Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–V(New) • EXAMINATION – WINTER 2016

Subject Code:2152408 **Date:19/11/2016**

Subject Name:Industrial Instrumentation

Time:10:30 AM to 01:00 PM **Total Marks: 70**

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

			MARKS
Q.1		**Short Questions: Fill in the blanks with appropriate options given into bracket.**	**14**
	1	Pirani Gauge is applied for _____ measurement. (pressure / flow / force)	
	2	For measurement of _____, Hot Wire Anemometer is used. (pressure / flow / force)	
	3	Piezo-electric transducers are _____ transducers. (active / passive / active and inverse)	
	4	Piezo-electric transducers work when we apply to it _____. (heat / mechanical force / vibration)	
	5	LVDT is a / an _____ transducer. (eddy current / inductive / resistive)	
	6	Load cell is essentially a _____. (thermocouple / strain gauge / thermistor)	
	7	Pyrometer is used to measure _____. (strain / pressure / temperature)	
	8	The device used for measurement of temperature exceeding 1500° C is _____. (radiation pyrometer / RTD / thermopile)	
	9	The most suitable device for measuring temperature of a furnace is a _____. (RTD / thermistor / optical pyrometer)	
	10	Rotameter is employed for measuring _____. (viscosity / flow / rotation)	
	11	_____ is commonly used for measurement of temperature. (strain gauge / thermistor / piezo-crystal)	
	12	_____ should be incorporated in the RTD to make a temperature sensing bridge most sensitive to temperature. (platinum / nickel / thermistor)	
	13	A thermos-couple is a junction of _____ metals. (two similar / two dissimilar)	
	14	For surface temperature measurement one can use _____. (RTD / thermos-couple / strain gauge)	
Q.2	**(a)**	List the advantages of LVDT.	**03**
	(b)	Explain the construction and working of LVDT.	**04**
	(c)	Derive the equation of the gauge factor for the resistance strain gauge.	**07**
		OR	
	(c)	Explain Solid State Sensors for temperature measurement.	**07**
Q.3	**(a)**	Enumerate the advantages and disadvantages of Ultrasonic Flow Meter.	**03**
	(b)	Explain Ultrasonic Flow Meter.	**04**

	(c)	Explain the construction and working of Variable Capacitance Transducer for displacement measurement.	**07**
		OR	
Q.3	**(a)**	Explain load cell.	**03**
	(b)	Discuss Proximity Torque Sensors.	**04**
	(c)	Discuss factors affecting strain measurements. Enlist the types of Strain Gauge. Explain the theory of operation of Resistive Strain Gauge.	**07**
Q.4	**(a)**	What do you mean by electrical transducer?	**03**
	(b)	What are the basic requirements of a transducer?	**04**
	(c)	Discuss in detail Piezo-electric Torque Transducer.	**07**
		OR	
Q.4	**(a)**	Explain Pressure Switch	**03**
	(b)	Discuss IC's used for Pressure Measurement.	**04**
	(c)	Explain Electrodynamic Pressure Transducer used for pressure measurement.	**07**
Q.5	**(a)**	Discuss Ultrasonic Level Sensor.	**03**
	(b)	Discuss Optical Level Detector.	**04**
	(c)	Explain the construction, working and characteristics LASER level sensor. List the advantages of LASER level sensor.	**07**
		OR	
Q.5	**(a)**	Discuss Smart Sensors.	**03**
	(b)	Write a short-note on Thermocouples.	**04**
	(c)	Explain the construction and working of RTD. Also enlist the advantages and disadvantages.	**07**

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