Seat No.: _____ **Enrolment No._____**

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–V (OLD) - EXAMINATION – SUMMER 2017

Subject Code: 150302 **Date: 08/05/2017**

Subject Name: Biomedical Transducers

Time: 02:30 PM to 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.**
4.

Q.1	**(a)**	Give classification of transducers with their transduction principles & related examples.	**07**
	(b)	Write a short note on Nano sensors for Biomedical applications.	**07**
Q.2	**(a)**	Explain working of Polarographic clark PO_2 sensor with its constructional diagram.	**07**
	(b)	Explain the thermocouple temperature transducer in detail with cold junction compensation technique.	**07**
		OR	
	(b)	A nickel wire RTD has 100 ohm resistance at 0 degree Celsius. If the diameter of the Wire used is 0.002 mm, find the length of the wire element. The resistance temperature co-efficient And the resistivity of nickel are 0.0068 /C and 8.7 x 10^{-6} ohm-cm respectively. Calculate Its resistance at steam point when used in a central autoclave of a hospital	**07**
Q.3	**(a)**	Explain the working principle of enzyme based glucose sensor.	**07**
	(b)	Explain working of Nuclear radiation transducers.	**07**
		OR	
Q.3	**(a)**	Explain working of ultrasonic blood flow meter with necessary equations.	**07**
	(b)	Explain working of Electromagnetic Blood flow meter with schematic diagram.	**07**
Q.4	**(a)**	Explain How resistive potentiometric used for translational and angular displacement measurement and also derive necessary equations.	**07**
	(b)	Explain working of Air flow transducer for Fleish pneumotachometer.	**07**
		OR	
Q.4	**(a)**	Explain working of Indirect Blood pressure measurement techniques.	**07**
	(b)	Explain the construction and working of LVDT with the help of a neat diagram. Draw the input- output characteristics of LVDT. Mention its advantages and limitations.	**07**
Q.5	**(a)**	Explain Electrical design consideration for the Generalized Instrumentation.	**07**
	(b)	Explain working of optical pyrometer with schematic diagram.	**07**
		OR	
Q.5	**(a)**	Explain a quarter bridge circuit using a strain gauge to produce an output Voltage in response to applied strain. What is the significance of temperature Compensation in such measurement and how can this be accomplished?	**07**
	(b)	Write a short note on various body surface recording electrodes.	**07**

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