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

Enrollment No.....

Faculty of Engineering

End Sem (Odd) Examination Dec-2022

RA3EL01 / RA3CO27 Sensors & Instrumentation

Programme: B.Tech. Branch/Specialisation: RA

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 physical quantity or a characteristic condition which is the object of measurement in an instrumentation is called- **1**

(a) Measurand (b) Standard
(c) Measurement (d) Sensitivity

ii. Error caused by vibrations of the apparatus- **1**

(a) Systematic error (b) Gross error
(c) Random error (d) None of these

iii. Technical name of the thermometer we use at home is- **1**

(a) Thermistor
(b) Thermocouple
(c) Resistance temperature detector
(d) Liquid in glass thermometer

iv. Instrument used for temperature measurement using resistance wire- **1**

(a) RTD (b) Thermocouple
(c) Both of (a) and (b) (d) None of these

v. Which is a not pressure measuring instrument? **1**

(a) Manometer (b) Bourden's Gauge
(c) Mc Leod Gauge (d) All of these

vi. Instrument used for low pressure measurement- **1**

(a) Manometer (b) Bourden's gauge
(c) Mc Leod gauge (d) None of these

vii. Which is a not flow measuring instrument? **1**

(a) Venturimeter (b) Rotameter
(c) Orificemeter (d) Pyrometer

viii. Which is a level measuring instrument? **1**

(a) Float gauge (b) Rotameter
(c) RTD (d) Thermocouple

ix. The output stage of a generalised measurement system is- **1**

(a) Manipulator (b) Transducer
(c) Indicating or recording unit (d) All of these

x. Which is a not a recorder instrument? **1**

(a) Chain drive mechanism (b) Strip chart recorder
(c) Magnetic tape recorder (d) Pyrometer

Q.2 i. State basic requirements of getting meaningful result from measurement. **2**

ii. Draw block diagram of generalised measurement system. Explain various functional elements of measurement system. **8**

OR iii. What are static characteristics of measurement system? How do they differ from dynamic characteristic. **8**

Q.3 i. Enlist various temperature measuring instruments. **2**

ii. Explain principle and working of resistance temperature detector. **8**

OR iii. Explain principle and working of infrared pyrometer with neat diagram. **8**

Q.4 i. Enlist various pressure measuring instruments with one application each. **3**

ii. Explain principle and working of capacitive pressure transducers with neat diagram. **7**

OR iii. Explain differential pressure transmitters with neat diagram. **7**

Q.5 i. Enlist various flow measuring instruments. Write application of each flow measuring instrument. **3**

ii. Explain principle and working of electromagnetic flow meters. **7**

OR iii. Explain principle and working of Venturimeter. **7**

Q.6 Write short note on any two of the following:

i. Recorder operating mechanism in measuring devices. **5**

ii. X- Y Type recorders **5**

iii. Magnetic tape recorders **5**

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Scheme of Marking

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

Q.1	i)	a) Measurand	1
	ii)	a) Systematic error	1
	iii)	d) Liquid in glass thermometer	1
	iv)	c) Both of (a) & (b)	1
	v)	d) None of these	1
	vi)	c) Mc Leod gauge	1
	vii)	d) Pyrometer	1
	viii)	a) Float gauge	1
	ix)	c) Indicating or recording unit	1
	x)	a) Chain drive mechanism	1
Q.2	i.	Explain basic measurement requirements 2 marks	
	ii.	Block diagram 3 marks Explain elements function 5 marks (each 1 marks)	
OR	iii.	Static characteristic 5 marks (each 1 marks) Differ from Dynamic characteristic 3 marks	
Q.3	i.	Temperature Measuring instruments 1 marks each	
	ii.	Block diagrams 2 marks. Working principle 6 marks	
OR	iii.	Block diagrams 2 marks. Working principle 6 marks	
Q.4	i.	Measuring instruments 1 marks each	
	ii.	Block diagrams 2 marks. Working principle 5 marks	
OR	iii.	Block diagrams 2 marks. Working principle 5 marks	
Q.5	i.	Flow Measuring instruments 1 marks each	
	ii.	Block diagrams 2 marks. Working principle 5 marks	
OR	iii.	Block diagrams 2 marks. Working principle 5 marks	
Q.6			
	i.	Block diagrams 2 marks. Working principle 3 marks	
	ii.	Block diagrams 2 marks. Working principle 3 marks	
	iii.	Block diagrams 2 marks. Working principle 3 marks	

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