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

Enrollment No.....

Faculty of Engineering

End Sem Examination Dec 2024

AU3EL07 Measurement & Instrumentation

Programme: B.Tech. Branch/Specialisation: AU

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.

			Marks	BL	PO	CO	PSO
Q.1	i.	The physical quantity or a characteristic condition which is the object of measurement in an instrumentation is called- (a) Measurand (b) Standard (c) Measurement (d) Sensitivity	**1**	2	1	1	1
	ii.	The output stage of a generalised measurement system may comprise of- (a) Manipulator (b) Transducer (c) Indicating or recording unit (d) All of these	**1**	4	1	1	1
	iii.	Strain gauges can be used measurement of- (a) Pressure (b) Temperature (c) Force (d) All of these	**1**	3	4	2	1
	iv.	Dynamometers are used for measuring- (a) Torque (b) Pressure (c) Temperature (d) Humidity	**1**	3	4	2	2
	v.	Thermal expansion of a solid is employed in: (a) Thermocouple (b) Resistance thermometer (c) Bulb thermometer (d) Bimetal element thermometer	**1**	4	1	2	1

P.T.O.

vi.	Which of the following may be measured by the deflection of an elastic element, by balancing against a known force, by the acceleration produced in an object of known mass: (a) Force (b) Pressure (c) Temperature (d) Level	**1**	2	4	2	2
vii.	CMM is- (a) Coordinate Measuring machine (b) Corner Measuring Machine (c) Combined Milling Machine (d) None of these	**1**	1	5	3	1
viii.	Profile meters are used for- (a) Linear Measurements (b) Angular Measurements (c) Surface Finish measurements (d) None of these	**1**	1	5	3	1
ix.	The quantity or condition of the controlled system which is directly, measured or controlled- (a) Set point (b) Deviation (c) Controlled variable (d) Command signal	**1**	3	4	3	1
x.	The time required for the controlled variable to reach a specified value after the application of a step input is called- (a) Rise time (b) Settling time (c) Response time (d) Peak time	**1**	2	4	3	2
Q.2 i.	Classify measurement errors. Write one example of each error.	**4**	1	4	1	1
ii.	Explain zero order, first order and second order systems.	**6**	2	4	1	1
OR iii.	Critically explain static and dynamic calibration.	**6**	2	4	1	1

Q.3 i.	Explain torque measurement. Name the devices used for the it.	**3**	3	5	2	1
ii.	Explain various strain gauge electrical circuits.	**7**	2	4	2	1
OR iii.	Explain displacement measurement. Explain principle and working of LVDT.	**7**	1	4	2	1
Q.4 i.	Explain principle and working resistance temperature detector with neat sketch.	**4**	1	5	2	2
ii.	Classify flow measurement devices. Explain principle and working of Venturi meter with neat diagram.	**6**	2	4	2	1
OR iii.	Classify pressure measuring devices. Explain principle and working of McLeod Gauge with neat diagram.	**6**	2	4	2	1
Q.5 i.	Classify linear and angular measuring devices. Write applications of each type.	**4**	3	5	3	2
ii.	Explain principle and working of autocollimator with neat sketch.	**6**	2	5	3	1
OR iii.	Explain CMM. Explain working of Gantry CMM.	**6**	2	5	3	1
Q.6	Write short notes on any two-					
i.	Transducers used in measuring devices.	**5**	1	4	1	2
ii.	Analog to digital and digital to analog converters.	**5**	1	5	2	2
iii.	Display devices used in measuring instruments.	**5**	1	4	2	2

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Marking Scheme
AU3EL07 (T) Measurement & Instrumentation (T)

				Marks
Q.1	i		(a) Measurand	**1**
	ii		(c) indicating or recording unit	**1**
	iii		(d) All the Above	**1**
	iv		(a) Torque	**1**
	v		(d) Bimetal element Thermometer	**1**
	vi		(a) Force	**1**
	vii		(a) Coordinate Measuring machine	**1**
	viii		(c) Surface Finish measurements	**1**
	ix		(a) Set point	**1**
	x		(c)Response time	**1**
Q.2	i		Classify measurement errors. Write one example of each error Classification: 02 Marks Example of each: 02 Marks	**4**
		ii	Explain Zero Order, First Order and Second Order systems. Award 02 Marks for each type	**6**
		iii	Critically explain Static and Dynamic Calibration. Award 03 Marks for each type of calibration	**6**
Q.3	i		Explain torque measurement. Name the devices used for the it Torque Measurement: 02 Marks Name of devices: 01 Marks	**3**
	ii		Explain various strain gauge electrical circuits 02 Marks for each Circuit described	**7**
OR	iii		Explain displacement measurement. Explain principle and working of LVDT. Displacement Measurement: 03 Marks LVDT Principle and Working: 04 Marks	**7**
Q.4	i		Explain principle and working Resistance temperature detector with neat sketch Principle: 02 Marks Working: 02 Marks	**4**
	ii		Classify Flow measurement devices? Explain principle and working of Venturi meter with neat diagram. Classification: 02 Marks Principle and Working: 04 Marks	**6**
OR	iii		Classify Pressure measuring devices. Explain principle and working of McLeod Gauge with neat diagram. Classification: 02 Marks Principle and Working: 04 Marks	**6**
Q.5	i		Classify linear and angular measuring devices. Write applications of each type Classification: 02 Marks Applications: 02 Marks	**4**
	ii		Explain principle and working of Autocollimator with neat sketch. Principle: 02 Marks Working: 04 Marks	**6**
OR	iii		Explain CMM. Explain working of Gantry CMM. CMM Definition: 02 Marks Gantry CMM Explanation: 04 Marks	**6**
Q.6			Write Short notes on any two	
		i	Transducers used in Measuring devices	**5**
		ii	Analog to Digital and Digital to Analog converters	**5**
OR		iii	Display devices used in measuring instruments	**5**

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P.T.O.