



R22 Regulation

Subject code: 4E5AB

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech V Semester Regular Examinations, December 2024**DESIGN OF REINFORCED CONCRETE STRUCTURES**

(CE)

Maximum Marks: 60

Date: 28.12.2024

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.
 5. IS456 and graphs for column design from SP-16 (Books should have signed with stamp of HOD)

Part-A		CO	Bloom Tx
All the following questions carry equal marks (10X1M=10 Marks)			
1.a)	What is meant by 'Stress'.	1	I
b)	What do you understand by limit state of collapse?	1	I
c)	Explain the term Diagonal tension cracks.	2	II
d)	Bring out the differences between primary torsion and secondary torsion.	2	II
e)	State the classification of slabs.	3	I
f)	What are the Span/Depth ratio in two way slabs for both simply supported slab and continuous slabs?	3	I
g)	Define slenderness ratio?	4	I
h)	What is meant by short column and long column?	4	I
i)	What are the situations in which the combined footings are preferred to isolated footings?	5	I
j)	How do you select the depth of a footing? What critical section in footing do you check for safety against shear?	5	IV
Part-B			
Answer All the following questions. (5X10M=50Marks)		CO	Bloom Tx
2	Determine the moment of resistance of a doubly reinforced concrete beam section, 300 mm wide and 400 mm effective depth, reinforced with 2 bars of 16 mm diameter in compression zone and 3 bars of 20 mm diameter in tension zone. Use M 25 grade concrete and Fe 500 steel. [10M]	1	V
OR			
3	A simply supported R.C. beam, 300mm wide and 700mm deep, carries a factored UDL of 100 kN/m ² including self weight over a span of 6 m. Design reinforcement with vertical stirrups. Take M25 grade concrete and FE-415 steel Effective cover is 50 mm. [10M]	1	VI

4	A rectangular simply supported beam of clear span 4.5m is 300mm x 300mm in cross-section. It is reinforced with 4 bars of 20mm diameter. M20 concrete and Fe415 steel is used. The effective cover is 40mm, taking superimposed live load as 25 kN/m and dead load as 15 kN/m, calculate the short term and long term deflections of the beam. [10M]	2	V
	OR		
5	(a) Explain in detail about causes of cracking in concrete. [5M] (b) Explain about long-term deflections. [5M]	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	Design a circular column of diameter 300mm to carry a factored axial load of 1500kN by using helical reinforcement. Use M25 concrete and Fe500 steel. Sketch the reinforcement details. [10M]	4	VI
	OR		
9	Design the reinforcement of a 450 mm x 450 mm column of unsupported length 4.2 m subjected to an axial load of 1600 kN with bi-axial moments 150 kNm and 100 kNm. Use M 25 concrete and Fe 500 steel. Sketch the reinforcement details. [10M]	4	VI
10	Design a rectangular isolated sloped footing for column of size 360mm x 660 mm carrying an axial load of 2500 kN. The SBC of the soil is 260 kN/m ² . Use M25 grade concrete and Fe415 grade steel. Sketch the reinforcement details. Assume mild exposure conditions. [10M]	5	VI
	OR		
11	a) List the types of footings with respective design. [5M] b) Enumerate the steps for design of combined rectangular footing [5M]	5	II