

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

CLASS: B.Tech
BRANCH: MECHANICAL

SEMESTER : V
SESSION : MO/2025

SUBJECT: ME377 MECHATRONICS

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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		CO	BL
Q.1(a)	Explain Mechatronics and give three examples of Mechatronic system.	[2] 2	1
Q.1(b)	Enumerate and explain briefly the elements of a measuring system.	[3] 2	3
Q.2(a)	What are signal conditioning devices ?	[2] 2	2
Q.2(b)	Show the functioning of Non Inverting Amplifier. What is the difference in gain for inverting and non inverting types?	[3] 3	3
Q.3(a)	Explain Boolean Logic and K Map with De Morgans Laws verification .	[2] 2	1
Q.3(b)	What is Sampling theorem? Show the functioning of 4 Bit Successive Approximation Register.	[3] 3	2
Q.4(a)	Explain the terms Hysterisis Error and Accuracy for a sensor	[2] 2	1
Q.4(b)	What are temperature Sensors. How are they classified Explain the working with ranges of application	[3] 2	2
Q.5(a)	Explain the functioning of Piezoelectric sensors.	[2] 2	1
Q.5(b)	A 2mm thick quartz PZT material having a voltage intensity of 0.055Vm/Nis subjected to a pressure of 1-8MN/m ² .Calculate the voltage output and the charge density of the crystal. Take the permittivity of the quartz as 40.6X 10 ⁻¹² F/m.	[3] 2	3

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