Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

ME – SEMESTER I (NEW) EXAMINATION – SUMMER 2017

Subject Code: 2713102 **Date:11/05/2017**

Subject Name: Biosensors & Biomems

Time:02:30 p.m. to 05:00 p.m. **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 biosensors? Explain glucose biosensor, working based on the Clark oxygen electrode.	**07**
	(b)	Give examples enzyme biosensors. Enlist advantages and disadvantages of Enzymes based biosensors.	**07**
Q.2	**(a)**	Write a short note on FET based transducers.	**07**
	(b)	Explain following terms • Beer-Lambert's law • Snell's Law for optical fiber • bio/chemiluminescence	**07**
		OR	
	(b)	Write a short note on biochips and biosensor arrays.	**07**
Q.3	**(a)**	What is BioMEMS? Explain different types of materials used for BioMEMS.	**07**
	(b)	Derive the equation of sensitivity for parallel plate capacitor due to change in distance between two plates.	**07**
		OR	
Q.3	**(a)**	Enlist and explain general properties of input transducers.	**07**
	(b)	Enlist variable resistance transducers. Explain any one transducers with necessary circuits/steps for measurement.	**07**
Q.4	**(a)**	Explain use of Electro dynamic & magnetostrictive transducers for physical quantity measurements.	**07**
	(b)	Explain technical design aspects of implantable sensors for long-term monitoring.	**07**
		OR	
Q.4	**(a)**	Discuss modern sensor technology for urea content determination.	**07**
	(b)	Explain fabrication process of BioMEMs with necessary schematics.	**07**
Q.5	**(a)**	Discuss the thermal sensors and actuators concept working based on thermal expansion.	**07**
	(b)	Write a short note on micro total analysis systems (MicroTAS) detection and measurement methods.	**07**
		OR	
Q.5	**(a)**	Discuss role of MEMS in drug delivery systems.	**07**
	(b)	Explain any one application of amperometric transducers.	**07**

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