Roll No. | | | | | | | | | | | | |

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech.(CE) (2011 Onwards) (Sem.–4)

DESIGN OF CONCRETE STRUCTURES-I

Subject Code : BTCE-403

M.Code : 56085

Time : 3 Hrs. Max. Marks : 60

INSTRUCTION TO CANDIDATES :

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.**
3. **SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.**

SECTION-A

Q.1 Answer briefly :

(a) What is the purpose of serviceability requirements?

(b) Why is the span to effective depth ratio of slabs larger than that of beams?

(c) What is lever arm?

(d) What are minimum cover requirements for slabs, beams and columns?

(e) What is bond stresses? Explain.

(f) Define characteristic strength.

(g) Distinguish between *'Factor of Safety'* and *'Partial Safety Factor'*.

(h) Define development length.

(i) How limit state method differs from working stress method.

(j) What is the maximum diameter and spacing of reinforcement in two-way RCC slab?

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 300mm × 600 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 3KN/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.

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.