



Max. Marks: 70

III B. Tech I Semester Supplementary Examinations, February-2022 DESIGN AND DRAWING OF REINFORCED CONCRETE STRUCTURES

(Civil Engineering)

Time: 3 hours

Answer any ONE Question from Part – A and any THREE Questions from Part – B Use of IS: 456-2000 and design charts from SP-16 is allowed. For all designs adopt Limit State Method

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PART-A

- Design a continuous R.C. slab for a class room 8 m wide and 16 m long. [28] The roof is to be supported on R.C.C. beams spaced at 4 m intervals. The width of beam should be kept 230 mm. The superimposed load is 3kN/m² and finishing load expected is 1.5kN/m². Use M20 concrete and Fe415 steel. Sketch the reinforcement details for slab.
- 2. Design a reinforced concrete footing for a column of section [28] 350 mm × 350 mm which is subjected to an axial load of 1000 kN and uniaxial moment of 350 kN.m at service state. Consider weight of soil = 20 kN /m³, angle of repose = 30°, allowable bearing capacity of soil = 150 kN/m³, concrete of grade M20 and steel of grade Fe 415. Sketch the reinforcement details for footing.

PART-B

- 3. Find the cross sectional area of concrete and steel for a R.C simply [14] supported rectangular beam of effective span 4 m, carrying dead load 2 kN/m and live load 4 kN/m. Use concrete grade M20 and HYSD steel Fe415. Use working stress method. Assume the following data: Steel Young's modulus Es = 2.1x10⁵ MPa, modular ratio m = 13 and clear cover = 40mm.
- 4. The T beam floor consists of 12 cm thick R.C. slab monolithic with [14] 30 cm wide beams. The beams are spaced at 3.5 m center to center and their effective span is 8 m. If the superimposed on the slab is 6.5kN/m², design an intermediate beam and an end beam. Use M20 mix and Fe 415 grade steel.
- 5. A 50 mm × 450 mm effective depth beam is having 4 HYSD bars of [14] 18 mm diameter at centre with 2 bars bent up at 450 and carried at the top near the support and two continued near the end. In addition two legged vertical stirrups of 8 mm diameter HYSD steel are also provided at 150 mm spacing. Determine the shear resistance of the beam. Assume M25 concrete and Fe 415 grade steel.

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(42 Marks)

(28 Marks)





- A T-beam of effective width of flange width 120 mm, thickness of flange, [14] 120 mm width of web 300 mm, effective depth 600 mm, main reinforcement of 8 bars 25 mm, M20 and Fe415 are used. Determine the short term maximum deflection if it is subjected to service load 40 kN/m, when used as simple supported beam of span 6 m.
- Design the reinforcements in a circular column of diameter 350 mm [14] with helical ties to support a factored load of 1600 kN. The column has an unsupported length of 3.5 m and is braced against side sway. Adopt M-25 grade concrete and Fe-500 grade reinforcement.

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