



	WINTER-2023		
	Exam Seat No.:		
	Academic Year:2023-2024	Semester:II	
	Name of Programme:M.Tech	Pattern:2022	
	Name of Course:Advanced Design of Concrete Structures	Course Code:CIV225109	
	Max. Marks:60	Duration:2.30	

	<p>Instructions: Candidates should read carefully the instructions printed on the Question Paper and on the cover page of the Answer Book, which is provided for their use.</p> <ol style="list-style-type: none">1. This question paper contains 02pages.2. Answer to each new question is to be started on a new page.3. Assume suitable data wherever required, but justify it.4. Draw the neat labelled diagrams, wherever necessary.5. The last columns indicates the Course Outcome and level of Blooms Taxonomy of the Question/sub-question.	
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Question No. 1 Attempt following Question

- 1a) What is yield lines and draw the notations used for yield lines and supports. (6) CO1

Question No. 2 Attempt following Question

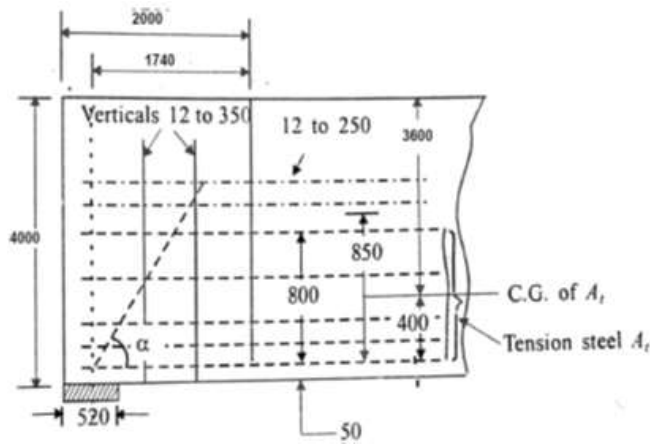
- 2a) Discuss the various methods for the analysis of grid floors. (6) CO2

Question No. 3 Attempt following Question

- 3a) A semi-circular beam with radius of 4 m is simply supported at ends, and is continuous over a column at its middle. The beam carries a uniformly distributed load of 20 kN/m length of the beam, inclusive of its own weight. Determine S.F., B.M. and T.M. at salient points, and plot S.F., B.M. and T.M. diagrams. (8) CO3

OR

- 3b) Determine the thickness and reinforcements for a simply-supported transfer girder of length 6.25 m loaded from two columns at 2.0 m from each end with 3750 kN (see Fig.). The total depth of the beam is 4.0 m and the width of supports is 520 mm. Assume grade 40 concrete and Fe 415 steel. (Design of simply-supported deep beam). (Shear check and R/F detailing not required). (8) CO3



- 3c) Write a short note on deep beam and enlist the design steps of deep beam. (8) CO3

OR

- 3d) A beam is curved in plan in the form of arc of a circle with radius $R = 4$ m and central angle equal to 90° . The beam carries a super-imposed load of 2 kN/m, and is fixed at both the ends. If the section of the beam is rectangular, having depth = 600 mm and width = 300 mm, draw the bending moment and torsional moment diagrams for the beam. Take $G = 0.45$ for concrete. (8) CO3

Question No. 4 Attempt following Question

- 4a) Design a circular water tank with joint between wall and base slab is rigid resting on the ground to store $50,000$ litres of water. The depth of tank may be kept 4 m. Use M25 concrete and Fe -415 steel. (8) CO4

OR

- 4b) Design a circular water tank with flexible base resting on the ground to store $50,000$ litres of water. The depth of tank may be kept 4 m. Use M25 concrete and Fe-415 steel. (8) CO4

- 4c) What are different types of water tank, explain any three in details. (8) CO4

OR

- 4d) Write down the design step of rectangular tank rest on ground by IS code method. (8) CO4

Question No. 5 Attempt following Question

- 5a) Design a pile under a column transmitting an axial load of 600 kN. The pile is to be driven to a hard stratum available at a depth of 8 metres. Take $\sigma_{cc} = 4$ N/mm² and $\sigma_{sc} = 130$ N/mm² (8) CO5

OR

- 5b) Explain different types of combined footing along with their suitable application. (8) CO5

- 5c) Explain in details group action of pile with formulae. (8) CO5

OR

- 5d) Write down the design step for beam and slab footing for columns. (8) CO5