

Continuous Assessment Test(CAT) – I AUG 2024

Programme	:	B.Tech (ECE/ECM)	Semester	:	Fall Semester 2023-24
Course Code & Course Title	:	Sensors Technology	Code	:	BECE409E
Faculty	:	Dr. MANIMARAN.P	Class Nbr	:	CH2024250100166
Duration	:	90 Mins	Slot	:	A1

General Instructions:

- Write only your registration number on the question paper in the box provided and do not write other information.
- Use statistical tables supplied from the exam cell as necessary
- Use graph sheets supplied from the exam cell as necessary
- Only non-programmable calculator without storage is permitted

Answer all questions

Q. No	Sub Sec.	Description	Marks	Blooms Taxonomy Level										
1.		Explain the importance of accuracy, precision, and resolution in the static characteristics of sensors. How do these characteristics affect the performance of resistive and capacitive sensors? Provide relevant examples to support your explanation.	10	L1										
2.	i)	Discuss the role of resolution in capacitive transducers with variable distance and variable area configurations. How does resolution affect the measurement accuracy in these sensors? (5 marks)	10	L4										
	ii)	A strain gauge is bonded to a beam 0.1m long and has a cross-sectional area 6 cm ² . Young's modulus for steel is 302GN/m ² . The strain gauge has an unstrained resistance of 270 Ohms and a gauge factor of 3.4. When a load is applied, the resistance of gauge changes by 0.015 Ohms. Calculate the change in length of the steel. (5 marks)		L3										
3.	i)	Explain the role of accuracy in photovoltaic sensors. How does accuracy influence the effectiveness of these sensors in solar energy applications? (5 Marks)	10	L1										
	ii)	Use the following values of resistance versus temperature for an RTD to find the linear approximations of resistance between 150°C to 180°C about a mean temperature of 165°C . (5 Marks)		L3										
		<table><tr><th>Temperature °C</th><th>Resistance Ohms</th></tr><tr><td>140</td><td>450</td></tr><tr><td>145</td><td>500</td></tr><tr><td>150</td><td>620</td></tr><tr><td>155</td><td>740</td></tr></table>	Temperature °C	Resistance Ohms	140	450	145	500	150	620	155	740		
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