R13

Code: 13A01502

B.Tech III Year I Semester (R13) Supplementary Examinations June 2017
DESIGN & DRAWING OF REINFORCED CONCRETE STRUCTURES
(Civil Engineering)

Time: 3 hours   Max. Marks: 70

Use of IS 456:2000 and only design charts for columns (sp-16) is allowed.

PART – A
(Answer any one question: 01 X 28 = 28 Marks)
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1   Design the roof slab for a building of clear dimensions 4 m x 7.5 m with wall thickness 300 mm. The slab is assume that access is provided to the roof. A weathering course of thickness 120 mm and unit weight 15 kN/m^3 is to be provided over the slab. Use M20 and Fe 415 steel. Take edge conditions as two edges continuous two discontinuous.
     Draw the cross section and elevation of the slab showing the reinforcement details.

2   A column of size 500 mm x 500 mm is transmitting a load of 850 kN to a soil having an allowable bearing capacity of 120 kN/m^2. Design a RCC square footing using M20 concrete and HYSD bars as reinforcement.
     Draw the cross section and elevation showing the reinforcement details.

PART – B
(Answer any three questions: 03 X 14 = 42 Marks)

3   A reinforcement concrete cross section of 200 mm width and 400 mm effective depth is provided with 4 numbers of 20 mm bars in tension zone and 3 numbers of 20 mm bars in the compression zone at depth 50 mm from the compression fiber. Determine whether the cross-section is capable of resisting limit moment.

4   A simply supported reinforced concrete beam is subjected to a working bending moment of 700 kNm and a shear force of 200 kN. Design a T-beam cross-section to resist the above forces using the following data: maximum width of flange 1000 mm and thickness of flange 150 mm, use M20 concrete and HYSD-Fe415 bars.

5   A simply supported RC rectangular beam of 350 mm x 750 mm overall size carries an u.d.l of 15 kN/m (inclusive of its self weight) over an effective span of 6.0 m. it is reinforced with 5 numbers of 16 mm dia. Fe 415 HYSD steel bars in tension with a clear cover of 30 mm throughout its length. The concrete is of M20 grade. Design the shear reinforcement in the form of vertical stirrups for the maximum shear force using 8 mm dia. Mild steel bars.

6   A short column, 600 mm x 600 mm in section, is subjected to a factored axial load of 1650 kN. Determine the area of longitudinal steel to be provided, assuming M20 concrete and Fe415 steel.

7   Design the open-well staircase of dimensions 6 m x 6 m. The dimensions of risers and trades are 160 mm and 270 mm respectively. The finish loads and live loads are 1 kN/m^2 and 5 kN/m^2 respectively. Use concrete of grade M20 and steel of grade Fe415.

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