No. of Pages: 1

Student Name: .....

Enrollment No: .....

Mid-Term Examination – November 2023

Programme: B.Tech (IIOT)

Course Code: IOT 305

Time: 1½Hrs.

Semester: Fifth Semester (Aug. 2023- Dec. 2023)

Paper Name: Sensor and Control Systems

Maximum Marks: 30

Note:

- Question No. 1 is compulsory.
- Attempt any two questions from the remaining questions.
- Some questions have internal choices also.
- All questions carry equal marks.
- Only scientific calculators are allowed.

	Question 1	Marks
1(a)	Classify transducers.	[2]
1(b)	Compare between Physical and Chemical Vapour Deposition.	[2]
1(b)	Define piezo-electric effect.	[2]
1(c)	On which fundamental principle does an Ultrasonic flow meter operate to measure the flow rate of a fluid? **OR** What makes a smart sensor different from a regular sensor?	[2]
1(d)	Draw the functional block diagram of the Measurement System.	[2]

Question 2

2(a)	State the various static and dynamic characteristics of transducers. **OR** A metallic strain gauge has a resistance of 120 Ω and a gauge factor of 2. It is installed on an aluminium structure which has a yield point stress of 0.2 GN/m^2 and Young's modulus of 68.7 GN/m^2, determine the change in resistance of the gauge that would be caused by loading the material to yield point.	[5]
2(b)	Discuss the principle of operation of LVDT. Also, state its advantages and disadvantages.	[5]

	Question 3	
3(a)	What are the challenges involved while interfacing smart sensors in different applications? **OR** With the help of a block diagram, illustrate the components and their interactions in a typical smart sensor system.	**[5]**
3(b)	How does the Sol-gel process work, and what are the key steps involved in this method of creating thin films or nanoparticles.	**[5]**
	Question 4	
4(a)	Obtain the expression for the voltage sensitivity of a piezoelectric crystal used for measurement of force.	**[5]**
4(b)	Write short notes on the following: i) Screen Printing ii) D.C. Tachogenerators **OR** Derive the expression of the output voltage under ideal conditions for a linear resistive potentiometer.	**[5]**

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