



R20 Regulation

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous, Accredited by NAAC with 'A' Grade)

Subject code: 3P5AC

B.Tech V Semester Regular Examinations, January 2023

DESIGN OF REINFORCED CEMENT CONCRETE STRUCTURES
(Civil Engineering)

Maximum Marks: 70

Date: 11.01.2023 Duration: 3 hours

- Note:
1. This question paper contains two parts A and B.
 2. Part A is compulsory which carries 20 marks. Answer all questions in Part A.
 3. Part B consists of 5 Units. Answer any one full question from each unit which carries 10M.
 4. Each question carries 10 marks and may have a, b, c, d as sub questions.

NOTE: IS456-2000 CODE BOOK IS ALLOWED FOR EXAMINATION.

Part-A

All the following questions carry equal marks

(10x2M=20 Marks)

- 1 Differentiate between under reinforced and over reinforced section?
- 2 Is modulus of rupture of concrete equal to its direct tensile strength?
- 3 What is primary torsion and secondary torsion with examples?
- 4 What is the significance of development length in RCC members?
- 5 What are the code limits for minimum and maximum reinforcement in column?
- 6 What is a slender column?
- 7 Write the advantages of helically reinforced columns?
- 8 How do you check for shear in slabs
- 9 Distinguish between (i) allowable soil pressure, (ii) gross soil pressure
- 10 What are the advantages of providing pilecap?

Part-B

Answer All the following questions.

(5X10M=50Marks)

- 11 Explain in details about stress strain diagram of concrete and steel material.
(10M)

OR

- 12 Design the flexural reinforcement for the beam that its size is limited to 250mm x 400mm and that it has to carry, 15KN/m including self-weight, Span of beam is 4.5m. Assume that the beam is subjected to moderate exposure conditions
(10M)

- 13 Design the rectangular beam section, 350mm wide and 750mm deep, subjected to an ultimate bending moment of 200 kN-m and an ultimate shear of 110kN. Assume M25 concrete and Fe415 steel and mild exposure conditions
(10M)

OR

- 14 A simply supported RC beam of section 300 mm x 500 mm (effective depth) is subjected to an ultimate shear force of 150 kN at the supports. The beam is reinforced with 4 bars of 20 mm diameter. Design the shear reinforcement. Sketch the shear reinforcement details. Use M 20 concrete and Fe 415 steel.
(10M)

- 15 Design an axially loaded tied column with an unsupported length of 3 m. The column is fixed at one end and pinned at the other end. The column has to carry a factored load of 2200 kN. Use M 25 grade concrete and Fe 415 grade steel. Sketch the reinforcement details. (10M)

OR

- 16 Explain in details about Axial, Uniaxial and Biaxial loaded columns with neat sketches. [10]
- 17 A RCC slab is built integrally with its supports and consists of two equal spans, each with clear span of 5m. The service live load is 5.1 kN/m^2 , $f_{ck} = 28 \text{ Mpa}$ and $f_y = 420 \text{ Mpa}$. Design the slab. (10M)

OR

- 18 Design a simply supported slab to cover a room with internal dimensions of 4m X 5m and 230mm thick brick walls all around. Assume a live load of 3 kN/m^2 and a floor finish of 1 kN/m^2 . Use M20 concrete and Fe415 steel. Assume that the slab corners are free to lift up. Assume mild exposure conditions. (10M)
- 19 Design the footing for a rectangular column $300 \text{ mm} \times 450 \text{ mm}$ subjected to an axial load of 900 kN. Assume the bearing capacity of soil is 180 kN/m^2 . Use M 20 concrete and Fe 415 steel. (10M)

OR

- 20 ~~Design~~ Describe a circular footing for circular column of 500mm diameter subjected with a service load of 1200kN use M25 and Fe 415 steel. take $SBC = 200 \text{ kN/m}^2$ (10M)