*R22 Regulation* *Subject code: 4E5AB*

# TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

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

## DESIGN OF REINFORCED CONCRETE STRUCTURES

*(CE)*

***Maximum Marks: 60*** Date:19.06.2025 Duration: 3 hours

**Note:** **1.This question paper contains two parts A and B.**
**2. Part A is compulsory which carries 10 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 (10X1M=10 Marks) | | Marks | CO | Bloom Tx |
|---|---|---|---|---|
| 1.a) | Differentiate between under reinforced and over reinforced section. | 1M | 1 | II |
| b) | Define lever arm and moment of resistance. | 1M | 1 | I |
| c) | Write about local bond and anchorage length. | 1M | 2 | I |
| d) | Define bond stress. | 1M | 2 | I |
| e) | Define continuous slabs. | 1M | 3 | III |
| f) | State the classification of slabs. | 1M | 3 | I |
| g) | Differentiate between long and short column. | 1M | 4 | II |
| h) | Define slenderness ratio. | 1M | 4 | I |
| i) | Write the classification of footing with respect to shape. | 1M | 5 | I |
| j) | State the types of piles. | 1M | 5 | I |

Part-B

| Answer All the following questions. (5X10M=50Marks) | | Marks | CO | Bloom Tx |
|---|---|---|---|---|
| 2 | Derive Stress Block Parameters as per the Limit State Method? Compare 'Working Stress Method' and Limit State Design of RCC Structures. Explain the answer with suitable examples. | 10M | 1 | V |
| | OR | | | |
| 3 | Design a singly reinforced section for a simply supported beam of effective span 5 m carrying an imposed load of 10 kN/m. Use M30 grade concrete and Fe 500 grade steel. Assume mild exposure condition. Adopt working stress method. Design reinforcement for flexure and shear. Sketch the reinforcement details. | 10M | 1 | VI |
| 4 | A rectangular simply supported beam of span 5m is 300mm x 650mm in cross section and is reinforced with 3 bars of 20mm on tension side at an effective cover of 50mm. Determine the short term deflection due to an imposed working load of 20kN/m, (excluding self wt). Assume grade of concrete M20 and grade of steel as Fe415. | 10M | 2 | V |
| | OR | | | |

| | | | | |
|---|---|---|---|---|
| 5 | Illustrate the basic concepts of shear and bond in R.C.C. sections with respect to: (a)Diagonal shear failure. (b)Shear – bond failure. (c) Flexure bond. | 10M | 2 | II |
| 6 | Differentiate between one way slab and two way slab? Explain briefly with neat figures? | 10M | 3 | II |
| | OR | | | |
| 7 | Design a slab for a room of clear internal dimensions 3m x 5m supported on walls of 300mm thickness, with corners held down. Two adjacent edges of the slab are continuous and other two discontinuous. Live load on the slab is $3kN/m^2$. Assume floor finish of $1kN/m^2$. Use M20 concrete and steel. Sketch the details of reinforcements. | 10M | 3 | VI |
| 8 | A column 300 mm × 450 mm has an effective length of 4 m. It is subjected to an ultimate load of 1800 kN and an ultimate moment of 350 kNm about its major axis. Determine the longitudinal and transverse reinforcement. Use M30 concrete and Fe 500 grade steel. Assume moderate exposure condition. Sketch the cross-section showing reinforcement details. | 10M | 4 | V |
| | OR | | | |
| 9 | Explain the procedure for design of columns with biaxial bending. | 10M | 4 | II |
| 10 | a) List the steps involved in the design of combined footings.<br>b) Enumerate the steps for design of combined rectangular footing. | 5M<br>5M | 5 | II |
| | OR | | | |
| 11 | Design the combined footing for two columns each of size 400 mm×400 mm and spaced at 4.2 m centre-to-centre. Each column is required to support an ultimate load of 900 kN. The safe bearing capacity of the soil is 160 kN/m2 . Draw the reinforcement details. | 10M | 5 | VI |