



R22 Regulation

Subject code: 4E5AB

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech V Semester Regular/Supplementary Examinations, November 2025

DESIGN OF REINFORCED CONCRETE STRUCTURES

(CE)

Maximum Marks: 60

Date: 20.11.2025

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.

IS456 & SP16 GRAPHS ARE ALLOWED.

Part-A

All the following questions carry equal marks (10X1M=10 Marks)		Marks	CO	Bloom Tx
1.a)	Why is the steel used as reinforced concrete	1M	1	L1
b)	What do you mean by under and over reinforced section?	1M	1	L1
c)	How can you find out the effective length of a simply supported beam?	1M	2	L3
d)	What is the purpose of a canopy?	1M	2	L1
e)	State the difference between one way slab and two way slab	1M	3	L2
f)	What should be the minimum diameter of bars to be used in slabs?	1M	3	L1
g)	What should be the minimum and maximum percentage of steel to be taken for a design of a column	1M	4	L1
h)	State the IS requirement of bar size in column design	1M	4	L1
i)	What is the purpose of a pile cap?	1M	5	L1
j)	What are the different types of footings?	1M	5	L1

Part-B

Answer All the following questions. (5X10M=50Marks)		Marks	CO	Bloom Tx
2	Design a balanced singly reinforced concrete beam with a span of 6m to carry a dead load of 4kN/m and working live load of 5 kN/m. Use M25 mix and steel is of Fe 415 grade steel	10M	1	L5
OR				
3	Compare working stress method and limit state design of RCC structures. Explain the answer with suitable examples.	10M	1	L4
4	Reinforced concrete beam has a support section with a width 250mm and effective depth 500mm. The support section is reinforced with bars of 3-20mm diameter on the tension side. 8mm diameter 2 legged stirrups are provided at a spacing of 200mm centres. Using M20 grade concrete and Fe415 HYSD bars, Calculate the shear strength of support section	10M	2	L3
OR				

5	Design a reinforced concrete beam of size 300 mm x 450 mm simply supported over effective span of 4.5m carrying moment 40kN-m and shear 25kN. The beam is supported by 300 mm thick walls. Use M25 grade concrete and Fe415 steel; design the beam section for shear, bending and serviceability conditions include curtailment of reinforcement and anchorage requirements.	10M	2	L5
6	Design a one-way slab with a clear span of 3.5m, simply supported on 200mm thick concrete masonry walls to support a live load of 4kN/m ² . Adopt M-20 grade of concrete and Fe-415 HYSD bars, Floor finish load 1.2kN/m ² .	10M	3	L5
OR				
7	Design one of the flights of a dog-legged stairs spanning between landing beams using the following data. Type of stair case: dog legged with waist slab, treads and risers. No. of steps in the flight = 10 Tread T = 300mm Rise R = 150 mm Width of landing beams = 300mm Use M20 concrete and Fe 415 steel.	10M	3	L5
8	Design the reinforcement in a circular column of diameter 300mm to support a service axial load of 800kN. The column has an unsupported length of 3m and is braced against side sway. The column is reinforced with helical ties. Assume M25 concrete and Fe 415 steel.	10M	4	L5
OR				
9	Design the reinforcement in a column of size 400 mm x 600 mm subjected to an axial load of 2000 kN under service dead load and live load. The Column has an unsupported length of 4.0 m and effectively held in position and restrained against rotation in both ends. Use M 25 concrete and Fe 415 steel.	10M	4	L5
10	Explain various types of footings with respect to shape and design.	10M	5	L5
OR				
11	Design an isolated square footing for a column 450mm x 450mm reinforced with 8- 20 mm diameter bars carrying a service load of 2000 kN The bearing capacity of soil is 250 kN/m ² . Assume M20 grade concrete and Fe 415 grade steel.	10M	5	L5