10

Code No: 115AB **R13**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech III Year I Semester Examinations, May - 2018
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.

IS 456-2000 code book and SP-16 Pu-Mu charts are allowed.

PART - A

(25 Marks)

1.a)	Distinguish between balanced section and un-balanced section.	[2]
b)	Determine the maximum depth of Neutral axis for mild steel, Fe500 and Fe415 steel when the effective depth of section is 400mm.	[3]
c)	Define Torsion and Bond.	[2]
d)	Define three modes of shear failures with the help of figures.	[3]
e)	Distinguish between one way slab and two way slab.	[2]
f)	Distinguish between beam and slab.	[3]
g)	Write the minimum and maximum percentages of steel in R.C.C. columns.	[2]
h)	Discuss briefly about the use of Pu-Mu charts in the design of columns.	[3]
i)	Distinguish between Raft footing and combined footing.	[2]
j)	Define Landing and write two uses of Landing in stair case.	[3]

PART – B

(50 Marks)

2. Describe stress block as per limit state method. Derive stress block parameters from the first principles. [10]

OR

3.a) A doubly reinforced section is 250 mm wide and 500 mm deep to the centre of tensile reinforcement. It is reinforced with 2 bars of 16 mm diameter as compression reinforcement at an effective cover of 50 mm and 4 bars of 25 mm diameter as tensile reinforcement. Calculate the ultimate moment of resistance of the beam section.

b) Find the area of steel and moment of resistance for the given data of a T-Beam when M20 Concrete and Fe415 grade steel are used. Flange width: 1200mm, Flange thickness: 80mm, effective depth: 500mm, rib width: 250mm. Consider the section as balanced section. [5+5]

4. A R.C Beam 300 mm × 450 mm is reinforced with 3 bars of 20 mm diameter with an effective cover of 50 mm in tension zone. The ultimate shear at the section is 210 kN. Design the shear reinforcement. Use M20 concrete and Fe415 steel. Sketch the reinforcement details. [10]

OR

5. Examine for bond in a simply supported beam of 230 mm × 370 mm effective dimensions, it is resting on 300 mm wide supports, subjected to factored shear force of 75 kN at critical section and consists of 5 bars of 12 mm dia on tension side. Adopt M 20 and Fe 415. [10]

6. Design a slab for room of size 5 m × 6 m supported on 300 mm thick masonry walls all around. The corners are held down. The Live load is 2.5 kN/m^2. Use M20 concrete and Fe415 steel. [10]

OR

7. Design the slab for a hall of 3 m × 7 m clear dimensions to act as a roof for a live load of 2 kN/m^2 and floor finishes of 1.5 kN/m^2. The slab rests on brick wall of 230 mm thick. Adopt M 20 grade of concrete and Fe 415 grade of steel. [10]

8. An R C rectangular column of size 250 mm × 300 mm is reinforced with 4 bars of 20 mm ϕ provided one at each corner with an effective cover of 60 mm. Examine the safety of the column. If it is subjected to P_u = 300 kN. M_{ux} = 30 kNm, M_{uy} = 20 kNm. Assume M20 concrete and Fe415 grade steel. [10]

OR

9. Design a short helically reinforced column of unsupported length 3.6m to carry an axial service load of 1200kN. Use M25 concrete and Fe415 steel. Sketch the reinforcement details. [10]

10. Design an isolated square footing for a column of size 300 mm × 300 mm carrying a factored axial load of 800 kN. Safe bearing capacity of the soil is 100 kN/m^2. Use M25 Concrete and Fe415 grade steel. [10]

OR

11. Design a stair case for an office building to be located in a room measuring 3.5m×5.5m. The vertical distance between floors is 3.8m. The Live load can be assumed as 4kN/m^2. Use M20 concrete and Fe415 steel. Take rise as 150mm and tread as 300mm. [10]

---ooOoo---