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Question Paper Code: 12062

M.E. DEGREE EXAMINATION, MAY 2014.

Second Semester

Structural Engineering

01PSE101 - ADVANCED REINFORCED CONCRETE DESIGN

(Regulation 2013)

Duration: Three hours   Maximum: 100 Marks

(Use of IS 456 - 2000, IS 13920, IS1893 (Part I) and SP16 are permitted.)

Answer ALL Questions.

PART A - (10 x 2 = 20 Marks)

1. What is mean by cracked section?

2. Write any two significance of deflection and crack width control.

3. What are the modes of failures of corbels?

4. Define spandrel beams.

5. State the assumptions made in the analysis of yield line theory of slabs.

6. What is the purpose of flat slab?

7. What is meant by moment redistribution?

8. Write any two assumptions made in flat slab design.

9. List out the factors affecting quality of concrete.

10. What is the importance of fire resistance of structural members?

PART - B (5 x 14 = 70 Marks)

11. (a) A rectangular simply supported beam 230 mm x 350 mm has been designed to carry a mid span bending moment of 25 kN-m to support a span of 3 m. Tensile reinforcement of 2 Nos. of 16 mm diameter is provided at the bottom. Age at loading is 28 days. Use M20 grade concrete and Fe 415 steel. Calculate total deflection and whether it meets the requirements as per code. (14)

Or

(b) A simply supported beam of span 8 m is with a flange of width 800 mm of depth 300 mm. The width of the web is 230 mm and overall depth is 600 mm. The beam is reinforced with 3 bars of 20 mm diameter on the tension side at an effective depth of 550 mm. The beam is subjected to service load moment 200 kN-m. Calculate crack width of the beam. (14)

12. (a) A hall of size 4 m x 6 m with 230 mm thick R.C walls all around has simply supported R.C.C roof slab. Assume live load of 6 kN/m^2. Design shear wall. Use M20 grade of concrete and Fe415 steel. (14)

Or

(b) Design a corbel to support a gantry girder reaction of 350 kN at service condition acting at a distance of 250 mm from the face of a 400 mm x 400 mm column. Use M25 concrete and HYSD bars. (14)

13. (a) Design a flat slab for the interior panel to suit the floor size of 20 m x 30 m with the column intervals at 5 m centre to centre. Live load on the slab is 5 kN/m^2. The column size of 500 diameters is used. Provide suitable drop. Use M25 Grade of concrete and Fe415 grade steel. (14)

Or

(b) A reinforced concrete spandrel beam floor is to be designed to cover a floor area of size 12 m x 16 m. The spacing of beams in a mutually perpendicular directions being 2 m centre to centre live load of 2 kN/sq.m. Use M20 and HYSD bars. (14)

14. (a) Explain the Baker's method of plastic analysis of RCC frames stating the assumptions made. (14)

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(b) Explain the moment rotation curves and moment redistribution of reinforced concrete sections from its assumptions. (14)

15. (a) Explain the design philoshphy of earth quake resistant design of structures and its applications. (14)

Or

(b) Write about fire resistances of structural members and quality of control of concrete. (14)

PART - C (1 x 10 = 10 Marks)

16. (a) A continuous deep beam 300 mm x 4500 mm carries service load of 200 kN/m including its self weight. The width of the support is 700 mm and the span of the beam is 9 m. Design and draw the detailing at the mid span and support section. Use M25 Grade of concrete and Fe415 grade steel. (10)

Or

(b) A reinforced concrete grid floor is to be designed to cover a floor area of size 12 m x 16 m. The spacing of ribs in a mutually perpendicular directions being 2 m centre to centre live load of 2 kN/sq.m. Use M20 and HYSD bars. (10)

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