

Reg. No:

--	--	--	--	--	--	--	--	--	--

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

B.Tech III Year I Semester Supplementary Examinations December-2021

DESIGN & DRAWING OF REINFORCED CONCRETE STRUCTURES
(Civil Engineering)

Time: 3 hours

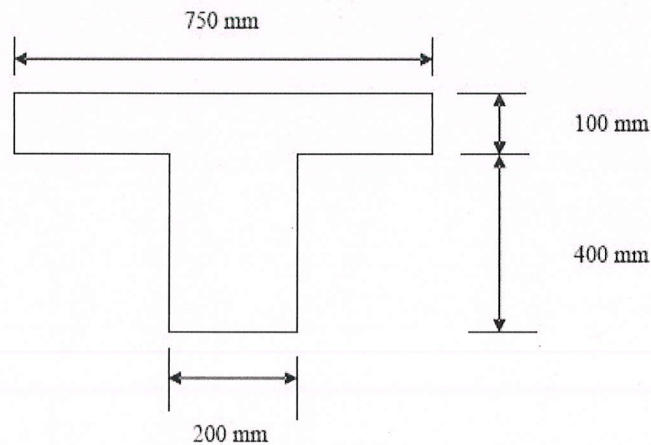
Max.Marks: 60

PART-A

Answer any one question

1X 24 = 24 Marks

- 1 Calculate the amount of steel required in a T- beam to develop a moment of resistance of 300kNm at working loads. The dimensions of the beam are given in Fig. Use M20 mix and Fe415 grade steel. Draw the cross-section of the beam showing reinforcement details.

**OR**

- 2 Design a slab over a room 4.5m x 6m as per IS code. The slab are simply supported on masonry walls all round, with adequate restrained at corners are held down. The live load on the slab is 3kN/m². The slab has a bearing of 150mm on supporting walls. Use M20 concrete and Fe415 steel. Draw the cross-section of the slab with reinforcement details.

PART-B

Answer any three questions. All carry equal marks.

3 X 12 = 36 Marks

- 3 A reinforced concrete beam of rectangular section has a width of 250mm and an effective depth of 500mm. The beam is reinforced with 4 bars of 25mm diameter on the tension side. Two of the tension bars are bent up at 45° near the support section. In addition the beam is provided with two legged stirrups of 8mm diameter at 150mm centers near the support. If $f_{ck}=25\text{N/mm}^2$ and $f_y = 415\text{N/mm}^2$, estimate the ultimate shear strength of the support section.
- 4 Determine the shear stress in a 25mm x 40mm effective rectangular section if the shear force is 10kN and torsional moment is 4kNm at factored loads. Assume M20 mix and 0.25% tension steel at the given section. State whether torsional reinforcement is required.
- 5 Design a simply supported two way slab for the roof of a room of clear dimensions 3mx3m using M25 grade concrete and Fe415 grade steel. The corners are not prevented from lifting. Width of supporting walls around is 320mm. Live load on the slab is 1.5kN/m² weight of weathering course is 1.75kN/m².
- 6 Design a circular column with helical reinforcement subjected to 1600kN. The column has

unsupported length of 3.6m and is effectively held in position at both ends but not restrained against rotation. Use M25 grade concrete and Fe415 steel.

- 7 A square RCC column 400mm x 400mm carries a working load of 650kN axially. Design a square footing if SBC of soil is 225kN/m². Use M25 grade concrete and Fe 500 grade steel. Use limit state method.

*** END ***