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

Autonomous Institute Affiliated to VTU

January / February 2025 Semester End Main Examinations

Programme: B.E. **Semester: V**
Branch: Electronics and Instrumentation Engineering **Duration: 3 hrs.**
Course Code: 22EI5PCTNI **Max Marks: 100**
Course: Transducer and Instrumentation

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

Important Note: Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. Revealing of identification, appeal to evaluator will be treated as malpractice.

			UNIT - I	*CO*	*PO*	Marks
1	a)		What are the functional elements of a measuring instrument? Explain using relevant block diagram.	*CO1*	*PO1*	**08**
	b)		Explain the following instrument characteristics: Sensitivity, Accuracy, Range, Precision and Resolution.	*CO1*	*PO2*	**08**
	c)		Classify the sensors with relevant examples.	*CO1*	*PO1*	**04**
			OR			
2	a)		Differentiate between Transducer and Sensor with Example	*CO1*	*PO1*	**06**
	b)		Explain Different IO Configurations	*CO1*	*PO1*	**06**
	c)		Illustrate with Block diagram, the functional elements of instrumentation system	*CO1*	*PO1*	**08**
			UNIT - II			
3	a)		Define Reynolds number, explain various regimes of operation and derive an equation for the same.	*CO2*	*PO1*	**08**
	b)		Explain the construction and working principle of electromagnetic type flowmeter.	*CO2*	*PO1*	**07**
	c)		What is the difference between Venturi tube and Orifice? Which is preferred and why?	*CO2*	*PO1*	**05**
			OR			
4	a)		Explain the construction and working principle of rotameter.	*CO2*	*PO1*	**08**
	b)		What is the velocity profile of a liquid flowing in a tube? Explain using relevant figure.	*CO2*	*PO2*	**07**
	c)		What is a turbine flowmeter? What is the flowrate equation for the same.	*CO2*	*PO1*	**05**

			UNIT - III			
	5	a)	Explain 2-wire, 3-wire and 4-wire RTD configurations. What are the characteristics of each configuration?	*CO3*	*PO2*	**08**
		b)	What is cold junction compensation? Why is it required? How is it achieved?	*CO3*	*PO2*	**07**
		c)	How can the sensitivity of bimetallic thermometer be improved?	*CO3*	*PO2*	**05**
			OR			
	6	a)	PT-100 is a Platinum RTD whose resistance at 0℃ is 100ohm. If $3.91x10^{-3}$/℃ is the resistance temperature co-efficient of Platinum, then find its resistance at 100℃	*CO3*	*PO2*	**05**
		b)	A thermocouple has a linear sensitivity of 30uv/℃, calibrated at a cold junction temperature of 0℃. It is used to measure an unknown temperature with the cold junction temperature of 30℃. Find the actual hot junction temperature if the emf is 3.0mv.	*CO3*	*PO2*	**05**
		c)	Mention the different types of Thermocouple available and explain its characteristics.	*CO3*	*PO2*	**10**
			UNIT - IV			
	7	a)	Draw and explain the application of a dead weight tester	*CO3*	*PO2*	**10**
		b)	List and discuss various elastic transducer with an example of each	*CO4*	*PO2*	**10**
			OR			
	8	a)	Explain the construction and working of McLeod gauge.	*CO4*	*PO1*	**08**
		b)	Where is a micromanometer used? How does it work? Explain using relevant diagrams.	*CO4*	*PO1*	**07**
		c)	Differentiate absolute pressure, gauge pressure and vacuum pressure.	*CO4*	*PO1*	**05**
			UNIT - V			
	9	a)	Explain the use of IoT for smart home application.	*CO5*	*PO6*	**08**
		b)	Draw and explain the IoT conceptual framework diagram.	*CO5*	*PO1*	**07**
		c)	Why is machine-to-machine communication important in IoT? Explain with an example.	*CO5*	*PO3*	**05**
			OR			
	10	a)	What is IoT? Break down the individual Technologies behind the IoT, examining their roles, Interdependencies, and how they collectively contribute to the seamless functioning of IoT applications	*CO4*	*PO3*	**10**
		b)	Detail the step-by-step process of designing cloud-based home automation system, incorporating a framework that outlines each component's role within the system. What will be the conceptual equation for the application	*CO4*	*PO3*	**10**

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