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B.TECH. DEGREE EXAMINATION, NOVEMBER 2014

Fifth Semester

Branch : Civil Engineering

DESIGN OF CONCRETE STRUCTURES—I (C)

(Old Scheme—Prior to 2010 Admissions)

[Supplementary/Mercy Chance]

Time : Four Hours   Maximum : 100 Marks

*Answer **all** questions.*
Missing data may be suitably assumed.
IS 456 and SP 16 permitted.
Do the detailing on the drawing sheet.
Each question carries 20 marks.

1. Design a R.C. rectangular beam for a simply supported span of 5 m. and carrying a superimposed load of 20 kN/m. inclusive of self-weight of the beam. Use M20 and Fe 415 by WSM.

Or

2. A doubly reinforced concrete beam 250 mm. × 550 mm. size, is reinforced with Fe 415 steel, 5 bars of 16 mm. ϕ at top and 4 bars of 20 mm. ϕ at bottom. Determine the stresses in steel and concrete if it is simply supported over a span of 5 m. and carries a load of 22.4 kN/m. inclusive of self-weight. Use M20 concrete.

3. Using LSM, design a rectangular RC beam simply supported over an effective span of 6 m. and clear span of 5.50 m. The superimposed load is 80 kN/m. Beam size is 300 mm. × 800 mm. deep (overall). Use M20 and Fe 415 steel.

Or

4. Determine the moment of resistance of a T-beam section reinforced with Fe 415 on tension side only with 4 nos. of 25 mm. ϕ. Use M20 concrete h_f = 1200 mm., D_f = 100 mm.; d_w = 250 mm., b_w = 225 mm. d' = 50 mm.

5. Design a reinforced concrete slab for an office floor to carry a load of 8 kN/m^2 inclusive of its own weight over an effective span of 3.5 m. simply supported at its ends. Use M20 concrete, Fe 415 steel.

Or

6. Design a two way slab for a room having effective spans in two directions as 4 m. and 5 m. Take LL = 3 kN/m^2 and finishes as 1.5 kN/m^2 Use M20, Fe 415 steel.

Turn over

7. Design a RC column to carry an axial load of 2000 kN. The size of the column is restricted to 600 mm^2. The effective height of the column is 9 m. Use M20 and $\sigma_{SC} = 190$ N/mm^2.

Or

8. Design a circular column 8 m. effective height and 400 mm. diameter to carry an axial load of 700 kN. M20 and Fe 415 steel.

9. Design an isolated footing for a column of size 350 × 500 mm. Axial load on column is 1200 kN. SBC of soil is 180 kN/m^2. Use M20, Fe 415. Steel sketch reinforcement details are required.

Or

10. Design a combined footing to support two columns 400 mm. diameter carrying axial loads 700 kN and 800 kN at 1.5 mc/c. Assume SBC of soil as 200 kN/m^2. Use M20, Fe 415 steel.

(5 × 20 = 100 marks)