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Register No.   :

Name of the Candidate:

POST DIPLOMA / DIPLOMA EXAMINATION, 2010

(CONCRETE TECHNOLOGY AND DESIGN OF CONCRETE STRUCTURES)

(PAPER – III)

530. STRUCTURAL CONCRETE DESIGN – II

December)   (*Time: 3 Hours*

Maximum: 100 Marks

Answer ONE full question from each unit   *(5×20=100)*
All questions carry equal marks
IS456, SP16 Design aids are permitted. Adopt M20 concrete and Fe415 steel
unless otherwise specified. Assume suitable data wherever necessary

UNIT- I

1. a) What is limit state of collapse?

    b) What is meant by characteristic strength of material as specified by IS456?

    c)   Explain the terms characteristic and factored loads.

2. a) What are various serviceability requirements recommended by IS456?

    b) Define the terms: partial safety factors. List the various partial safety factors and state the values stipulated in IS456.

UNIT- II

3. Design a RC beam having an effective simply supported span of 5.5m. The beam is required to support a live load and superimposed loads of 15 kN/m and 10 kN/m respectively.

4. Design a T beam section with a flange width of 1250mm, flange depth of 100mm. Web width of 250mm and an effective depth of 500mm which is subjected to a factored moment of 560 kNm.

UNIT- III

5. Design a RC slab for a room measuring 4m × 6m from face to face of walls. The slab is to carry a service load of 2 kN/m^2 and a dead load due to floor finish and partitions of 1.5

kN/m². The slab can be considered to be simply supported on all edges with the corners free to lift.

6. A simply supported circular slab of radius 2.8 m is reinforced with 10mm diameter bars at 180mm centre to centre in two mutually perpendicular directions. Average effective depth is 100mm and over all depth is 125mm. Determine how much service load it can carry.

UNIT- IV

7. A RC beam of rectangular cross section of 300mm wide and 550mm overall depth is reinforced with 6 bars of 20mm diameter placed at an effective cover of 50mm. Out of 6 bars, 3 bars have been bent up at 45°. Design the shear reinforcement if the beam is subjected to a uniformly distributed factored load of 100 kN/m over simply supported clear span of 7m.

8. A R C column of un supported length of 3m is to be designed for a factored axial load of 2500 kN. Determine the cross sectional dimensions of the column and the reinforcement required.

UNIT- V

9. Design a square spread footing to carry a column load of 1000 kN from a 400mm square tied column containing 20mm bars as longitudinal steel. Safe bearing capacity of soil = 100 kN/m². Depth of foundation below ground level = 1m. Unit weight of soil = 20 kN/m³.

10. Design a stair case to be provided on a residential building in two straight & opposite flights of 1m width connected by a landing for a floor height of 3.3m. The landing which is 1m wide spans in the same direction as the stair slab. The rise and tread shall be 150mm and 270mm respectively.

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