R18 Regulation *Subject code:2P5AB*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech V Semester Supplementary Examinations, April 2026

DESIGN OF REINCORCED CEMENT CONCRETE STRUCTURES

(CE)

Maximum Marks: 70 Date: 17.04.2026 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.

Code book IS 456-2000 is allowed

	Part-A			
All the following questions carry equal marks (10X2M=20 Marks)		Marks	CO	BTL
1	What are the different limit states considered in the design of RCC structures?	2M	1	L1
2	Distinguish between balanced section, under reinforced section and over reinforced section.	2M	1	L1
3	State the maximum and minimum requirement of reinforcement for beams in compression.	2M	2	L1
4	What is canopy?	2M	2	L1
5	What are the main factors which govern the strength of a RC column?	2M	3	L1
6	What are the codal specifications for slenderness limits for columns?	2M	3	L1
7	Write about spacing of slab reinforcement.	2M	4	L1
8	Draw a plan of dog legged stair case.	2M	4	L1
9	Write any 3 main requirements of a foundation system for a structure?	2M	5	L1
10	Draw pile cap.	2M	5	L1
	Part-B			
Answer All the following questions. (5X10M=50Marks)		Marks	CO	BTL
11	Explain about working stress method and limit state method	10M	1	L2
	OR			
12	An RCC rectangular beam is reinforced on tension side is 250 mm wide and 450 mm effective depth reinforced with 4 bars of 18 mm diameter. Calculate the moment of resistance by limit state method. Use M15 concrete and mild steel (Fe250).	10M	1	L2
13	Write about philosophy of limit state of design.	10M	2	L2
	OR			
14	Write about design of canopy in detail.	10M	2	L2
15	Design a short column using M15 grade of concrete and mild steel reinforcement to carry an axial load of 800 kN by using limit state method.	10M	3	L2
	OR			

16	Find the safe load on a short circular column of 400 mm diameter and 4 m long. The column is reinforced with 6 longitudinal bars of 16 mm dia. The column carries lateral ties. The column is effectively held in position at both ends, but not restrained against rotation. Use M20 grade of concrete and Fe415 grade of steel.	10M	3	L2
17	Design a one way slab, with a clear span of 4 m simply supported on 230 mm thick masonry walls and subjected to a live load of 4 kN/m^2 and a surface finish of 1 kN/m^2. Assume Fe415 steel. Assume that the slab is subjected to moderate exposure conditions.	10M	4	L2
	OR			
18	Design a doglegged staircase for a building in which the height of floor is 3.3 m. Adopt rise and tread of each step is 150 mm and 225 mm respectively. The stair hall is 2.5 m X 4.5 m. LL is 3 kN/m^2. Use M20 grade concrete and Fe415 grade steel. Assume the stairs are supported on 230 mm walls at the ends of outer edges of landing slabs.	10M	4	L2
19	Design an isolated square RCC footing of uniform thickness for a square RCC column 400 mm X 400 mm, carrying a load of 900 kN. Use M15 and Fe415 grades respectively.	10M	5	L2
	OR			
20	Design a suitable pile cap for a reinforced concrete column of size 500 mm X 500 mm, reinforced with 8-25 dia. Bars, carrying a factored axial load of 4000 kN, supported by four symmetrically placed piles, 300 mm dia., spaced at 1.2 m in both x- and y- directions. The pile location tolerance may be taken as 50mm. The column and piles are with M30 concrete and use M25 concrete for the pile cap. Use Fe415 steel.	10M	5	L2