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III B.Tech I Semester Supplementary Examinations, October/November-2020
DESIGN AND DRAWING OF REINFORCED CONCRETE STRUCTURES
(Civil Engineering)

Time: 3 hours   Max. Marks: 70

Answer any ONE Question from Part – A and any THREE Questions from Part – B
Use of IS: 456-2000 and design charts from SP-16 is allowed.
For all designs adopt Limit State Method
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PART –A

1   Design a suitable footing for a reinforced concrete column of size 300 mm by   [28M]
    500 mm supporting a factored axial load of 1500 kN. Assume the safe bearing
    capacity of the soil as 200 kN/m^2. Adopt M-20 grade concrete and Fe-415 HYSD
    bars. Sketch the details of reinforcements in the footing.

2   A short reinforced concrete column located at the corner of a multi storey building   [28M]
    is subjected to an axial factored load of 1600 kN together with factored moments
    of 60 kN.m and 40 kN.m acting in perpendicular planes. The size of the column is
    fixed as 400 mm by 400 mm. Adopting M-20 grade concrete and Fe-415 HYSD
    bars design suitable reinforcements in the corner column.

PART –B

3 a) What are the assumptions made in the elastic theory of reinforced concrete   [7M]
      sections? Explain.
  b) Explain clearly the concept of assigning different safety factors for different types   [7M]
      of loads.

4   Determine the minimum effective depth required and the corresponding area of   [14M]
    tension reinforcement for a rectangular beam having a width of 200 mm to resist
    an ultimate moment of 200 kN.m. Using M-20 grade concrete and Fe-415 HYSD
    bars.

5   Design a reinforced concrete continuous beam of rectangular section to support a   [14M]
    dead load of 8 kN/m and service live load of 15 kN/m over 4 spans of 8 m each.
    Assume the ends as simply supported. Adopt M-20 grade concrete and Fe-415
    HYSD bars.

6   Design a two-way slab for a residential roof to suit the following data: [14M]
    Size of roof = 4.5 m by 6 m,
    Edge conditions; simply supported on all the sides on load bearing masonry walls
    300 mm thick without any provision for torsion at corners.
    Materials: M-20 grade concrete and Fe-415 HYSD bars.

7   Design the waist slab type staircase consisting of a straight flight of stairs resting   [14M]
    on two stringer beams along the two sides. Assume the span of the slab as 2 m
    with risers of 160 mm and treads of 270 mm. live load= 3 kN/m^2. Adopt M-20
    grade concrete and Fe250 grade steel.

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