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

Enrollment No.....

Faculty of Engineering

End Sem (Odd) Examination Dec-2019

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.

Q.1 i. The accuracy of the deflection type instruments and of the null type instruments depends on **1**
(a) Linearity, calibration of spring
(b) Calibration of spring, linearity and calibration of weights
(c) Linearity and calibration of spring, calibration of weights
(d) Both depends on calibration of weight

ii. Accuracy of a measuring instrument indicates the **1**
(a) Closeness of the output reading to the true value
(b) Ratio of output value to the input value
(c) Change in output with each change in input
(d) Degree of freedom from random errors

iii. Change in output of sensor with change in input is _____ **1**
(a) Threshold (b) Slew rate (c) Sensitivity (d) None of these

iv. Smallest change which a sensor can detect is _____ **1**
(a) Resolution (b) Accuracy (c) Precision (d) Scale

v. In _____ velocity of fluid is constant on every point at a specific time. **1**
(a) Steady flow (b) Rotational flow
(c) Non steady flow (d) None of these

vi. Dipsticks are used for the **1**
(a) Pressure measurement
(b) Flow measurement
(c) Displacement measurement
(d) Level measurement

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

P.T.O.

viii. Which of the following is not a technique for preparing solid samples in IR spectroscopy? **1**
(a) Solids run in solution (b) Mull technique
(c) Solid films (d) Thin films

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. Discuss classification of industrial instruments in detail. **6**

Q.3 i. List any four applications of sensors. **4**
ii. State and explain basic architecture elements considered in sensor network. **6**
OR iii. Explain the functional configuration of a typical sensor system in detail. **6**

Q.4 i. Explain the principle used in anemometer. **3**
ii. Discuss essential functional operations of velocity measurement type flow meters. **7**
OR iii. Explain operation of optical level indicators with neat diagram. **7**

Q.5 i. What is the principle of chromatography? Explain in detail. **4**
ii. Draw a generalised diagram of geiger-muller counter and explain each component in detail. **6**
OR iii. Explain with neat diagram infrared analyzer. **6**

Q.6 Write a short on any two:
i. Temperature measuring devices **5**
ii. Chemical sensors **5**
iii. Radiation measurement **5**

******

Marking Scheme
OE00049 Industrial Instrumentation & Sensors

Q.1	i.	The accuracy of the deflection type instruments and of the null type instruments depends on (c) Linearity and calibration of spring, calibration of weights	**1**
	ii.	Accuracy of a measuring instrument indicates the (a) Closeness of the output reading to the true value	**1**
	iii.	Change in output of sensor with change in input is _____ (c) Sensitivity	**1**
	iv.	Smallest change which a sensor can detect is _____ (a) Resolution	**1**
	v.	In _____ velocity of fluid is constant on every point at a specific time. (a) Steady flow	**1**
	vi.	Dipsticks are used for the (d) Level measurement	**1**
	vii.	Chromatography is a physical method that is used to separate and analyse _____ (b) Complex mixtures	**1**
	viii.	Which of the following is not a technique for preparing solid samples in IR spectroscopy? (d) Thin films	**1**
	ix.	Which of the following can be used for measuring temperature? (b) Fluid expansion system	**1**
	x.	Which of the following is not a fundamental quantity? (b) Angle	**1**

Q.2	i.	Importance of instrumentation in industries		**4**
		At least 4 points 1 mark for each	(1 mark *4)	
	ii.	Static characteristics	3 marks	**6**
		Dynamic characteristics	3 marks	
OR	iii.	Industrial instruments		**6**
		Introduction	1 mark	
		Classification	2 marks	
		Explanation	3 marks	

Q.3	i.	Any four applications of sensors		**4**
		1 mark for each application	(1 mark * 4)	
	ii.	Basic architecture elements considered in sensor network		**6**
		Diagram	2 marks	
		Explanation	4 marks	
OR	iii.	Functional configuration	4 marks	**6**
		Diagram	2 marks	

Q.4	i.	Anemometer function	1 mark	**3**
		Principle used	2 marks	
	ii.	Functional operations	5 marks	**7**
		Diagram	2 marks	
OR	iii.	Operation of optical level indicators	5 marks	**7**
		Diagram	2 marks	

Q.5	i.	Introduction	1 mark	**4**
		Principle of chromatography	3 marks	
	ii.	Diagram of geiger-muller counter	2 marks	**6**
		Component explanation	4 marks	
OR	iii.	Infrared analyser		**6**
		Diagram	2 marks	
		Explanation	3 marks	
		Application	1 mark	

Q.6		Write a short on any two:		
	i.	Temperature measuring devices		**5**
		Different devices	2 marks	
		Explanation of devices	3 marks	
	ii.	Chemical sensors		**5**
		Different devices	2 marks	
		Explanation of devices	3 marks	
	iii.	Radiation measurement		**5**
		Introduction	2 marks	
		Diagram	1 mark	
		Explanation	2 marks	

******