Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VII • EXAMINATION – SUMMER • 2014

Subject Code: 170904 **Date: 29-05-2014**

Subject Name: Industrial Instrumentation

Time: 02:30 pm - 05:00 pm **Total Marks: 70**

Instructions:

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

Q.1	**(a)**	Explain the following characteristics of a Transducer. (i)Linearity (ii) Resolution (iii) Sensitivity (iv) Threshold (v) Repeatability (vi) Calibration (vii) Hysteresis.	**7**
	(b)	Differentiate between the following with suitable examples of each: (i) Active and Passive Transducer. (ii) Primary and Secondary Transducer (iii) Analog and Digital Transducer	**7**
Q.2	**(a)**	Explain temperature compensation in Strain gauges using Dummy gauge.	**7**
	(b)	What is Piezo-resistive effect? Explain the term Gauge Factor with respect to resistance strain gauge and obtain its expression in terms of poission's ratio.	**7**
		OR	
	(b)	What is load cell? Explain Proving ring and Hydraulic load cell.	**7**
Q.3	**(a)**	List different types of thermocouples used for temperature measurement. Explain thermoelectric laws and the method for cold junction compensation in thermocouple	**7**
	(b)	Give the merits, demerits and applications of (i) Platinum resistance thermometer (ii)Thermister (iii) Thermocouple for measurement of temperature.	**7**
		OR	
Q.3	**(a)**	What is synchros? Explain in short control type synchro system.	**7**
	(b)	Draw the schematic of X-Y recorder and describe it's working.	**7**
Q.4	**(a)**	State and explain various principles of operation of Capacitive Transducers for level measurements.	**7**
	(b)	What is Torque? State different types of torque measurement techniques and explain any one in brief.	**7**
		OR	
Q.4	**(a)**	Explain Black Body concepts for very high temperature measurements. Describe with neat diagram how disappearing filament type optical pyrometer can measure very high temperature. Mention it's merit and demerits.	**7**
	(b)	Describe basic difference between a variable area type flow meter and differential pressure type flow meter. With necessary formula describe how Rotameter is used to measure the flow of given liquid.	**7**
Q.5	**(a)**	Describe with neat diagram how strain gauge is used for torque and pressure measurement	**7**
	(b)	Describe the application of LVDT for pressure measurement.	**7**
		OR	
Q.5	**(a)**	Describe the schematic of strip chart recorder and describe it's working and construction of each components. Compare with circular chart recorder	**7**
	(b)	Describe the construction and working principle of Electro-magnetic type flow meter, with it's merit and demerits.	**7**

****