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15CT51

Fifth Semester B.E. Degree Examination, Dec.2019/Jan.2020
Design of RC Structural Elements

Time: 3 hrs.   Max. Marks: 80

Note: 1. *Answer any FIVE full questions, choosing ONE full question from each module.*
2. *IS 456 – 2000 and SP – 16 is permitted.*

Module-1

1 a. Explain Balanced section, under reinforced section and over reinforced section. **(04 Marks)**
   b. Explain methods of Design for RCC members. **(04 Marks)**
   c. Derive stress Block parameter total compression C and its CG disk $\bar{y}$ **(08 Marks)**

OR

2 A rectangular section 200×500mm on overall is reinforced with 3 bars of 12mm diameter at an effective depth 420mm. Two hangers bars of 12mm diameter are provided at compression face effective span 5m. The beam support a service load 10kN/m. Calculate deflection adopt M20 concrete Fe 415 steel. **(16 Marks)**

Module-2

3 a. A doubly reinforced concrete beam having rectangular cross section 250mm × 500mm is reinforced with 2-12mm dia in compress and 4-20mm dia is tension. Effective cover 40mm effective span 5m. Find ultimate moments adopt M20 concrete HYSD bars. **(08 Marks)**
   b. AT beam having flange 1200 mm × 100mm web 300mm effective depth 550mm is reinforced with steel 2280mm^2. Find ultimate moments adopt M20 concrete FE500 steel. **(08 Marks)**

OR

4 a. A concrete beam 350mm wide 700mm effective depth subjected to factored moment 600kN-m. Effective cover 50mm find steel adopt M20 concrete Fe 415 steel
   Given :

Strain	Sterss
0.002760	351.8N/mm^2
0.003800	360.9 N/mm^2

   (08 Marks)
   b. A T beam has a flange width 1200mm flange thickness 100mm effective depth 600mm web 300mm. Find steel for ultimate moment 550 KN-m. Adopt M15 concrete Fe 415 steel. **(08 Marks)**

Module-3

5 Design a T beam slab floor reinforced concrete, thickness of slab 150mm beam are spaced 3m C/C diameter span of beam 10m bearing 450mm live load 4kN/m^2. Design intermediate T beam for flexure, shear and check for bond and deflection. Adopt M20 concrete Fe 415 steel. **(16 Marks)**

OR

6 A hall measuring 16m × 6m beam are spaced 4m C/C slab thickness 120mm live load 5kN/m^2 including floor finish. Design the T beam for flexure and shear adopt M20 concrete Fe415 bearing 500mm. **(16 Marks)**

Module-4

7 Design a slab over a room of 5.5m × 4m live load 4kN/m² floor finish 1.0 kN/m² M15 concrete Fe 415 steel Edges restrained corners held down design the slab for flexure check the shear, sketch the detail of reinforcement. **(16 Marks)**

OR

8 Design the stair for an office building in a room measuring 3.5m×5.5m distinguish between the floor 3.75m live load 3kN/m² adopt M20 concrete Fe 5415 steel. **(16 Marks)**

Module-5

9 a. Design a RCC column to support ultimate load 1800kN E length 1.85m Adopt M20 concrete Fe 415 steel. **(10 Marks)**

b. A column 300×400mm supporting an ultimate load 1200kN ultimate moment 200kN-m. Find steel adopt M20 concrete Fe 415 steel. Assume 50mm E. cover. **(06 Marks)**

OR

10 A square column 400mm × 400mm carries a load of 1000kN. Design the footing SBC of soil 100kN/m². Adopt M20 concrete Fe 415 steel check shell be carried due for shear, bond and Transfer of load at column base. **(16 Marks)**

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