Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–V • EXAMINATION – SUMMER • 2015

Subject Code: 151702 **Date: 11/05/2015**

Subject Name: Sensors and Signal conditioning

Time: 02.30pm-05.00pm **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 operations of 'multiplexing' and 'demultiplexing' and indicate their application in instrumentation.	**07**
	(b)	What is the difference between a voltage controlled oscillator and voltage to frequency counter?	**07**
Q.2	**(a)**	Explain active electric filter. Explain one of each with draw necessary circuit diagram and calculation.	**07**
	(b)	Define measurement, Instrument, Instrumentation and Calibration. Explain the need of measurement, in detail.	**07**
		OR	
	(b)	Explain Capacitive level transducer for use in insulating and conducting liquids and for use in conducting liquid only. Give its equivalent capacitance Circuit.	**07**
Q.3	**(a)**	What are data acquisition systems? What is their role in the field of Instrumentation, Explain it with necessary block diagram.	**07**
	(b)	What are the indirect digital transducers? explain with suitable example.	**07**
		OR	
Q.3	**(a)**	Explain process of calibration with suitable example.	**07**
	(b)	List the radiation range of nuclear gauge. Describe its construction, working, Benefits and limitation.	**07**
Q.4	**(a)**	Describe the construction features of magnetostrictive transducer and obtain input and output relationship with application.	**07**
	(b)	Describe the construction and operation of a thermal conductivity gauge and show that it can be used for analysis binary mixtures.	**07**
		OR	
Q.4	**(a)**	Explain the Schmitt Trigger ckt with necessary calculation/diagram/waveforms.	**07**
	(b)	Explain how electrode system are designs for measurement of hydrogen(pH) Ion concentration and indicate the problems associate with the measurement.	**07**
Q.5	**(a)**	Explain Piezoelectric Acceleration Transducer, in detail.	**07**
	(b)	Draw functional block diagram of Measurement System and describe each Component in detail.	**07**
		OR	
Q.5	**(a)**	Explain Photo electric effect. Compare performance and application of Photovoltaic, Photo-emissive and Photo-conductive transducer.	**07**
	(b)	Explain concept of Resistive Strain Transducer with its basic equation. Also Draw and Explain strain gauge whetstone bridge circuits for temperature compensation using one active and one dummy strain gauge, two active gauge on the same side, two active opposite sides.	**07**

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