R15

B.Tech III Year I Semester (R15) Regular & Supplementary Examinations November/December 2019
DESIGN & DRAWING OF RCC 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)
*****

1   Design a roof slab for a building of clear dimensions 4 m x 6 m. The slab is supported on walls of thickness 230 mm. A weathering coarse of thickness 120 mm and unit weight 15 kN/m^3 is to be provided over the slab. Use M25 grade of concrete and Fe415 grade steel. Take a condition as two edges continuous and two edges discontinues. Sketch the reinforcement details of cross section and elevation of slab.

OR

2   A reinforced concrete column 400 x 400 mm supports an axial service load of 1000 kN. The safe bearing capacity of soil at site is 200 kN/m^2. Adopt M25 grade of concrete and Fe-415 HYSD bars. Design a suitable footing for the column and sketch the details of reinforcement.

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

3   Design a singly reinforced concrete beam of clear span 6 m when a working live load of 12 kN/m is supported on two masonry walls of thickness 230 mm. Use M25 grade of concrete and Fe-415 grade of steel. Design the beam with all necessary checks.

4   (a) Distinguish between short term and long term deflection in case of RC structures. Mention the main factors affecting these deflections
    (b) A rectangular section 200 x 450 mm overall depth is reinforced with three bars of 16 mm diameter at an effective depth of 420 mm. Two hanger bars of 12 mm diameter are provided at the compressive face. The effective span of the beam is 5 m. The beam supports a service live load of 10 kN/m, If f_{ck} = 20 N/mm^2 and f_y = 415 N/mm^2. Compute short term deflection according to IS:456 code specifications.

5   (a) Design the interior span of a continuous slab for an office floor to suit the following data:
         Slab is continuous over tee- beams spaced at 4.5 m intervals and width of rib is 250 mm
         Superimposed load on the office floor = 4 kN/m^2
         Materials: M20 grade concrete and Fe- 415 HYSD bars.
    (b) Derive the expression to determine the shear strength of RC section.

6   Design a square reinforced column of size 400 mm to carry an ultimate load of 1000 kN at an eccentricity of 160 mm. Use M20 grade of concrete and Fe415 grade of steel.

7   A straight stair in a residential building is supported on wall one side and stringer beam on other side. The risers are 150 mm and treads are 250 mm, and the horizontal span of the stairs may be taken as 1.2 meters. Design the steps, use M25 grade of concrete and Fe415 HYSD bars.

*****