*R20 Regulation* *Subject code:3P5AC*

# TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

## B.Tech V Semester Supplementary Examinations, May 2025

## DESIGN OF REINFORCED CEMENT CONCRETE STRUCTURES

*(CE)*

***Maximum Marks: 70*** Date: 23.06.2025 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.**
**4. Each question carries 10 marks and may have a, b, c, d as sub questions.**

Part-A

| All the following questions carry equal marks (10X2M=20 Marks) | | Marks | CO | BTL |
|---|---|---|---|---|
| 1 | Write the classifications available in serviceability limit state? | 2M | 1 | L1 |
| 2 | Differentiate between under reinforced and over reinforced beam. | 2M | 1 | L1 |
| 3 | Write about primary and secondary torsion with examples | 2M | 2 | L1 |
| 4 | What is short and long column. | 2M | 2 | L1 |
| 5 | Assess the minimum number of steel rods for different types of columns. | 2M | 3 | L1 |
| 6 | Write the advantages of helical reinforced columns? | 2M | 3 | L1 |
| 7 | Distinguish between the behavior of one way and two way slabs | 2M | 4 | L1 |
| 8 | Write the different types of staircase | 2M | 4 | L1 |
| 9 | Write about eccentric loading on a footing. | 2M | 5 | L1 |
| 10 | Compare one way footing and two way footing in foundation? | 2M | 5 | L1 |

Part-B

| Answer All the following questions. (5X10M=50Marks) | | Marks | CO | BTL |
|---|---|---|---|---|
| 11 | Explain the basic concept behind reinforced cement concrete with a neat sketch. | 10M | 1 | L2 |
| | OR | | | |
| 12 | A rectangular RC section having a width of 350mm is reinforced with 2 Nos of 28 mm dia. bars at an effective depth of 550mm. Use M20 concrete and Fe 415 steel. Determine the ultimate moment of resistance of the section. | 10M | 1 | L2 |
| 13 | What are the types of reinforcements used to resist shear? Explain the action ofdifferent types of shear steel in resisting shear. | 10M | 2 | L2 |
| | OR | | | |
| 14 | Design a singly reinforced beam of effective span 5.3 m carrying load of 10 kN/m (including self weight). Take grade of concrete and steel as M20 and Fe415. Assume width of the beam = ½ of depth. Assume if any data required. | 10M | 2 | L2 |
| 15 | Design a short circular column of diameter 350 mm to support a factored axial loadof 1200 kN, together with a factored moment of | 10M | 3 | L2 |

| | | | | |
|---|---|---|---|---|
| | 100kNm. Adopt M20 grade concrete and Fe415 HYSD bars. | | | |
| | OR | | | |
| 16 | Explain in detail about Axial, Uniaxial and Biaxial loaded columns with neat sketches. | 10M | 3 | L2 |
| 17 | Design a dog legged staircase for a building in which vertical distance between floor is 3.6m, live load is 3kN/m$^2$, landing width is 1.25m, support thickness is 230mm. Adopt M20 concrete and Fe 415 steel. | 10M | 4 | L2 |
| | OR | | | |
| 18 | Design a two way slab for an office floor size 3.5m x 4.5m with discontinuous and simply supported edges on all the sides with corners prevented from lifting and supporting service live load if 4.5kN/m$^2$. Adopt M20 and Fe 415. | 10M | 4 | L2 |
| 19 | What is pile. Write different types of pile. | 10M | 5 | L2 |
| | OR | | | |
| 20 | Design an isolated square footing to carry column load 600 kN and moment 30 kN-m respectively. Assume safe bearing capacity of soil 120 kN/m$^2$ . Use M25 and Fe415. Apply relevant design checks for strength and serviceability conditions. (Use Limit State Method). Neatly sketch the footing section and detail the reinforcement and connection between the column and footing. | 10M | 5 | L2 |