BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(MID-SEMESTER EXAMINATION MO/2024)

CLASS: BTECH **SEMESTER: VII**
BRANCH: MECHANICAL ENGINEERING **SESSION: MO/2024**

SUBJECT: ME481 THEORY OF ELASTICITY

TIME: 02 Hours **FULL MARKS: 25**

INSTRUCTIONS:
1. The question paper contains 5 questions, each of 5 marks and a total of 25 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
***4*. Tables/Data handbook/Graph paper etc., if applicable, will be supplied to the candidates**

			CO	BL
Q.1	Derive an expression for the octahedral stresses.	[5]	1	3
Q.2	At a point P, the rectangular stress components are: $\sigma_x = 1\ \text{kPa}, \sigma_y = -2\ \text{kPa}, \sigma_z = 4\ \text{kPa}, \tau_{xy} = 2\ \text{kPa}, \tau_{yz} = -3\ \text{kPa}, \tau_{zx} = 1\ \text{kPa}$ Find principal stresses and check for invariance.	[5]	1	3
Q.3	Derive an expression of equilibrium in a Cartesian coordinate system for a three-dimensional stress system.	[5]	2	2
Q.4	Discuss clearly the compatibility equations for a three-dimensional stress system.	[5]	2	2
Q.5	Derive an expression of equilibrium in a polar coordinate system.	[5]	3	2

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