Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–V • EXAMINATION – WINTER • 2014

Subject Code: 151702 Date: 03-12-2014

Subject Name: Sensors and Signal Conditioning

Time: 10.30 am - 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.**

Q.1 **(a)** Define the role of sensor. Discuss its different types. Also explain different characteristics of sensor. **07**

(b) Give the difference between: **07**

i) Primary transducer and secondary transducer.
ii) PMMC (Permanent Magnet Moving Coil) and MI (Moving Iron) System
iii) Repeatability and Reproducibility
iv) Pulse code modulation and Pulse width modulation
v) Active filter and Passive filer
vi) Sample & hold and Track & hold
vii) Curvilinear and Rectilinear tracing system

Q.2 **(a)** Discuss the basic principle of hot wire resistance sensor. Explain hot wire Anemometry and its role in the measurement of gas flow rates in closed pipes. **07**

(b) Explain the construction of resistive strain gauge with its basic principle. Also discuss its application for the measurement of force and flow. **07**

OR

(b) Describe the use of resistive transducer for measuring the concentration of electrolytic solution. **07**

Q.3 **(a)** Discuss the role of capacitive transducers to monitor the thickness of insulating sheer in motion, without making physical contact. Also comment on the sensitivity and linearity of the system **07**

(b) Explain the basic principle of electromechanical transducer. Discuss variable reluctance tachometer in detail. **07**

OR

Q.3 **(a)** Discuss hall effect phenomenon. Explain its application. **07**

(b) Discuss the principle of inductive transducers. Explain LVDT with its application. Also discuss its displacement-voltage characteristic. **07**

Q.4 **(a)** What is photoelectric phenomenon? Explain the basic principle of photo conductive and photo emissive transducers. **07**

(b) Discuss the role of op-amp as a comparator. Also discuss the function of ZCD (Zero Crossing Detector) and Schmitt trigger with neat circuit diagram and input-output waveform. **07**

OR

Q.4 **(a)** What is pH? Explain different types of pH electrodes in detail. **07**

(b) Draw and design sine and square wave oscillator with oscillating frequency of 5 KHz. Explain their working in brief. **07**

Q.5 **(a)** Discuss the role of data logger. Describe different stages of data logger with its internal block diagram. **07**

(b) Draw and explain the function of Strip chart and X-Y recorders. **07**

OR

Q.5	**(a)**	Draw circuit diagram of instrumentation amplifier and explain its function. Also Derive its gain equation.	**07**
	(b)	Explain the function of CRT with neat diagram.	**07**

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