



Code No. : 6080/S

FACULTY OF ENGINEERING
B.E. 3/4 (Civil) I Semester (Suppl.) Examination, July 2014
REINFORCED CEMENT CONCRETE

Time: 3 Hours]

[Max. Marks: 75

Note: Answer *all* questions from Part – A and *any five* questions from Part – B.

PART – A

1. What is the limitation for the shear resistance of bent-up bars to be considered as per code of practice ? 2
2. Explain the function of longitudinal and lateral reinforcement in columns. 2
3. What is Punching Shear ? How it is taken care in the design of footing ? 2
4. Write about the advantages of T-Beams. 2
5. Explain how the torsional moment is considered in the design of beams. 2
6. What is segregation of concrete ? What measures are required to prevent segregation of concrete ? 3
7. What is limit state and what is a balanced design and why it is preferred ? 3
8. What is splicing of reinforcement, why it is required and show how it is done ? 3
9. Explain what are restrained and unrestrained slabs, how the restraints are provided ? 3
10. Explain the Bi-axial bending of columns and the design procedure. 3

PART – B

(50 Marks)

11. A R.C.C. beam of 250 mm × 650 mm is reinforced with 4 bars of 16 mm dia., 2 bars are bent up and the beam is subjected to a shear of 80 kN. Design the shear reinforcement as per the code of practice and check for the development length, assume 300 mm support width. The grade of concrete is M25 and steel is Fe415. Use working stress method. Sketch the details.



12. A concrete beam has 230 mm width and 500 mm overall depth and is subjected to an ultimate bending moment of 240 kNm. Design the beam assuming 40 mm effective cover. Use M20 concrete and Fe 415 steel.
13. A hall 15 m×6 m is provided with beams spaced at 3 m c/c cast integrally with a RCC slab 110 mm thickness and subjected to an all inclusive ultimate load of 90 kN/m. Design an intermediate beam assuming the width as 280 mm and ends as simply supported. Adopt M 20 concrete and Fe 415 steel.
14. Design a helically reinforced circular column for an axial ultimate load of 1600 kN. The effective length of the column is 2.75 m. Use M20 concrete and Fe 415 steel.
15. Design a two way slab using IS code method for a room 5m×3.5 m clear in size with two adjacent edges discontinuous and carries a superimposed load of 6 kN/m². Use M20 concrete and Fe 415 steel.
16. A simply supported beam of width 230 mm and 500 mm overall depth is subjected to an all inclusive service load of 20 kN/m over an effective span of 5m. The tensile reinforcement consists of 5 bars of 16 mm dia. at an effective cover of 35 mm. The effective moment of inertia of the section is $1536 \times 10^6 \text{ mm}^4$ and the short term deflection is 4.73 mm. Find the long term deflection and check for safety.
17. a) Draw neat sketches showing the three cases of possible position of neutral axis and the corresponding stress diagrams in the design of T-Beams. Write expressions for each of them.
b) What is the effective span to be considered to calculate the bending moment in a dog-legged staircase ?
c) Write the properties of yield lines.