

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

**CLASS: BTECH
BRANCH: Mechanical**

**SEMESTER : V
SESSION : MO/2025**

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.
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		CO	BL
Q.1(a)	Outline the static characteristics for the instruments.	[5] 1	2
Q.1(b)	The following values were obtained from the measurements of the value of a micrometer screw: 1.34,1.38,1.56,1.47,1.42,1.44,1.53,1.48,1.40,1.59mm 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)	Demonstrate in details LVDT.	[5] 2	2
Q.2(b)	A single strain gauge having resistance of 130Ω is mounted on a steel cantilever beam at a distance of 0.12m from free end. The beam dimensions are 25cm length, 2cm width, 0.3cm depth. An unknown force F is applied at free end and produce a deflection of 11.8mm of free end. If the change in gauge resistance is found to be 0.145Ω , Calculate the gauge factor. Take Young's modulus for steel is $200GN/m^2$.	[5] 2	4
Q.3(a)	How Op-amp is used as multiplier and integrator in instrumentation.	[5] 3	3
Q.3(b)	Why filters are being used in signal conditioning. How filters are classified.	[5] 3	2
Q.4(a)	Enumerate various forms of sine bars.	[5] 4	3
Q.4(b)	Describe surface Profilometer. How it is being used in manufacturing industry.	[5] 4	3
Q.5(a)	Demonstrate different methods of viscosity measurement for liquid.	[5] 5	2
Q.5(b)	How velocity and acceleration measurement are helpful for mechanical element in practice.	[5] 5	3

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