SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR (AUTONOMOUS)

B.Tech III Year I Semester Supplementary Examinations August-2021
DESIGN & DRAWING OF REINFORCED CONCRETE STRUCTURES
(CIVIL ENGINEERING)

Time: 3 hours

Max.Marks: 60

(Answer all Six Units **6 X 10 = 60** Marks)

PART-A

Answer any one question.

1X 24 = 24 Marks

1 Design a short column, with effect length 3.6 m, capable of safety resisting the following factored loads effects (under uniaxial eccentricity):
   a. Pu = 1665 kN, Mu = 85 kN-m
   b. Pu = 385 kN, Mu = 206 kN-m

   Assume M25 concrete and Fe415 steel. Draw the cross section and elevation details.

OR

2 Design an isolated footing for a column of size 400 mm × 500 mm subjected to an axial service load of 1500 kN. The safe bearing capacity of the soil is 190 kN/m^2. Use M25 concrete and Fe415 steel. Draw the cross-section of the column showing the reinforcement details.

PART-B

Answer any three questions. All carry equal marks.

3 X 12 = 36 Marks

3 Design a rectangle beam from the method of limit state of collapse to resists a bending moment equal to 75 kN-m using M25 concrete and Fe415 grade steel. Overall depth to breadth ratio may be assumed as 1.5.

4 A reinforced concrete beam of rectangular section 300 mm wide is reinforced with four bars of 25 mm diameter at an effective depth of 600 mm. The beam has to resists a factored shear force of 400 kN at support section. Assume f_{ck} = 25 N/mm^2 and f_y = 415 N/mm^2, design vertical stirrups for the section.

5 Determine the shear stress in a 25 mm x 40 mm effective rectangular section if the shear force is 10 kN and torsional moment is 4 kN-m at factored loads. Assume M20 mix and 0.25% tension steel at the given section. State whether torsional reinforcement is required.

6 Design a simply supported roof slab for a room 8 m x 3.5 m clear in size. If the super imposed load is 5 kN/m^2. Use M20 concrete and Fe415 steel.

7 Design a dog legged stair case for an office building in a room measuring 3 m x 6 m clear dimensions. Floor to Floor height is 3.5 m. The building is a public building liable to overcrowding. Stairs are supported on brick wall 230 mm thick at the ends of the landing. Use M20 concrete and Fe415 steel.

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