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PAPER CODE	U124-373

May 2024 (ENDSEM) EXAM

F.Y.B. TECH. (SEMESTER - II)

COURSE NAME: Smart Sensors **Branch: CSE – IoTCSBT (PATTERN 2023)** **COURSE CODE:**CI12233

Time: [1Hr. 30 Min] **[Max. Marks: 40]**

(*) Instructions to candidates:

1) **Figures to the right indicate full marks.**
2) **Use of scientific calculator is allowed**
3) **Use suitable data wherever required**
4) **All questions are compulsory. Solve any one sub question from each Question 1 and 2 and any three sub questions each from Questions 3 and 4.**

Q. No.	Question Description	Max. Marks	CO mapped	BT Level
Q.1	a) Elobrate the Characteristics of Sensors	[5]	CO1	L2
	b) Exolain the operational principles of an actuator	[5]	CO1	L2
Q.2	a) Which Is The Most Accurate Temperature Sensor? Why?	[5]	CO2	L2
	b) How Does a Solenoid Work?	[5]	CO2	L2
Q.3	a) Which technologies are driving Industry 4.0? Explain	[5]	CO3	L2
	b) Assess the key characteristics of a smart factory	[5]	CO3	L2
	c) Recognize the application areas of smart sensors in robotics, highlighting two specific tasks or functions where sensor integration is critical for robot performance and autonomy.	[5]	CO3	L2
	d) Design a smart sensor system for monitoring environmental conditions in an industrial facility. Specify the types of sensors required, their placement within the facility, and the data processing techniques used to analyze sensor data.	[5]	CO3	L3
Q.4	a) Discuss the importance of noise reduction and filtering in sensor data acquisition systems. Explain how noise affects sensor measurements and identify two commonly used noise reduction techniques.	[5]	CO4	L2

	b) Develop an interface circuit for connecting multiple sensors to a microcontroller using a multiplexing technique. Illustrate the circuit diagram and discuss how multiplexing optimizes resource usage and reduces hardware complexity.	[5]	CO4	L3
	c) Analyze the role of memory and storage interfaces in sensor devices, focusing on their importance in data logging and long-term data storage. Discuss two types of memory interfaces commonly used in sensor systems and their respective advantages and limitations.	[5]	CO4	L4
	d) Describe the function of sensor signal conditioning techniques in preparing raw sensor data for processing and analysis. Provide examples of two signal conditioning techniques and their applications in sensor systems.p	[5]	CO4	L2