Code No: 115AB R13

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech III Year I Semester Examinations, November/December - 2016
REINFORCED CONCRETE STRUCTURES DESIGN AND DRAWING
(Common to CE, CEE)

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 and may have a, b, c as sub questions.

PART - A
(25 Marks)

1.a) What are the assumptions made in the working stress method of design? [2]
b) Explain the salient features of under-reinforced, balanced and over-reinforced sections. [3]
c) What are the different methods of strengthening the RC section to resist shear force? [2]
d) Explain the factors influencing the crack-width in flexural member. [3]
e) Distinguish between the behavior of one-way and two-way slabs. [2]
f) Explain the necessity of corner reinforcement in two-way slabs. [3]
g) Explain the functions of transverse reinforcement in a RC column. [2]
h) Define slenderness ratio of a column and what are its implications? [3]
i) What is the purpose of providing a footing for any structure? [2]
j) Explain the load transfer mechanism in a two-column combined footing. [3]

PART - B
(50 Marks)

2. Design a doubly reinforced concrete simply supported rectangular beam of span 6 m and cross-section 300 mm × 600 mm (Over all depth). The beam is to carry a factored imposed load of 120 kN/m. Use M25 grade of concrete and Fe415 steel. [10]

OR

3. Determine the moment of resistance of a T-beam section with an effective flange width of 1100 mm, width of rib 230 mm and overall depth of the T-beam is 550 mm. The thickness of the slab is 125 mm. The beam is reinforced with 4 bars of 25 mm diameter on tension side. Use M20 grade of concrete and Fe415 steel. [10]

4. Design the reinforcement of a beam section 300 mm × 600 mm subjected to an ultimate twisting moment of 120 kNm and an ultimate shear force of 80 kN. Use M 20 concrete and Fe 415 steel. Sketch the reinforcement details. [10]

OR

5. A simply supported RC beam of effective span 5 m has cross-section 230 mm × 450 mm (overall depth) is reinforced with 3 bars of 20 mm diameter on tension and 2 bars of 12 mm diameter on compression side. The beam is subjected to an imposed working load of 15 kN/m. Determine the short term deflection and long term deflection. Adopt M 20 grade concrete and Fe 415 steel. [10]

6. Design a simply supported RCC slab for a room of clear dimensions 4.2 m × 6.0 m subjected to live load of 3 kN/m^2 and floor finish of 1 kN/m^2. Assume the width of supports is 300 mm. Use M 20 concrete and Fe 415 steel. Draw the reinforcement detailing. [10]

OR

7. Design a continuous reinforced concrete roof slab for a room of 5 m × 14 m. The thickness of the roof is 125 mm and supported by RCC beams of 230 mm wide spaced at 3.5 m c/c. The slab is to carry an imposed load of 3 kN/m^2 and floor finish of 1 kN/m^2. Use M 20 concrete and Fe 415 steel. Also draw the reinforcement detailing. [10]

8. Design an RC column of height 3.6 m and cross-section 400 mm × 400 mm located at the corner of a multi-storied building to support an axial load of 2250 kN together with moments 60 kNm and 45 kNm acting in two perpendicular planes. Use M 25 concrete and Fe 415 steel. [10]

OR

9. Design the reinforcement for a rectangular column 450 mm × 500 mm and effective length 6.6 m, using the following data:
Factored axial load: 1500 kN.
Factored moment about major axis is 60 kNm at top and 45 kNm at bottom
Factored moment about minor axis is 45 kNm at top and 30 kNm at bottom
The column is restrained against sway. Use M 25 concrete and Fe 415 steel. [10]

10. Design an RC square footing for a column of size 400 mm × 400 mm subjected to an axial factored load of 1800 kN. The safe bearing capacity of soil is 200 kN/m^2. Use M 25 concrete and Fe 415 steel. [10]

OR

11. A staircase room has clear dimensions 4 m × 2.5 m and the height between the floors is 3.3 m. Design a suitable dog-legged stair case with mid-landing. Use M 20 grade concrete and Fe 415 steel. Draw the reinforcement detailing in one of the flights. [10]

---ooOoo---