Seat No.: _____ *Enrolment No._____*

GUJARAT TECHNOLOGICAL UNIVERSITY

M. E. IST Semester–Remedial Examination – July- 2011

Subject code: 713102N

Subject Name: Biosensors & Biomems

Date:08/07/2011 **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)**	What is Gauge Factor? Which methods are used to determine gauge factor ?	**07**
	(b)	Write difference between thermocouple and RTD temperature measurement.	**07**
Q.2	**(a)**	Explain how strain gauge is used in pressure measurement system with all necessary equation and diagrams.	**07**
	(b)	Explain working of LVDT with neat diagram. Also explain its signal conditioning circuit.	**07**
		OR	
	(b)	A copper resistance thermometer is to be used in a temperature measurement system that must provide an output voltage of 0 V at 0º Cand 1.0V at 100 º C. The sensor has four terminals and has resistance of 10Ω at 25 º C. Design a signal conditioning circuit using operational amplifier op27. Excite the sensor with 1mA DC current.	**07**
Q.3	**(a)**	Explain various kinds of load cells with equations and neat diagram. Draw its signal conditioning circuit.	**07**
	(b)	With help of neat diagram explain working of electromagnetic flow meter. Can we place this flow meter vertically to measure flow? If yes why? And if No why?	**07**
		OR	
Q.3	**(a)**	Explain capacitance type level sensor with equation. What is inherent drawback in it?	**07**
	(b)	Explain with neat diagram functioning of ultrasonic type flow meter.	**07**
Q.4	**(a)**	Explain functioning of cross correlation flow meter with equation.	**07**
	(b)	What are MEMS? How does physical property of MEMS differ from simple systems? What are biosensors?	**07**
		OR	
Q.4	**(a)**	What are smart sensors? Explain in detail working of neurosensor.	**07**
	(b)	Explain with example how biosensor is used for measurement of chemical.	**07**
Q.5	**(a)**	What are amperometric sensors? Explain with neat diagram.	**07**
	(b)	Explain various techniques used for thin film deposition.	**07**
		OR	
Q.5	**(a)**	What is NTC thermistor? Explain signal conditioning circuit of it.	**07**
	(b)	Explain dual wavelength IR radiation thermometers.	**07**

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