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Code No: 115AB

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech III Year I Semester Examinations, November - 2015
REINFORCED CONCRETE STRUCTURES DESIGN AND DRAWING
(Civil Engineering)

Time: 3 hours **Max. Marks: 75**

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A. Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks.

PART - A (25 Marks)

1.a) What is the philosophy of limit state method of design? [2]
b) Explain the structural behavior of a balanced section. [3]
c) What are the parameters affecting the shear strength of an RCC beam section? [2]
d) Explain the factors influencing the deflections of reinforced concrete beams. [3]
e) Differentiate the structural behavior of one-way slab and two-way slab. [2]
f) Explain the necessity of corner reinforcement in two-way slabs. [3]
g) What are the functions of the transverse reinforcement in a reinforced concrete column? [2]
h) Explain the structural behavior of short column and a slender column. [3]
i) What are the different types of footings? [2]
j) What are the situations in which combined footings are recommended? [3]

PART - B (50 Marks)

2. A T-beam roof consists of 125 mm thick reinforced concrete slab cast monolithic with 230 mm wide beams spaced at 3.6 m centre to centre. The roof slab is subjected to a live load of 3 kN/m^2 and dead load of 1.5 kN/m^2 excluding self-weight. The effective span of the beam is 4.5 m. Design an intermediate T-beam. Use M20 grade of concrete and Fe415 steel. Sketch the reinforcement details. [10]

OR

3. Determine the ultimate moment of resistance of a doubly reinforced concrete rectangular section *300 mm × 500 mm* (Total depth). The tension reinforcement is of *4-25Ø* and the compression reinforcement consists of *3-12Ø*. Adopt the clear cover to the reinforcement is 35 mm. Use M25 concrete and Fe415 steel. [10]

4. A simply supported RC beam of effective span of 5.4 m has section 300 mm × 450 mm (overall depth). The beam is reinforced with 4 bars of 20 mm diameter of which two bars are curtailed at 1 m from the supports. Design the shear reinforcement if the beam is subjected to uniformly distributed working load of 40 kN/m. Sketch the reinforcement details. Use M 25 grade concrete and Fe 415 steel. [10]

OR

5. A simply supported rectangular beam of effective span 6 m has cross – section 300 mm × 550 mm and reinforced with 4 bars of 20 mm diameter in tension and 2 bars of 10 mm diameter as compression steel. Determine the short-term deflection due to an imposed working load of 30 kN/m(excluding the self-weight). Adopt M25 grade concrete and Fe 415 steel. [10]

6. Design an RC slab for a room of clear dimensions 4.5 m × 5.4 m. The slab is supported all around on beams of width 300 mm. The slab is subjected to a live load of 3.5 kN/m^2 and floor finish of 1.5 kN/m^2. The corners of the slab are held down. Use M20 grade concrete and Fe 415 steel. Sketch the reinforcement details. [10]

OR

7. Design a cantilever slab projecting 1.5 m from a beam and subjected a live load of 2 kN/m^2. Use M25 grade of concrete and Fe 415 steel. Sketch the reinforcement details. [10]

8. Design a short circular column with helical reinforcement subjected to an ultimate load of 1800 kN. The unsupported length of the column is 4.2 m. The column is effectively held in position at both ends and restrained against rotation at one end only. Use M 25 grade concrete and Fe 415 steel. Sketch the reinforcement details. [10]

OR

9. Design the reinforcement for a column of section 400 mm × 400 mm and effective length 4.2 m. The column is subjected to a factored axial load of 1250 kN and a factored moment of 125 kNm about one of the centroidal axes. Use M25 grade concrete and Fe 415 steel. [10]

10. Design a square footing of a column 400 mm × 400 mm subjected to an axial load of 900 kN. The safe bearing capacity of the soil is 200 kN/m^2. Use M25 grade concrete and Fe 415 steel. Sketch the reinforcement details. [10]

OR

11. Design an RCC combined footing for two columns located 4 m apart. The sizes of the columns are 400 mm × 400 mm and 500 mm × 500 mm and transferring axial loads 750 kN and 900 kN respectively. The centre of 400 mm column is 0.6 m from the property line. The safe bearing capacity of the soil is 180 kN/m^2. Use M20 grade concrete and Fe 415 steel. Sketch the reinforcement details. [10]

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