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Register Number :

7943

Name of the Candidate :

POST DIPLOMA/DIPLOMA EXAMINATION MAY 2014.

(CONCRETE TECHNOLOGY AND DESIGN OF CONCRETE STRUCTURES)

520 — STRUCTURAL CONCRETE DESIGN – I

Time : Three hours

Maximum : 100 marks

Use of IS 456 – 2000 is permitted.

Answer any ONE question from each Unit. (5 × 20 = 100)

UNIT I

1. Compare the working stress method and ultimate load design and explain the design concept of the ultimate load design.
2. Define ultimate load design explain the concept of the design and list the advantages and disadvantages of this method.

UNIT II

3. A doubly reinforced beam is to be designed having an overall cross sectional dimensions of 250mm × 400mm with an effective span of 4m. The beam has to support an uniformly distributed dead load of 2.5 kN/m together with a live load of 20 kN/m, in addition to its self weight. Adopting M20 grade concrete and Fe 415 HYSD bars, design suitable reinforcements in the beam by working stress method.
4. A reinforced concrete simply supported beam of effective span 5.0m is subjected to a uniformly distributed load of 22kN/m, run. Design the beam, concrete grade M20 and Fe415 steel are used, using working stress method.

UNIT III

5. Design a simply supported R.C.C. slab for an office floor having clear dimensions of 4m × 10m. With 230mm walls all-round. Adopt m20 grade concrete Δ Fe415 grade HYSD bars.
6. Design a two way slab for a room of size 4m × 5m with discontinuous and simply supported edges on all the sides with corners prevented from lifting to support a live load of 4kN/m². Adopt M20 grade concrete Δ Fe415 HYSD bars.

UNIT IV

7. Design a suitable R.C.C. column of rectangular section and a suitable footing to support an axial service load of 1000kN. Size of the column is 300mm × 500mm safe bearing capacity of the soil is 200kN/m². Adopt M20 grade concrete and Fe415 HYSD bars.
8. Design the reinforcements in a circular column of diameter 300mm to support axial load of 1200kN. The column has an unsupported length of 3.20m and is braced against side sway. The column is reinforced with helical ties. Adopt M25 grade concrete and Fe415 HYSD bars.

UNIT V

9. Design a dog-legged staircase (waist slab type) using working stress method for an office building assuming floor to floor height of 3m.

Width of flight	=	1.2m
Landing width	=	1.2m
Risers	=	150mm
tread	=	300mm

Adopt M20 grade concrete and Fe415 HYSD bars. Assume a live load of 5kN/m². Assuming the landing to be supported only on two edges perpendicular to the risers.

10. Design one of the flights of stairs of a school building spanning between landing beams to suit the following data :

Type of stair case : Waist slab type

No. of steps in flight	=	12
Tread T	=	300mm
Rise R	=	160mm
Width of landing beams	=	400mm

Materials M20 concrete and Fe415 HYSD bars.