



K. K. Wagh Institute of Engineering Education & Research, Nashik
(An Autonomous Institute From A.Y. 2022-23)

	In Sem Examination-I Winter 2023		
	Exam Seat No.:		
	Academic Year: 2023-2024	Semester: I	
	Name of Programme: M.Tech	Pattern: 2022	
	Name of Course: Solid Mechanics	Course Code: CIV225103	
	Max. Marks: 30	Duration: 1 hr.	

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 page(s).
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

Question No. 1 Attempt following Question

- a) State the assumptions which are used in Theory of Elasticity (7) CO1

OR

- b) Short Note on External forces and Internal forces. (7) CO1
c) Derive the equations of Equilibrium for 3D Elasticity problems (8) CO1

OR

- d) Derive the equations of strain-displacement relationship (8) CO1

Question No. 2 Attempt following Question

- a) The state of strain at point is given by,
$$\begin{bmatrix} 18 & 0 & -36 \\ 0 & -54 & 5.4 \\ -36 & 5.4 & 0 \end{bmatrix} \times 10^{-4}$$

(7) CO2
Determine the stress matrix. If $E = 210 \text{ Gpa}$ and $\mu = 0.3$.

OR

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| b) | State and explain the Generalized Hook' Law | (7) | CO2 |
| c) | Derive the equations of Biharmonic equation by using Airys stress function | (8) | CO2 |

OR

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|----|---|-----|-----|
| d) | Explain the terms plane stress and plane strain | (8) | CO2 |
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