


Final Assessment Test – November 2025

Course: BMEE210L - Mechatronics and Measurement Systems

Class NBR(s): 2169 / 2170 / 2171 / 2172

Slot: C2+TC2

Time: Three Hours

Max. Marks: 100

- KEEPING MOBILE PHONE/ANY ELECTRONIC GADGETS, EVEN IN 'OFF' POSITION IS TREATED AS EXAM MALPRACTICE
- DON'T WRITE ANYTHING ON THE QUESTION PAPER

COs	CO Statements
CO1	Demonstrate the basic concepts, applications and elements of mechatronic systems.
CO2	Analyze various measuring instruments for different applications.
CO3	Compare various types of sensors and actuators used in mechatronics systems.
CO4	Apply the concept of signal processing and use of interfacing systems.

BL – Blooms Taxonomy Level (1 – Remember, 2 – Understand, 3 – Apply, 4 – Analyse, 5 – Evaluate, 6 – Create)

 Answer ALL Questions

(10 X 10 = 100 Marks)

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| 1. | Discuss the role of feedback in mechatronics systems, comparing positive and negative feedback with examples. | CO1 | BL2 |
| 2. | Explain the types of errors in a measurement system, discuss the various sources of these errors and the methods to minimize or eliminate them. | CO2 | BL2 |
| 3. | With a neat diagram, explain the construction and working principle of an LVDT. Also mention its advantage and applications. | CO3 | BL2 |
| 4. | With neat diagram, explain the construction and working of a metal foil strain gauge. Describe how strain is measured using a Wheatstone bridge and explain the need for temperature compensation. | CO4 | BL4 |
| 5. | Discuss the measurement process of vibration and acceleration. Identify a suitable sensor and explain the working principle, advantages, and limitations. | CO2 | BL3 |
| 6. | Explain construction and working of DC electric motor. Draw and explain its torque speed characteristics and mention its types and application. | CO3 | BL2 |
| 7. | Explain the construction and working of a Digital-to-Analog Converter (DAC) and an Analog-to-Digital (ADC). Mention types and applications of each. | CO4 | BL3 |
| 8. | Explain the construction and working of an optical encoder. Mention its types and applications. | CO2 | BL2 |
| 9.a) | Discuss the working principle of load cells for force measurement applications with a note on advantages. | CO2 | BL3 |

OR

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| g.b) | Compare and contrast hydraulic and pneumatic actuators, highlighting their key differences. Provide examples of applications for each type. | CO2 | BL3 |
| 10.a) | Explain the methods used for measuring surface finish. Discuss the significance of surface roughness parameters and their impact on component performance. | CO4 | BL2 |

OR

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| 10.b) | Describe the working principle and types of Coordinate Measuring Machines (CMM). Discuss the advantages and limitations of using CMM in dimensional measurement applications. | CO4 | BL2 |
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