Total No. of Questions: 6 *Total No. of Printed Pages:2*

Enrollment No.....

Faculty of Engineering
End Sem Examination Dec-2023
OE00049 Industrial Instrumentation & Sensors

Programme: B.Tech. Branch/Specialisation: All

Duration: 3 Hrs. **Maximum Marks: 60**

Note: All questions are compulsory. Internal choices, if any, are indicated. Answers of Q.1 (MCQs) should be written in full instead of only a, b, c or d. Assume suitable data if necessary. Notations and symbols have their usual meaning.

Q.1 i. In a measuring system, quantity under measurement is called- **1**
(a) Measurand (b) Controllers (c) Sensors (d) Indicators

ii. The _____ of a measurement defines how close a result comes to the true value. **1**
(a) Sensitivity (b) Accuracy (c) Precision (d) None of these

iii. The smallest change which a sensor can detect- **1**
(a) Accuracy (b) Precision (c) Resolution (d) Scale

iv. The sensors are classified on the basis of- **1**
(a) Functions (b) Performance (c) Output (d) All of these

v. A hotwire anemometer is used to measure- **1**
(a) Head of a flowing fluid
(b) Temperature of a flowing fluid
(c) Velocity of a flowing fluid
(d) Pressure of a flowing fluid

vi. When a fluid mass rotates without any external force being imposed on it, then it is called as- **1**
(a) Free vortex motion (b) Force vortex motion
(c) Cyclone (d) Turbulence

vii. Chromatography is a physical method that is used to separate and analyse- **1**
(a) Simple mixtures (b) Complex mixtures
(c) Viscous mixtures (d) Metals

viii. Which of the following is used as a source in the simple infrared analyser for gas analysis? **1**
(a) Tungsten filament lamp (b) Hot wire spiral
(c) Mercury arc lamp (d) None of these

ix. Which of the following can be used for measuring temperature? **1**
(a) Metallic diaphragm (b) Fluid expansion system
(c) Capsule (d) Bourdon tube

x. Which of the following is not a fundamental quantity? **1**
(a) Length (b) Angle (c) Time (d) Luminous intensity

Q.2 i. Explain the importance of instrumentation in industries. **4**

ii. Describe static and dynamic characteristics of an instrumentation system. **6**

OR iii. Explain indicating, recording and controlling instruments with suitable examples. **6**

Q.3 i. List any four applications of sensors. **4**

ii. What do you mean by sensor technology? Why it is necessary? **6**

OR iii. Explain different types of sensors. **6**

Q.4 i. What is the principle of operation of optical level indicators? **4**

ii. Define flow meter and explain on what basis flow meters are classified. **6**

OR iii. Explain construction and working of anemometer. State its advantages and disadvantages. **6**

Q.5 i. Explain chromatography. What are the advantages of chromatography over other techniques? **4**

ii. Write a short note on radiation detectors. **6**

OR iii. Explain the working of mass spectrometer. What are the components of mass spectrometer? **6**

Q.6 Write a short note on any two of the following:

i. Temperature measuring devices **5**

ii. Chemical sensors **5**

iii. Radiation measurement **5**

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Marking Scheme

Industrial Instrumentation & Sensors (T) - OE00049 (T)

Q.1	i)	(a) Measurand		**1**
	ii)	(b) accuracy		**1**
	iii)	(c) Resolution		**1**
	iv)	(d) All of the above		**1**
	v)	(c) velocity of a flowing fluid		**1**
	vi)	(a) free vortex motion		**1**
	vii)	(b) complex mixtures		**1**
	viii)	(b) hot wire spiral		**1**
	ix)	(d) Bourdon tube		**1**
	x)	(b) Angle		**1**
Q.2	i.	importance of instrumentation	(1 Mark*4)	**4**
	ii.	static characteristics	(1 Mark *3)	**6**
		dynamic characteristics	(1 Mark *3)	
OR	iii.	indicating	(1 Mark *2)	**6**
		recording	(1 Mark *2)	
		controlling	(1 Mark *2)	
Q.3	i.	Each application	(1 Mark *4)	**4**
	ii.	Concept of sensor technology	(1 Mark *3)	**6**
		its necessary	(1 Mark *3)	
OR	iii.	Each type of sensor	(1 Mark *6)	**6**
Q.4	i.	Basic principle of operation	2 Marks	**4**
		its explanation	2 Marks	
	ii.	Definition of flow meter	2 Marks	**6**
		Classification	4 Marks	
OR	iii.	construction details	2 Marks	**6**
		working details	2 Marks	
		advantages	1 Mark	
		disadvantages	1 Mark	
Q.5	i.	Explanation	2 Marks	**4**
		advantages	2 Marks	
	ii.	Its explanation	6 Marks	**6**
OR	iii.	working	4 Marks	**6**
		components	2 Marks	
Q.6				
	i.	Explanation	(As per explanation)	**5**
	ii.	Explanation	(As per explanation)	**5**
	iii.	Explanation	(As per explanation)	**5**

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