

Code: CE5T1

III B.Tech - I Semester – Regular Examinations – December 2016

**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 is allowed.

PART – A

Answer any **ONE** question.

1 x 28 = 28 M

1. Design an L-beam for an office to suit the following data.
Clear span = 7m
Distance between column c/c = 7.45 m
Spacing of T-beam ribs = 2.75 m c/c
Thickness of slab = 100 mm
Materials: M20 grade concrete and Fe 250 steel.
L-beams are supported on RC columns. Sketch the details of reinforcements.
2. Design a continuous RC slab for a hall 6 m and 13.5m long.
The slab is supported on RCC beams each 250mm wide which are monolithic. The ends of the slab are supported on walls 300mm wide. Design the slab for a live load of 2.75 kN/m². Assume the weight of roof finishing equal to 1.5 kN/m². Use M20 concrete and Fe 415 steel. Sketch the reinforcement details. Assume mild exposure condition.

PART – B

Answer any **THREE** questions. All questions carry equal marks. 3 x 14 = 42 M

3. a) Explain the principles of:
- i) Working stress method.
 - ii) Limit state method
- b) Design a simply supported singly reinforced rectangular beam to carry 10 kN/m superimposed load over a span of 5m on 330mm wide supports. Use M20 grade concrete and FE 415 grade steel. Check the design for all necessary conditions. Use working stress method.
4. a) Derive the stress-block parameters.
- b) Explain how the variations in loads and material strength have been accounted in the limit state method.
5. A rectangular beam 250mm wide is subjected to the following at a section
- Sagging bending moment of 35 kN-m.
 - Shear force of 27 kN.
 - Torsional moment of 25 kN-m.
- Use M25 and Fe 415 steel. Design a suitable section and find the reinforcement required in the section. Sketch the reinforcement details.

6. Design the reinforcement for a column having a cross-section of 300×520 mm and effective length of 3.6 m subjected to a factored axial load 1280 kN with biaxial moments of 200 kNm and 120 kNm with respect to major and minor axes respectively. Use M30 concrete and Fe 415 steel. Sketch the reinforcement details. Assume moderate exposure condition.

7. Design a two way slab for a room 5.5 m x 4m clear in size for a superimposed load 5 kN/m^2 . All the edges are Simply supported and corners are not held down. Use M 20 concrete and Fe 415 steel.