K. K. Wagh Institute of Engineering Education & Research, Nashik

(An Autonomous Institute From A.Y. 2022-23)

WINTER-2025	
Exam Seat No.:	
Academic Year:2025-2026	Semester:I
Class:PG-I	Program:M.Tech
Branch Code:CIV	Pattern:2024
Name of Course:Advanced Solid Mechanics	Course Code:2404503
Max. Marks:60	Duration:2.30 Hrs.

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.

1. This question paper contains 2 pages.
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.

		Marks	CO
Question No. 1			
1a)	Write the stress and strain components on a rectangular parallelepiped in Cartesian coordinate system with neat sketch.	(6)	CO1, CO2, CO3
Question No. 2			
2a)	Explain plane state of stress in 2D cartesian coordinate system.	(6)	CO1, CO2, CO3
Question No. 3			
3a)	Derive the equilibrium equations for axisymmetric body using polar coordinates.	(8)	CO1, CO2, CO3, CO4, CO5
	OR		
3b)	Explain plane stress and strain conditions in axisymmetric body using polar coordinates.	(8)	CO1, CO2, CO3, CO4, CO5
3c)	Derive an expression for torsion “T” for a general solid section.	(8)	CO1, CO2, CO3, CO4, CO5
	OR		
3d)	Explain Prandtle’s stress function approach.	(8)	CO1, CO2, CO3,

			CO4, CO5

Question No. 4

4a)	Explain the concept of ideal plastic body.	(8)	CO3, CO4, CO5
	OR		
4b)	Explain Mohr's theory of failure.	(8)	CO3, CO4, CO5
4c)	Explain in brief about Rankine's maximum principal stress theory.	(8)	CO3, CO4, CO5
	OR		
4d)	Explain the Beltrami's theory of failure.	(8)	CO3, CO4, CO5

Question No. 5

5a)	Explain in brief plastic torsion and Nadai Sand heap analogy.	(8)	CO3, CO4, CO5
	OR		
5b)	Derive the equation of radial and tangential stress in plastic zones for thick-walled cylinders under internal pressures considering elasto-plastic behaviour.	(8)	CO3, CO4, CO5
5c)	Discuss successive stages of plastic yielding of rectangular beams.	(8)	CO3, CO4, CO5
	OR		
5d)	Derive the elastic plastic analysis of thick spherical shell due to internal pressure.	(8)	CO3, CO4, CO5

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