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

Enrollment No.....

Faculty of Engineering

End Sem (Odd) Examination Dec-2022

AU3EL07 / FT3EL06 / ME3EL01

Measurement & Instrumentation

Programme: B.Tech. Branch/Specialisation: AU/FT/ME

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 smallest change in input that will cause a change in output is called- **1**

(a) Drift (b) Resolution (c) Threshold (d) Hysteresis

ii. The radius of sphere is estimated as (50±0.5) mm. The estimated error in its mass is-

(a) 3% (b) 0.1%

(c) 1% (d) Radius and mass are not related

iii. Which is a torque measuring instrument? **1**

(a) Thermometer (b) Vibrometer

(c) Dynamometer (d) Strain gauge

iv. Strain measurement using strain gauge is based on _____. **1**

(a) Variable resistance (b) Capacitance

(c) Wheatstone bridge (d) None of these

v. Working of thermocouple is based on- **1**

(a) Conservation of momentum

(b) Seebeck effect

(c) Uncertainty principle

(d) Hysteresis

vi. Which of the following is NOT correct statement? **1**

(a) Venturimeter is based on Bernoulli's principle

(b) Venturimeter measures flow rate

(c) Orifice-meter measures flow

(d) All are correct

P.T.O.

vii. Which is NOT correct? **1**
(a) Comparators are used to measure dimensions
(b) Comparators compares dimensions with some standard dimensions
(c) Both (a) and (b) are correct
(d) Both (a) and (b) are not correct

viii. Two gears should have _____ to form a gear train. **1**
(a) Same diameter (b) Same material
(c) Same module (d) Same no. of teeth

ix. Which is NOT correct? **1**
(a) CRT displays produce more heat
(b) CRT displays consumes more power
(c) LED displays are high current device
(d) All are correct

x. Mechanical transducers sense- **1**
(a) Biological parameters (b) Physical parameters
(c) Electrical parameters (d) Chemical parameters

Q.2 i. What is different type of errors in measurements? **4**
ii. Define calibration and explain static and dynamic calibration. **6**
OR iii. Explain time constant in first order measuring instrument. **6**

Q.3 i. Explain the principle of resistance strain gauge. **4**
ii. Explain working of LVDT with a sketch. **6**
OR iii. Discuss various types of dynamometers. **6**

Q.4 i. What is a pyrometer. Discuss briefly. **3**
ii. What are various functional elements of a measuring instruments. Discuss them taking the example of liquid in glass thermometer. **7**
OR iii. What is differential pressure measurement. Draw a diagram of measuring instrument which is used to measure differential pressures. **7**

Q.5 i. Define surface finish and how it is measured. **3**
ii. Draw diagram of square threads and discuss all terms related to it. **7**

OR iii. Discuss construction and working of profile meter. **7**

Q.6 Write short note on any two:
i. Analogue voltmeters **5**
ii. Data acquisition system **5**
iii. Transducers and its classification. **5**

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Scheme of Marking

	Faculty of Engineering End Sem (Odd) Examination Dec-2022 AU3EL07-FT3EL06-ME3EL01-Measurement & Instrumentation
	Programme: B.Tech. | Branch/Specialisation:

Note: The Paper Setter should provide the answer wise splitting of the marks in the scheme below.

Q.1	i)	b. Resolution	1
	ii)	a. 3%	1
	iii)	c. Dynamometer	1
	iv)	c.Whetstone Bridge	1
	v)	b.Seebeck effect	1
	vi)	All are correct – awarded 1 marks	1
	vii)	d. Both (a) and (b) are not correct	1
	viii)	c.Same module	1
	ix)	All are correct – awarded 1 marks	1
	x)	b.Physical parameters	1
Q.2	i.	Listing Different errors: 2 Brief description of at least two of them: 2	
	ii.	Brief description of calibration, Drawing input-output curve (calibration): 3 marks Static and dynamic calibration: 3 marks	
OR	iii.	Discussing Time constant and its units (same as time units):3 First order measuring instrument: 3	
Q.3	i.	Drawing 1 marks Working of RTD : 3 marks	
	ii.	Proper LVDT sketch: 3 marks Working: 4 marks	
OR	iii.	Dynamometers:3 Absorption and transmission:4	
Q.4	i.	Discussing pyrometer as non-contact temperature measuring device: 3 marks	
	ii.	Various functional elements (sensor, transducer, amplifier/signal conditioner, output stage): 3 marks Showing all these elements in Liquid in Glass Thermometer: 4	
OR	iii.	Discussion of pressure differential measurement: 3 Diagram and working 4	
Q.5	i.	Correct Definition of surface finish and its measurement:3	
	ii.	Drawing of square thread: 2 marks Terms related to it: 5 marks	
OR	iii.	Diagram and construction: 4 marks Working 3 marks	
Q.6			
	i.	Weightage for Drawing in each: 2 marks Discussion and working: 3 marks	
	ii.	Weightage for Drawing in each: 2 marks Discussion and working: 3 marks	
	iii.	Weightage for Drawing in each: 2 marks Discussion and working: 3 marks	