCTURES-I**

Subject Code : CE-307

Paper ID : [A0615]

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTION TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students has to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students has to attempt any TWO questions.

**SECTION-A**

I. Write briefly :

- (a) Define long column, short column & pedestal. Also give expressions for load carrying capacities of long columns.
- (b) Discuss two main drawbacks of working stress method.
- (c) Give the stress and strain block parameters in limit state design approach for concrete.
- (d) Distinguish in the analysis philosophy of one way and two way slabs.
- (e) What are the different states considered in Limit State of Serviceability
- (f) How is the tensile strength and modulus of elasticity of concrete linked to compressive strength?
- (g) How can the shear strength of RC sections be enhanced?
- (h) How the transverse reinforcement is provided in short columns?

- (i) Under what circumstances are doubly reinforced sections provided?
- (j) What are the two main components of staircases?

**SECTION-B**

2. Discuss the following :

- (i) Stress-Strain Characteristics of steel reinforcement
  - (ii) Accelerators and retarders as admixtures
3. A RC beam of 350mm by 500mm effective depth contains 4 bars of 25 mm diameter. Calculate the shear reinforcement needed for a factored shear force of 400 kN, if M20 concrete and Fe 250 steel is to be used as shear reinforcement.
  4. Design a rectangular beam to resist a bending moment of 45 kNm using M20 concrete and Fe415 steel.
  5. Discuss in detail the codal provisions to control cracking of RC elements.
  6. 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.

**SECTION-C**

7. Design a short column, square in cross section to carry an axial load of 2000 kN using lateral ties. Use M25 concrete and Fe415 steel.
8. Find the moment of resistance of a beam 250 mm × 600 mm deep if it is reinforced with 2-12 mm diameter bars in compression zone and 4-20 mm dia bars in tension zone, each at an effective cover of 40 mm. Assume M20 mix and Fe415 steel.
9. Design a two way slab for the room 5.5 m × 6.5 m clear in size if the superimposed load is 5 kN/m<sup>2</sup>. The edges of the slab are simply supported and corners are not held down.