

5E1742**5E1742**

B.Tech. V-Sem. (Main&Back) Examination, November/December - 2025
Civil Engineering
5CE4-03 Design of Concrete Structures

Time : 3 Hours**Maximum Marks : 70****Instructions to Candidates:**

Attempt all Ten questions from Part A, Five questions out of seven questions from Part B and Three questions out of five questions from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

*Use of following supporting material is permitted during examination.
(Mentioned in form No. 205).*

PART - A

(Answer should be given up to 25 words only)

All questions are compulsory.

(10×2=20)

1. Define the characteristics strength of concrete. (2)
2. Define the modular ratio. (2)
3. What is the working stress design philosophy? (2)
4. What is meant by "Limit State of Collapse in Flexure"? (2)
5. Distinguish between one-way and two-way slabs. (2)
6. What is a Pu-Mu interaction Curve? (2)
7. Write the IS code provision for torsional moment. (2)
8. Define a short column. (2)
9. What is anchorage length? (2)
10. List two advantage of LSM over WSM. (2)

PART - B

(Analytical / Problem Solving Questions)

Attempt any Five questions.

(5×4=20)

1. Discuss the IS: 456-2000 provisions for design of beam subjected to combined bending, shear and torsion. (5)

2. Explain the design principles of isolated column footings and combined footings with sketches. (5)
3. With neat sketches, explain detailing rules for reinforcement in slabs. (5)
4. Write short note on:
 - a) Minimum and maximum reinforcement requirement in beams. (2.5)
 - b) Curtailment of reinforcement in beams. (2.5)
5. Discuss the difference between simply supported, continuous and cantilever slabs with their design consideration. (5)
6. A T-beam floor system has a flange thickness of 120 mm, flange width of 1200 mm, web width 250 mm and effective depth 550 mm. Determine the ultimate moment of resistance using M25 and Fe-415. (5)
7. Determine the ultimate moment of resistance of a rectangular beam of width 350 mm with 550 mm effective depth which is casted with M30 grade of concrete and reinforced with 4 numbers of 25 mm diameter bars of Fe-250 steel grade. (5)

PART - C

(Descriptive / Analytical / Problem Solving / Design Questions)

Attempt any Three questions.

(3×10=30)

1. A beam carries a uniformly distributed service load 35 kN/m including self weight on a simply supported span of 5m. The beam width is 300 mm and effective depth is 640 mm and is reinforced with 4-25 ϕ Fe-415 bars. Determine the stress developed in concrete and steel at service load use M20 concrete. (10)
2. Design a doubly reinforced beam by limit state method of span 8m which is being subjected to a live load 30 kN/m. Overall depth of the beam is limited to 650mm. Use M20 concrete and Fe 415 steel. (10)
3. A RC rectangular beam of size 350mm × 450mm effective depth is subjected to a flexural moment of 25 kNm, a shear force of 55 kN and a torsional moment of 40 kNm using M20 concrete and Fe 415 steel design the reinforcement for the beam. (10)
4. Design a short column to carry a working, axial load of 450 kN. Use M20 concrete and Fe 250 steel. The unsupported length of the column is 4m and effective length factor is 0.85 use sp-16. <https://www.rtuonline.com> (10)
5. Design a spread footing to carry an axial load of 1200 kN through a column of size 450mm × 450mm having 4-25 ϕ bearing capacity of soil is 105 kN/m². Assume footing to be 1.25m below ground level and concrete of grade M25 and Fe 415 steel. (10)