Register Number:……..

KUMARAGURU college of technology
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M.E /M.TECH DEGREE EXAMINATIONS: NOV/ DEC 2024

(Regulation 2024)

First Semester

STRUCTURAL ENGINEERING

24STT503: Design of Advanced Concrete Structures

COURSE OUTCOMES

CO1: Calculate short term and long-term deflections and crack width for structural elements

CO2: Understand inelastic behaviour of concrete beams and design beam-column joints for ductility

CO3: Design and detail the ribbed slab, deep beams, grid floor and flat slabs in accordance with relevant IS code and standards.

CO4: Design corbels, slender columns, shear walls, edge (spandrel beams), pile cap, bunkers and silos.

Time: Three Hours **Maximum Marks: 100**

PART A (4*20 = 80 Marks)

1.	a)	Scenario: A hall of dimension 6m × 8m simply supported on all the four edges is to be covered with a slab system. The live load on the slab is 3 kN/m^2. The slab need to be provided using M30 concrete and Fe415 steel. Question: Suggest a suitable type of slab system for the hall and design the slab and supporting structure as per IS 456 code. Assume the necessary data for the design.	20	CO4	[K_4]
2.	a)	What are the factors influence moment rotation characteristics of reinforced concrete section.	6	CO2	[K_3]
	b)	What is meant by moment redistribution in beams what are the advantages of moment redistribution.	4	CO2	[K_3]
	c)	Explain the conditions for moment redistribution in reinforced concrete beams.	10	CO2	[K_3]
3.	a)	Define ductility of a RC structure , how it can be improved	6	CO3	[K_3]
	b)	Explain with neat sketch the ductile detailing for RC beams and columns as per IS code	14	CO3	[K_3]

4.	a)	What is meant by deep beams , discuss the design steps for deep beams	8	CO5	[K_3]
	b)	What is the purpose of providing pile cap in pile foundation	2	CO5	[K_3]
	c)	Design the side walls of a 3m× 3m square bunker to store 30 tons of coal. Density of coal is 9 kN/m^3 and angle of repose = 30°. Use M25 concrete and Fe415 steel with permissible stress of 230 N/mm^2.	10	CO5	[K_4]

Answer any ONE Question
PART B (1*20 = 20 Marks)

5.	a)	What are the major factors that influence crack widths in flexural members	6	CO1	[K_4]
	b)	For the beam cross section shown in Figure 1, compute the crack widths at points A and B. The beam is simply supported over a span of 6m and subjected to a service load including self weight of 30 kN/m. 4 numbers of 20mm dia bars are provided as tension steel reinforcement. M30 grade concrete and Fe 415 steel are used.	14	CO1	[K_4]

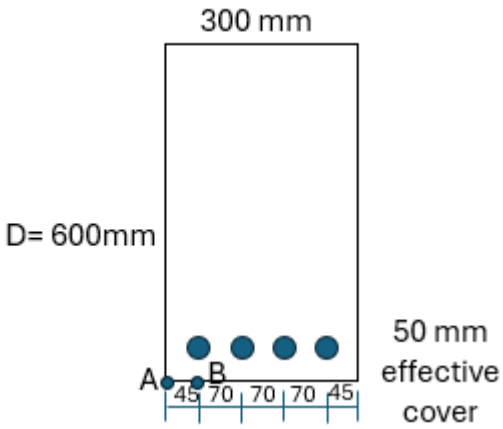

Figure 1

OR

6.	a)	What are the long term deflections in RC beams	4	CO1	[K_4]
	b)	A simply supported beam of 6m span is 300mm wide and 600 mm deep. It is subjected to a maximum bending moment of 150 kN-m. Due to uniformly distributed service loads out of which 60% moment is due to permanent loads. The beam is reinforced with 6- 16 mm diameter bars at an effective cover of 50mm. Check the beam for deflection using M20 grade concrete and Fe415 steel.	16	CO1	[K_4]

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