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# PRESIDENCY UNIVERSITY

BENGALURU

## Mid - Term Examinations - March 2026

Date: 12-03-2026

Time: 09:30am - 11.00am

School: SOE	Program: B. Tech		
Course Code : EEE3104	Course Name: Smart Sensors for Engineering Applications		
Semester: VI	Max Marks: 50	Weightage: 25%	

CO - Levels	C01	C02	C03	C04	C05
Marks	10	20	20		

### Instructions:

- (i) Read all questions carefully and answer accordingly.
- (ii) Do not write anything on the question paper other than roll number.

### Part A

Answer ALL the Questions. Each question carries 2marks.

5Q x 2M=10M

1	Explain the term <i>transducer</i> with a neat block diagram.	2 Marks	L2	C01
2	Classify transducers based on a) energy source and b) output nature.	2 Marks	L2	C01
3	Explain primary and secondary transducers.	2 Marks	L2	C01
4	Compare RTD and Thermistor in terms of their characteristics.	2 Marks	L2	C01
5	Explain the working principle of capacitive transducers.	2 Marks	L2	C01

### Part B

Answer the Questions.

Total Marks 40M

6.	a.	Discuss the dynamic characteristics that influence a sensor's response to changing inputs.	10 M	L2	C02
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Or

7.	a.	The performance of a sensor is evaluated using various parameters. Describe the static characteristics of sensors and explain any five static sensor parameters with appropriate examples.	10 M	L2	CO2
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8.	a.	Describe the classification of sensors based on measurand with examples. Find Accuracy and Precision of the two temperature sensors T1 and T2 used to measure the temperature of boiling water 5 times and the readings are:  T1: 96.5 °C, 101.5 °C, 100 °C, 99.8 °C, 96 °C T2: 97.5 °C, 98.5 °C, 100.5 °C, 99.95 °C, 99.1 °C	10 M	L2	CO2
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**Or**

9.	a.	Classify sensors based on their principle of operation. Explain any five types with suitable examples.  For analyte of concentration 50mM, resistance is 3 kΩ and for 400mM, it is 11 kΩ. What is the sensitivity of sensor? What is the sensitivity of the sensor at 450mM? What is the threshold offset and range of the sensor?	10 M	L2	CO2
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10.	a.	<b>With neat sketches, explain the construction and working of inductive and capacitive proximity sensors. Compare their applications.</b>	10 M	L2	CO3
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**Or**

11.	a.	Explain light sensing technology in detail. Discuss the working principles, characteristics, and applications of photodiodes, phototransistors, and photoresistors.	10 M	L2	CO3
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12.	a.	<b>Explain motion sensing using PIR and ultrasonic sensors. Compare their performance and applications.</b>	10 M	L2	CO3
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**Or**

13.	a.	Discuss miscellaneous sensors such as pH sensors and gas sensors, explaining their working principles and real-world applications.	10 M	L2	CO3
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