2022

SUBJECT NAME: Design of RCC Structures (DCE 504)

Full Marks : 100

Time : Three hours

The figures in the margin indicate full marks for the questions.

*Answer **any five** questions.*

1.	a)	Explain WSM and LSM of Design. Which one of them is most preferred and why? What do you mean by neutral axis depth? How do you determine neutral axis depth in WSM and LSM for rectangular beam?	5+2+2+3 = 12
	b)	Define balanced, under-reinforced and over-reinforced beam section with diagram. How do you determine ultimate moment of resistance if the beam section is over-reinforced section?	5+3 = 8
2.		Explain singly and doubly reinforced section with diagram. A doubly reinforced beam section has a size of 250 X 400 mm total depth. It is reinforced with 3-20 Φ as compression reinforcement and 4-25 Φ as tensile reinforcement. Assume M20 concrete and Fe 415 steel and clear cover as 30 mm. Determine the stresses in concrete, compression steel and tension steel. Also determine allowable moment of resistance and ultimate moment of resistance.	3+17 = 20
3.		A simply supported beam of span 6.5 m carries a dead load of 35 kN/m (including self-weight), live load of 10 kN/m and surface finish of 1 kN/m. Design the beam as balanced section by a) WSM and b) LSM, by assuming M25 concrete and Fe 415 steel and width of the beam is 250 mm.	20
4.		What do you mean by shear reinforcement. A beam of span 7 m has a size of 250 X 500 mm effective carries an udl of 25 kN/m excluding self-weight of beam. Design the beam for shear reinforcement at a) support and b) at midspan. Assume M 25 concrete and Fe 415 steel. The beam is reinforced with 4 - 20Φ as tensile reinforcement.	20
5.		Define one way and two-way slab. Write the procedure to design a two-way slab. Design a 1way slab of clear span 4m simply supported on 230 mm thick walls and subjected to a live load of 5 kN/m^2 and surface finish of 1 kN/m^2. Use M25 concrete and Fe 415 steel.	5+15 =20
6	a)	What do you mean by Bond. What are the mechanisms of bond resistance?	10

		Differentiate between Flexural bond and Anchorage bond. Write notes on anchoring bars in tension and compression.	
	b)	What do you mean by slenderness ration. Classify column based on i) type of reinforcement and ii) slenderness ratio. Define effective length and unsupported length of a compression member.	10