

SECTION-B

- Q.2 Explain the various types of shear failures and shear design of R.C.C beams.
- Q.3 A rectangular beam 250 mm wide and effective depth 500 mm has 4 bars of 22 mm diameter. Find the position of the neutral axis, the lever arm, the forces of compression and tension and the actual moment of resistance, if concrete is M20 mix and steel is Fe 415 grade.
- Q.4 A T beam has flange dimensions 1500×120 mm. The width of rib is 250 mm and rib depth is 350 mm. If the beam is reinforced with 1900 mm^2 of steel in tension zone with an effective cover of 40 mm, determine the maximum allowable udl inclusive of self-weight over a simply supported span of 6m. M20 grade concrete and Fe 415 steel is used.
- Q.5 At a particular cross section of R.C beam $300 \text{ mm} \times 600 \text{ mm}$ in size, a factored bending moment of 120 kN/m, a factored shear force of 100 kN and a factored torsion moment of 60 kN/m are acting. Design the necessary reinforcements using M25 concrete and Fe415 HYSD bars.
- Q.6 Design a one way continuous slab of span 3.6 m, if imposed load is 3 kN/m^2 and finishing load is 1 kN/m^2 . Assume width of beams as 250 mm. Use M20 concrete and Fe415 steel.

SECTION-C

- Q.7 Explain the three design philosophies of reinforced concrete structural elements.
- Q.8 An RC beam, 230 mm X 600 mm of effective span 6m. Effective cover for reinforcement should be 50 mm. Imposed load on the beam is 40 kN/m. Use M20 grade concrete and Fe415 steel.
- Q.9. Design a reinforced concrete slab of size 6m X 4m whose one short edge is discontinuous and corners are restrained at supports. The slab has to carry a live load of 3 kN/m^2 and a floor finish of 1 kN/m^2 . Use M20 concrete and Fe415. Sketch the details of reinforcements.

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