Code: CE5T1

III B.Tech - I Semester – Regular/Supplementary Examinations MARCH 2021

DESIGN AND DRAWING OF CONCRETE STRUCTURES - I
(CIVIL ENGINEERING)

Duration: 3 hours   Max. Marks: 70

Use of IS:456-2000 and design charts from SP-16 Charts allowed.
Data not given but found necessary may be assumed suitably

PART – A

Answer any **ONE** question.   1 x 28 = 28 M

1. Design the reinforcement in a column of size 450mm × 600mm, subject to an axial load of 2000kN under service dead and live loads. The column has an unsupported length of 3.0m and is braced against sideway in both directions. Use M 20 concrete and Fe 415 steel. Sketch the details of reinforcement.   28 M

(OR)

2. Design a reinforced concrete slab for a room of clear dimensions 5 m x 6 m. The slab is supported on walls of width 300 mm. The slab is carrying a live load of 5 kN/m^2 and floor finish 2 kN/m^2. Use M30 concrete and Fe 415 steel. The corners of slab are held down. Sketch the layout of the reinforcement.   28 M

PART-B

Answer any **THREE** questions. All questions carry equal marks.

$$3 \times 14 = 42 \text{ M}$$

3. A reinforcement concrete beam section of size 300mm x 600mm effective depth is reinforced with 3 bars of 16 mm diameter in tension. Determine the moment of resistance and the maximum stresses induced in the materials using working stress method? Adopt M20 grade Concrete and Fe415 steel.   14 M

4. a) What is meant by limit state? Discuss the different 'limit states' to be considered in reinforced concrete design.
                                                                                            7 M

   b) Draw stress-strain relationship for concrete and explain it briefly.   7 M

5. A simply supported R.C.C. beam 300 mm wide and 500 mm deep (effective) is reinforced with 4 numbers of 20 mm diameter bars. Design the shear reinforcement if M25 grade of concrete and Fe 415 steel is used and beam is subjected to a shear force of 250 kN at service state.   14 M

6. Design a short R.C.C. column to carry an axial load of 1600 kN. It is 4 m long, effectively held in position and restrained against rotation at both ends. Use M20 concrete and Fe 415 steel.   14 M

7. Design a R.C. slab for a room having inside dimensions 3 m x 6 m. The thickness of supporting wall is 300 mm. The slab carries 100 mm thick lime concrete at its top, the unit weight which may be taken as 19 kN/m^3. The live load on the slab may be taken as 3 kN/m^2. Assume the slab to the simply supported at the ends. Use M30 grade concrete and Fe 415 grade steel.   14 M