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

Enrollment No.....

Faculty of Engineering

End Sem Examination May-2024

CS3EO05 Sensors & Transducers

Programme: B.Tech. Branch/Specialisation: CSE 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. Which of the following is caused by careless handling? **1**

(a) Systematic error (b) Gross error

(c) Random error (d) None of these

ii. In a measuring system what is the term used to specify a difference between higher and lower calibration values? **1**

(a) Range (b) Span (c) Drift (d) Threshold

iii. Which transducer is known as 'self-generating transducer'? **1**

(a) Active transducer (b) Passive transducer

(c) Secondary transducer (d) Analog transducer

iv. Following is not an example of transducer: **1**

(a) Analogue voltmeter (b) Thermocouple

(c) Photo electric cell (d) Pneumatic cylinder

v. For a material capacitance increases with _____. **1**

(a) Decrease in area of plates, all other factors constant

(b) Increase in distance between plates, all other factors constant

(c) Decrease in distance between plates, all other factors constant

(d) None of these

vi. Inductive proximity sensors can be effective only when the objects are of _____ materials. **1**

(a) Ferro magnetic

(b) Diamagnetic

(c) Paramagnetic

(d) All of these

vii. Following is the coded output: **1**
(a) Modulation of amplitude
(b) Modulation of frequency
(c) Modulation of pulse width
(d) All of these

viii. Which element among the following is used to modify the data before display? **1**
(a) Data presentation element
(b) Data transmission element
(c) Data processing element
(d) Variable manipulation element

ix. Digital acquisition systems are used when _____. **1**
(a) Bandwidth is high (b) Bandwidth is medium
(c) Bandwidth is zero (d) Bandwidth is low

x. For lower accuracies _____. **1**
(a) Digital acquisition system is used
(b) Both digital and analog acquisition systems are used
(c) Analog acquisition system is used
(d) Mechanical data acquisition system is used

Q.2 Attempt any two:
i. What are the classifications of instrument errors? Explain about the causes and remedies for each error in detail. **5**
ii. Discuss the significance of calibration of measuring instruments in detail. **5**
iii. Define error, accuracy and precision of measurements in detail. **5**

Q.3 Attempt any two:
i. Discuss the significance of static and dynamic characteristics of transducers. **5**
ii. Explain the working and significance of zero order and first order systems. **5**
iii. List the factors to be considered for selection of transducer for a particular application. **5**

Q.4 Attempt any two:
i. Explain the working principle of LVDT with suitable diagrams. **5**
ii. Discuss the functioning of Piezoelectric transducer with suitable diagrams. **5**
iii. Explain the terms sensitivity and linearity of transducers with an example for each. **5**

Q.5 Attempt any two:
i. Explain the working of BCD to 7-Segment Display Decoder. **5**
ii. Explain the requisite characteristics of a filter for signal conditioning. **5**
iii. Explain the working of analog to digital converters. **5**

Q.6 Attempt any two:
i. Draw and explain the block diagram of data acquisition systems. **5**
ii. Discuss the single channel and multi-channel data acquisition system in brief. **5**
iii. Compare landline and RF telemetry in detail. **5**

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Marking Scheme

CS3EO05 (T) Sensors and Transducers

Q.1	i)	B		**1**
	ii)	B		**1**
	iii)	A		**1**
	iv)	A		**1**
	v)	C		**1**
	vi)	A		**1**
	vii)	D		**1**
	viii)	C		**1**
	ix)	D		**1**
	x)	C		**1**

Q.2 i. What are the classifications of instrument errors? Explain about the causes and remedies for each error in detail **5**

classifications of instrument errors - 2 marks
causes and remedies - 3 marks

ii. Discuss the significance of calibration of measuring instruments in detail. **5**

Definition - 2 marks
significance of calibration - 3 marks

iii. Define error, accuracy and precision of measurements in detail. **5**

Definition - 3 marks
Examples and importance - 2 marks

Q.3 i. Discuss the significance of static and dynamic characteristics of Transducers. **5**

Definition of static and dynamic characteristic - 2 marks
Significance - 3 marks

ii. Explain the working and significance of Zero Order and First Order Systems. **5**

Working principle of both - 4 mark
Significance - 1 mark

iii. List the factors to be considered for selection of transducer for a particular application. **5**

Each factor with justification - 1 mark each

Q.4 i. Explain the working principle of LVDT with suitable diagrams. **5**

Diagram–2 marks
Description - 3 marks

ii. Discuss the functioning of Piezoelectric transducer with suitable diagrams. **5**

Diagram - 2 marks
Description - 3 marks

iii. Explain the terms sensitivity and linearity of transducers with an example for each. **5**

Definition of sensitivity - 2 marks
Definition of linearity - 2 marks
Example of each - 1 mark

Q.5 i. Discuss the functional principle of BCD to 7-Segment Display Decoder. **5**

Diagram - 2 marks
Description - 3 marks

ii. Explain the requisite characteristics of a filter for signal conditioning. **5**

Each characteristic with justification - 1 mark each

iii. Explain the working of Analog to Digital converters. **5**

Diagram - 2 marks
Description - 3 marks

Q.6 Attempt any two

i. Draw and explain the Block Diagram of Data Acquisition Systems. **5**

Diagram - 2 marks
Description - 3 marks

ii. Discuss the Single channel and multi-channel data Acquisition system in brief. **5**

Diagram - 2 marks
Description - 3 marks

iii. Compare landline and RF telemetry in detail. **5**

Diagram - 2 marks
Comparison - 3 marks

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