PRN:		Course Code:	CET 2604

Third Year B. Tech End Semester Examination Summer 2024

Design of Concrete Structures I

Day and Date: 30 MAY 2024 Thursday Max Marks: **100**

Time: 2.00pm to 5.00pm Duration: **03** hrs

Instructions: All questions are compulsory.
IS: 456: 2000 and SP 16 are allowed

			Marks	Bloom's Level	CO
Q.1		**Attempt the following**			
	a)	Explain how can you control cracking of reinforced concrete structural elements.	08	L1	CO 1
	b)	Write note on bond and development length.	08	L2	CO 1
		OR			
	b)	Define the terms (i) Factored Load (ii) Limit state of serviceability (iii)Characteristic strength of concrete and steel (iv) Limit state of collapse.	08	L2	CO 1
Q.2		**Attempt the following**			
	a)	Describe the modes of failure in beams and based on those types of sections.	05	L2	CO 2
	b)	Design a singly reinforced beam with span of 5m to carry a dead load of 25KN/m and a working Live load 20KN/m. Use M20 concrete and Fe500 steel.	11	L3	CO 2
		OR			
	b)	Design a singly reinforced beam with span of 6m to carry a total dead and superimposed load of 60 KN/m. Use M25 grade of concrete and Fe 415 steel assume clear cover 20 mm.	11	L3	CO 2
Q.3		**Attempt any One from the following**			
	a)	The slab of a residential building of size 4.3 m X 6 m is simply supported on all the four sides on 230 mm walls. Assuming an imposed load of 2. kN/m^2 and load due to finishes of 1.0 kN/m^2. Design the floor slab. Use M25 concrete and Fe415 steel. Use mild exposure condition.	18	L4	CO 3
	b)	Design a R.C. slab for a room having inside dimensions 3 m X 7 m. The Thickness of supporting wall is 300 mm. The live loads on the slab taken as 2 kN/m^2. Assume the slab is simply supported at the ends. The slab carries 75 mm thick. Use M20 concrete and Fe415 steel.	18	L4	CO 3
Q.4		**Attempt any One from the following**			
	a)	A concrete column is reinforced with 4 bars of 20 mm dia. Determine the ultimate load capacity of the column using M20 grade concrete and Fe 415 grade steel, if the size of the column is a) 450mm X 450mm.	16	L4	CO 3

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	b)	Design a short helically reinforced column of unsupported length 3.5 m to carry a axial service load of 700kN. Use M25 concrete and Fe 415 grade steel. Sketch the reinforcement details.	16	L4	CO 3
Q.5		**Attempt any One of the following**			
	a)	Design a rectangular Isolated sloped footing for a column of 400 X 400mm carrying an axial load of 1000KN. The SBC of soil is 250 KN/Sqm. Use M20 Concrete & Fe 500 steel. Sketch the reinforcement details.	18	L5	CO 3
	b)	Design an isolated square footing with uniform thickness for the column of size 300 X 450 mm carrying an axial load of 800 KN. The SBC of soil is 250KN/sqm. Use M25 Concrete and Grade Fe 415 steel. Sketch the reinforcement details.	18	L5	CO 3
Q.6		**Attempt any Two of the following**			
	a)	What are post tensioning anchorages.	08	L3	CO 4
	b)	List the various types of tensioning devices used in prestressed concrete.	08	L3	CO 4
	c)	Explain the principle of pre tensioning & post tensioning.	08	L3	CO 4

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