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

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

InSem Examination-I Winter2025	
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:30	Duration:1 Hour 15 minutes

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			
1 a)	Explain the concept of body force, surface force, and stress tensor with neat diagram.	(7)	CO1, CO3, CO5
Question No. 2			
2 a)	Derive an expression for stress components on an arbitrary plane.	(8)	CO1, CO3, CO5
	OR		
2 b)	A rectangular steel bar having a cross-section 20 mm x 30 mm is subjected to a tensile force of 6000 N. If the axes are chosen as shown in figure 1, determine the normal and shear stresses on a plane whose normal has the direction cosines: $n_x = n_y = \frac{1}{\sqrt{2}}, n_z = 0$	(8)	CO1, CO3, CO5

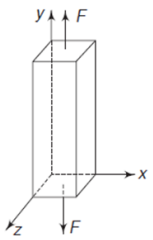

Figure 1

Question No. 3

3 a)	Explain Generalized Hooke's Law.	(7)	

			CO1, CO3, CO5

Question No. 4

4 a)	Derive an expression for Lame's displacement equations of equilibrium.	(8)	CO1, CO3, CO5

OR

4 b)	Derive an expression for Saint-Venant's equations of compatibility.	(8)	CO1, CO3, CO5

····· End of question paper·····