C 3119

B.E./B.Tech. DEGREE EXAMINATION, MAY/JUNE 2007.

Sixth Semester

(Regulation 2004)

Civil Engineering

CE 1354 — DESIGN OF RC ELEMENTS

(Common to B.E. (Part-Time) Fifth Semester Regulation 2005)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

Use IS 456 and SP 16 are permitted.

Use M20 Concrete and Fe 415 Steel unless otherwise mentioned.

PART A — (10 × 2 = 20 marks)

1. Draw stress – strain curve for mild steel bars.

2. Differentiate between design mix and nominal mix.

3. Define partial safety factor.

4. Differentiate between WSD and LSD.

5. What is the purpose of providing distribution reinforcements in RC slabs?

6. Explain the purpose of providing lintel beams in buildings.

7. Differentiate between two way and one way slab.

8. Differentiate between long and short column.

9. Differentiate between uniaxial and biaxial bending.

10. Define safe bearing capacity of soil.

11. (a) Sketch the longitudinal elevation of beam for various support condition and indicate the position and direction of web shear cracks and flexural shear cracks.

Or

(b) What are all the properties of uncracked section?

12. (a) Design a simply supported slab covering a hall of internal dimensions 3.2 m × 9.0 m. The slab rests on a brick wall of 230 mm thick all around. Use a live load of 3 .0 kN/Sq.m and floor finish of 1.0 kN/Sq.m.

Or

(b) Design an interior span of a continuous one way slab for an office floor which has continuous 'Tee' beams. The Tee beams are spaced at 4 m c/c. Use a live load of 3.0 kN/Sq.m and total dead load of 2.5 kN/Sq.m.

13. (a) The floor slab for a hall consists of 150 mm thick RC slab supported by beams spaced at 3 m intervals. The beams are simply supported over a span of 7 m. Load due to floor finish is 1.0 kN/Sq.m and live load is 3 kN/Sq.m. Design the beam as rectangular beam. Use limit state method.

Or

(b) Determine the area of steel required for a T – beam with the following dimensions. Depth of slab = 100 mm, breath of flange 750 mm. Breath of web = 250 mm. The total depth = 600 mm. The beam is subjected to an ultimate moment of resistance of 525 kN-m. Use 16 mm diameter steel.

14. (a) Design a circular RC column to carry an axial load of 1250 kN. The effective length of the column is 6 m. Use limit state method.

Or

(b) Determine the reinforcements to be provided in a short RC column given the following data, by limit state method :

Size of column   =   300 × 600 mm

Factored load   =   1200 kN

Factored moments, M_{ux} =   160 kN-m

M_{uy} =   80 kN-m

15. (a) A column 450 mm × 450 mm in size with 8 steel bars of 18 mm diameter transfers a dead load of 620 kN and a live load of 860 kN to the footing. The bearing capacity of the soil is 120 kN/Sq.m. Design a square footing to support the column.

Or

(b) A circular column of 480 mm diameter transfers an axial dead load of 650 kN and an axial live load of 500 kN. The column is having 8 steel bars of 18 mm diameter. The safe bearing capacity of the soil is 140 kN/Sq.m. Design a circular footing to support the circular column.

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