R20 Regulation *Subject code:3P5AC*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech V Semester Supplementary Examinations, April 2026

DESIGN OF REINFORCED CEMENT CONCRETE STRUCTURES

(CE)

Maximum Marks: 70 Date: 20.04.2026 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	List 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	Define bond stress.	2M	2	L1
5	On what condition intermediate column is more suitable?	2M	3	L1
6	What are the code limits for minimum and maximum percentage of reinforcement in column?	2M	3	L1
7	List out two differences between one way and two way slab.	2M	4	L1
8	What is staircase?	2M	4	L1
9	Define Allowable soil pressure and Gross soil pressure.	2M	5	L1
10	What is pile cap?	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 if any data required.	10M	2	L2
15	Design a circular column of 4 m height is effectively held in position at one end and pinned at other end. The diameter of the column is 400 mm. Calculate the reinforcement if it is required to carry a factored axial load of 1600 kN. Use M30 mix and Fe 500 grade steel.	10M	3	L2

	OR		3	L2
16	Design a uniaxial spiral circular short column for the given below details: Factored axial load = 300KN, Factored bending moment = 80KN, Column size =400mm. Use M30 and Fe 415.	10M	4	L2
17	Design the waist slab type stair case consisting of a straight flight of stairs resting on two stringer beams along the two sides. Assume the span of the slab as 2 m with risers of 160 mm and treads of 270 mm. Live load= 3 kN/m^2. Adopt M20 grade concrete and Fe 415 grade steel.	10M	4	L2
	OR			
18	Design a two way R.C.C slab for a room of size 4.5m x 6.5m is supported at the edges. Assume a live load of 4 kN/m^2. Concrete of M-20 grade and Fe 415 HYSD bars are available for use. Sketch the details of reinforcement in the slab.	10M	4	L2
19	What is footing? Write different types of footings with neat sketches.	10M	5	L2
	OR			
20	Design a combined footing for the two columns of a multistory building. The columns of size 400mm×400mm transmit a working load of 800kN each and theyare spaced at 5m centers. The safe bearing capacity of soil at site is 200kN/m^2. Adopt M-20 grade concrete and Fe-415 grade reinforcement. Sketch the details of reinforcements in the combined footing.	10M	5	L2