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B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

December 2023 Supplementary Examinations

Programme: B.E. **Semester: III**
Branch: Electronics and Instrumentation Engineering **Duration: 3 hrs.**
Course Code: 22EI3PCSMT **Max Marks: 100**
Course: Sensors and Measurement Techniques

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

UNIT - I

1	a)	Define the term "Measurement" and highlight the significance of each functional elements of a measurement system.	**08**
	b)	Differentiate the sets of Static characteristics with respect to (i) Accuracy and Precision. (ii) Resolution and Threshold	**06**
	c)	A voltmeter reading 70V on its 100V range and an ammeter reading 80mA on its 150mA range are used to determine the power dissipated in a resistor. Both these instruments are guaranteed to be accurate within ±1.5% at FSD. Determine the Limiting error of the power.	**06**

UNIT - II

2	a)	Discuss the construction, principle of operation and transfer-characteristics of a Linear Variable Differential Transformer.	**10**
	b)	Discuss the principle of Hall effect sensors using relevant illustrations and governing relationships. Also provide the equivalent circuit of a commercial device, and its details.	**10**

OR

3	a)	Illustrate the concept of dielectric constant, its effect on capacitance, its polarization and its application with relevant expression.	**08**
	b)	Piezoelectric transducers are Passive, Reversible, Direction-sensitive, and can only measure Dynamic inputs. Justify all these statements with suitable illustrations and expressions.	**12**

UNIT - III

4	a)	Describe the working of fibre-optic interferometric microphone with help of neat diagram	**07**
	b)	Explain how radiation is measured using scintillation counter detector. Draw its diagram.	**07**

c) Explain the light to voltage conversion using a photodiode. **06**

OR

5 a) Justify the statement, "Efficiency of a detector depends on its surface area or the area of the focusing system in a phototransistor". **08**

b) Describe the terms Moisture, Absolute humidity and Relative humidity and bring out its differences **07**

c) With a neat diagram, explain how photoresistor acts as light switch and beacon light. **05**

UNIT - IV

6 a) Describe the significance of optical temperature sensors and Explain Fluoroptic and Interferometric sensors in detail. **10**

b) Discuss the characteristics and operational principles of RTD and Thermistor. **10**

UNIT - V

7 a) Explain two-wire 4-20mA analog data transmission for coupling sensors to control and monitor devices in the process industry. **08**

b) Describe the Sources and coupling of transmitted noise. Explain how additive and multiplicative noise can be removed. **12**

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