Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

ME - SEMESTER–I(New course)• EXAMINATION – WINTER- 2015

Subject Code: 2713108 **Date: 01/01/2016**

Subject Name: Medical Instrumentation & systems

Time:2:30 pm to 5:00 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)**	Enlist Static Limitations of Operational Amplifier and explain any two of them in detail.	**07**
	(b)	Explain switched capacitor type filter in detail with its necessary circuit and equations.	**07**
Q.2	**(a)**	Design and derive the necessary equation for the signal conditioning circuit to convert the current in to its equivalent voltage. How can we improve the sensitivity of I-V converters?	**07**
	(b)	Enlist Electrical Safety issues in Biomedical Instrumentation system. Discuss any three in details.	**07**
		OR	
	(b)	State merits of using Low noise of amplifier over conventional amplifier in medical instrumentation. Explain briefly Low noise amplifier with its necessary equation.	**07**
Q.3	**(a)**	What is need of Isolation of Amplifier in Biomedical Instrumentation? Explain it with any application.	**07**
	(b)	What is the importance of using Instrumentation amplifier in biomedical application? Derive equation of gain for instrumentation amplifier.	**07**
		OR	
Q.3	**(a)**	Write an introductory notes on Modulation and Demodulation techniques for Biomedical Signals.	**07**
	(b)	Differentiate between active filters and passive filter. Explain first order high pass active filter with its overall gain equation.	**07**
Q.4	**(a)**	What are the sources of random noises in medical instrumentation system? Give their properties.	**07**
	(b)	Write Short on voltage controlled oscillators with necessary schematic and equations. Explain its importance in medical instrumentation.	**07**
		OR	
Q.4	**(a)**	Draw and explain the noise equivalent circuit for the BJT amplifier.	**07**
	(b)	Write Short on Current controlled oscillators with necessary schematic and equations. Explain its importance in medical instrumentation.	**07**
Q.5	**(a)**	Explain working of weighted capacitor type DAC. Derive relation between analog output and digital input.	**07**
	(b)	Give statistical related to noise in Resistors.	**07**
		OR	
Q.5	**(a)**	Explain working of successive approximation type ADC.	**07**
	(b)	Explain two-noise source model for a noisy amplifiers.	**07**

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