

Code: CE5T1

**III B.Tech - I Semester – Regular/Supplementary Examinations
October 2017**

**DESIGN AND DRAWING OF CONCRETE
STRUCTURES - I
(CIVIL ENGINEERING)**

Duration: 3 hours

Max. Marks: 70

Use of IS:456-2000 and design charts from SP-16 are allowed.

PART – A

Answer any **ONE** question.

1 x 28 = 28 M

1. Design (tensile reinforcement, shear reinforcement, other detailing) a section of beam 50cm wide and 70 cm deep subjected to bending moment of 200 KNm, twisting moment of 15 KNm and a shear force of 150 kN at ultimate condition. Use M20 mix and Fe415 grade steel. Do necessary checks as and when required. Sketch the details of reinforcement.

(OR)

2. Design a short column under biaxial bending with the following data: Size of column 45 cm X 45 cm; Factored load of 1000 kN; Factored moments are 75 kNm and 60 kNm with respect to x axis and y axis respectively. Assume M25 grade concrete and Fe415 grade steel. (Note: Moments due to minimum eccentricity are less than the values given above. Sketch the reinforcement details.

PART-B

Answer any **THREE** questions. All questions carry equal marks.

3 x 14 = 42 M

3. a) Define the term Modular ratio. Determine its value for M25 grade concrete. 4 M
- b) Name the various types of sections in a singly reinforced rectangular beams based on the quantity of steel. How do you identify each in working stress method? 6 M
- c) State any four assumptions made in working stress method of designing flexural members. 4 M
4. a) Draw the stress-strain curve of steel bars with and without definite yield point and indicate the yield stress f_y of them. 10 M
- b) Define design strength of a material and design load. 4 M
5. A reinforced concrete beam 250 mm wide and 400 mm effective depth is subjected to ultimate design shear force of 150 kN at the critical section near supports. The tensile reinforcement at the section near supports is 0.5 percent. Design the shear stirrups near the supports. Also, design the minimum shear reinforcement at the mid span. Assume concrete of grade M 20 and mild steel bars of Fe 250 grade. Span of beam is 4.5 m. 14 M

6. a) A short column 400mm X 400mm is reinforced with 4 numbers of 25mm dia. Find the axial factored load that the column can carry. The materials are M20 grade concrete and HYSD reinforcement Fe415. 8 M
- b) Define the terms Long column and Short column. Also mention how the above columns fail. 6 M
7. Design a simply supported RCC slab for a room of clear dimension 3 m x 8 m, width of support is 250 mm. Superimposed load is 2 kN/m² and weight of finishes is 1 kN/m². Use M25 concrete and HYSD bars of Fe415 grade. Check for deflection. 14 M