Total No. of Questions: 6 *Total No. of Printed Pages:3*

Enrollment No.....

Faculty of Engineering

End Sem (Even) Examination May-2022

CS3EO01 Sensors & Transducer

Programme: B.Tech. Branch/Specialisation: CSE

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. Which among the following is not a dynamic characteristic? **1**

(a) Response speed
(b) Accuracy
(c) Retardation type measuring lag
(d) Time delay lag

ii. How systematic errors are eliminated? **1**

(a) Frequent measurement (b) Replacement of instrument
(c) Finding mean of reading (d) Finding variance of reading

iii. Smallest change which a sensor can detect is _____. **1**

(a) Resolution (b) Accuracy (c) Precision (d) Scale

iv. Which of the following statements is/are correct? **1**

S1: Transducer is a device which converts physical into electrical quantity.
S2: Transducer is also called as sensor.
(a) S1 is true & S2 is false (b) S2 is true & S1 is false
(c) Both S1 & S2 are true (d) Both S1 & S2 are false

v. The capacitive transducer works on the principle of change of capacitance which may be caused by a change in- **1**

I. Dielectric constant.
II. The overlapping area of plates.
III. Distance between the plates.

(a) I and II only (b) I and III only
(c) II and III only (d) I, II and III

P.T.O.

vi. The transducers which require external power and their output is a measure of some variables such as resistance, inductance, capacitance, etc., are called as- **1**
(a) Active transducer (b) Self generating transducer
(c) Passive transducer (d) Primary sensor

vii. A buffer Amplifier has gain of- **1**
(a) Zero (b) Infinite
(c) Unity (d) Depend upon the circuit parameter

viii. A/D converter is used for _____. **1**
(a) Converting analog to digital
(b) Converting digital to analog
(c) Converting digital to mixed signal mode
(d) Converting analog to mixed signal mode

ix. What is a data acquisition system? **1**
(a) System used for data processing, conversion and transmission
(b) Accepts data as an input
(c) Removes noise
(d) Boosts the signal

x. Telemetry includes data transfer over _____. **1**
(a) Wireless modes (b) Optical fibre link
(c) Computer link (d) All of these

Q.2 i. Compare accuracy and precision. **2**
ii. Define error. Classify different types of error in brief. **3**
iii. What are the basic elements of generalized measurement system? Explain with suitable block diagram. **5**
OR iv. What do mean by calibration? Explain the process of calibration with suitable block diagram. **5**

Q.3 i. What is transducer? Compare active and passive transducers. **2**
ii. Explain the selection criteria of a transducer. **2**
iii. Explain generalized performance of zero order and first order systems. **6**
OR iv. What are the characteristics of a transducer? Explain in detail. **6**

Q.4 i. What is Piezoelectric transducer? Explain piezoelectric effect with suitable diagram. **2**
ii. Explain the working principle of resistive transducers? Compare RTD and Thermistor. **3**
iii. What is LVDT? How we use LVDT in displacement measurement. **5**
OR iv. Explain the working principle of capacitive transducers with suitable diagrams. **5**

Q.5 i. What is need of signal conditioning? **2**
ii. Write down the characteristics of A/D converters. **3**
iii. What are the different operations which are the part of signal conditioning? Explain in detail. **5**
OR iv. Explain BCD to seven-segment display decoder in detail. **5**

Q.6 i. What are the important factors to consider when setting up a data acquisition system? **3**
ii. What do you mean by Data Acquisition System (DAS)? Explain single channel and multi-channel DAS with suitable diagrams. **7**
OR iii. What is Telemetry? Classify telemetry in detail. Also explain land line and RF telemetry with suitable diagram? **7**

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Marking Scheme

CS3EO01 Sensors & Transducer

Q.1	i.	Which among the following is not a dynamic characteristic? (b) Accuracy		**1**
	ii.	How systematic errors are eliminated? (b) Replacement of instrument		**1**
	iii.	Smallest change which a sensor can detect is _____. (a) Resolution		**1**
	iv.	Which of the following statements is/are correct? S1: Transducer is a device which converts physical into electrical quantity. S2: Transducer is also called as sensor. (a) S1 is true & S2 is false		**1**
	v.	The capacitive transducer works on the principle of change of capacitance which may be caused by a change in- I. Dielectric constant. II. The overlapping area of plates. III. Distance between the plates. (d) I, II and III		**1**
	vi.	The transducers which require external power and their output is a measure of some variables such as resistance, inductance, capacitance, etc., are called as- (c) Passive transducer		**1**
	vii.	A buffer Amplifier has gain of- (c) Unity		**1**
	viii.	A/D converter is used for _____. (a) Converting analog to digital		**1**
	ix.	What is a data acquisition system? (a) System used for data processing, conversion and transmission		**1**
	x.	Telemetry includes data transfer over _____. (d) All of these		**1**
Q.2	i.	Compare accuracy and precision.	2 Marks	**2**
	ii.	Define error. Classify different types of error in brief.	1 Mark 2 Mark	**3**
	iii.	What are the basic elements of generalized measurement system Explain Block diagram.	2 Marks 2 Marks 1 Mark	**5**
OR	iv.	What do mean by calibration Explain the process of calibration Block diagram.	2 Marks 2 Marks 1 Mark	**5**
Q.3	i.	What is transducer Compare active and passive transducers.	1 Mark 1 Mark	**2**
	ii.	Explain the selection criteria of a transducer.	2 Mark	**2**
	iii.	Explain generalized performance of zero order First order systems.	3 Marks 3 Marks	**6**
OR	iv.	Input characteristics of a transducer Output characteristics of a transducer Explain in detail.	2 Marks 2 Marks 2 Marks	**6**
Q.4	i.	What is Piezoelectric transducer Explain piezoelectric effect with suitable diagram.	1 Mark 1 Mark	**2**
	ii.	Explain the working principle of resistive transducers Compare RTD and Thermistor.	1 Mark 2 Mark	**3**
	iii.	What is LVDT How we use LVDT in displacement measurement.	2 Marks 3 Marks	**5**
OR	iv.	Explain the working principle of capacitive transducers Capacitive transducers with suitable diagrams.	2 Marks 3 Marks	**5**
Q.5	i.	What is need of signal conditioning?	2 Marks	**2**
	ii.	6 characteristics of A/D converters.	0.5 Mark each (0.5 Mark*6)	**3**
	iii.	What are the different operations which are the part of signal conditioning. Explain in detail.	2 Marks 3 Marks	**5**
OR	iv.	Explain BCD to seven-segment display decoder Implementation with diagram	2 Marks 3 Marks	**5**
Q.6	i.	Important factors to consider when setting up a data acquisition system	3 Marks	**3**
	ii.	Data Acquisition System (DAS) Explain single channel Multi-channel DAS with suitable diagrams.	3 Marks 2 Marks 2 Marks	**7**
OR	iii.	What is Telemetry Classify telemetry in detail. Also explain land line and RF telemetry with suitable diagram	2 Marks 2 Marks 1.5 Marks 1.5 Marks	**7**