Regulation R18 *Subject code: 2P5AB*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech V Semester Supplementary Examinations, February 2024

DESIGN OF REINCORCED CEMENT CONCRETE STRUCTURES

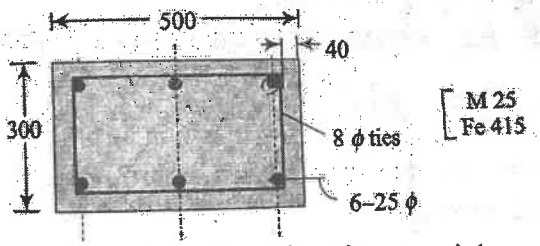
(CIVIL ENGINEERING)

Maximum Marks: 70 Date:17.02.2024 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 which carries 10M.
4. Each question carries 10 marks and may have a, b, c, d as sub questions.

Note: IS 456:2000 code book is allowed

	Part-A		
All the following questions carry equal marks	(10X2M=20 Marks)	CO	Bloom Tx
1	Design stress–strain curve for concrete.	CO1	L2
2	Distinguish between singly reinforced and doubly reinforced beams.	CO1	L2
3	Mention 3 grades of cements and their characteristics.	CO2	L2
4	What are the limit states of collapse?	CO2	L1
5	Mention any 2 differences between short and long columns.	CO3	L2
6	What are the codal specifications for slenderness limits for columns?	CO3	L1
7	Write about spacing of slab.	CO4	L1
8	Draw a plan of dog legged stair case.	CO4	L3
9	What is footing? Mention what are the 3 types of footings.	CO5	L1
10	What is pile cap?	CO5	L1
	Part-B		
Answer All the following questions.	(5X10M=50Marks)		
11	What are the concrete mix designs? Explain in brief. [10M]	CO1	L1
	OR		
12	A beam simply supported over an effective span of 5.3m carries a LL of 20 kN/m. Design the singly reinforced beam by limit state method for flexure. Provide effective depth 1.5 times the breadth. Use M20 and Fe415 grades respectively. [10M]	CO1	L4
13	What are the assumptions in the limit state method of design in flexure? [10M]	CO2	L1
	OR		
14	A reinforced concrete beam of rectangular section has the cross sectional dimensions of depth=600 mm, breadth=300 mm. Assume M20 grade of concrete and Fe415 grade steel, compute: (a) The cracking moment (b) The stresses due to an applied moment of 50 kN-m. [10M]	CO2	L4

15	Design the reinforcement in a column of size 450 mm X 600 mm, subject to an axial load of 2000 kN under service dead and live loads. The column has an unsupported length of 3 m and is braced against sideway in both directions. Use M20 concrete and Fe415 steel. [10M]	CO3	L4
	OR		
16	For a column section shown in below figure. Construct the design interaction curve for axial compression combined with uniaxial bending about the major axis. Hence, investigate the safety of the column section under the following factored load effects: [10M]  (i) P_u = 2275 kN, M_{ux} = 46.4 kN-m (maximum axial compression) (ii) P_u = 1105 kN, M_{ux} = 125 kN-m (maximum eccentricity).	CO3 L4	
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 M20 grade of concrete and Fe415 steel. Assume that the slab is subjected to moderate exposure conditions. [10M]	CO4	L4
	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]	CO4	L4
19	Design a reinforced concrete footing of uniform thickness for a reinforced concrete column of 400 mm X 400 mm size carrying an axial load of 1200 kN using M20 grade of concrete and Fe415 steel. The safe bearing capacity of soil is 220 kN/m^2. [10M]	CO5	L4
	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 50 mm. The column and piles are with M30 concrete and use M25 concrete for the pile cap. Use Fe415 steel. [10M]	CO5	L4