BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(MID SEMESTER EXAMINATION SP/2025)

CLASS: BTECH **SEMESTER : VIth**
BRANCH: CSE, AI & ML, EEE **SESSION : SP/2025**

SUBJECT: EC361 INTRODUCTION TO MEMS

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

INSTRUCTIONS:
1. The question paper contains 5 questions each of 5 marks and total 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

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Q.1(a)	What is the role of Silicon micromachining MEMS? Why is silicon the material of choice for MEMS?	[2]	1	2
Q.1(b)	Discuss classification of Thinfilm deposition techniques?	[3]	1	3
Q.2(a)	State the intrinsic characteristics of MEMS.	[2]	1	3
Q.2(b)	Describe the various step of nMOS fabrication process	[3]	1	3
Q.3(a)	Write a schematic representation of Thinfilm deposition?	[2]	1	3
Q.3(b)	Explain stress and strain curve with diagram.	[3]	2	3
Q.4(a)	Explain the analogy between electrical and mechanical systems with suitable examples.	[2]	2	3
Q.4(b)	The intrinsic carrier concentration(ni) of silicon under room temperature is $1.5 * 10^{10}$/cm3. A silicon piece is doped with phosphorus to a concentration of $10^{18}cm^{-3}$. The mobility of electrons and holes in the silicon are approximately 1350 cm^2/V-s and 480 cm^2/V-s respectively. Find the resistivity of the doped bulk silicon.	[3]	2	3
Q.5(a)	Define stress and strain. What are the various factors in MEMS components that can lead to stress and strain?	[2]	2	3
Q.5(b)	A cylindrical silicon rod is pulled on both ends with a force of 10 mN. The rod is 1 mm long and 100μm in diameter. Find the stress and strain in the longitudinal direction of the rod.	[3]	2	3

::::::04/03/2025::::::E