BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION)

CLASS: B.TECH   SEMESTER : V
BRANCH: MECHANICAL   SESSION : MO/2023

SUBJECT: ME357 MEASUREMENT AND INSTRUMENTATION

TIME: 3 Hours   FULL MARKS: 50

INSTRUCTIONS:
1. The question paper contains 5 questions each of 10 marks and total 50 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
4. Before attempting the question paper, be sure that you have got the correct question paper.
5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.

			CO	BL
Q.1(a)	What is the difference between accuracy and precision?	[5]	1	2
Q.1(b)	The following values were obtained from the measurements of the value of a resistor:147.2 Ω, 147.9 Ω, 148.1 Ω, 147.1 Ω, 147.5 Ω, 147.6 Ω, 147.4 Ω, 147.6 Ω, and 147.5 Ω. Calculate (a) the arithmetic mean, (b) the average deviation, (c) the standard deviation, (d) Variance of the ten readings.	[5]	1	3
Q.2(a)	Describe the general working principles of capacitive sensors and discuss some applications of them.	[5]	2	1,2
Q.2(b)	What are Hall effect sensors? How do they work and what are they used for?	[5]	2	2
Q.3(a)	Explain the working of inverting amplifier and derive the voltage gain of the circuit.	[5]	3	4
Q.3(b)	Discuss various filters used in measurement signal processing.	[5]	3	1
Q.4(a)	What are the different functional requirements of a comparator in metrology and discuss electrical comparators used in metrology.	[5]	4	2
Q.4(b)	Discuss different types of mechanical and electro-mechanical pressure measuring gauges.	[5]	5	1
Q.5(a)	Explain how temperature effect compensated in strain gauges.	[5]	5	3
Q.5(b)	Explain how a thermistor provides temperature measurement.	[5]	5	2

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