Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

ME – SEMESTER-1 (NEW) EXAMINATION – WINTER 2016

Subject Code: 2713108 **Date:04/01/2017**

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)**	Give design of I to V converter. How its sensitivity can be modified?	**07**
	(b)	Derive gain equation for current amplifiers.	**07**
Q.2	**(a)**	What is input offset voltage? Explain input-error compensation techniques.	**07**
	(b)	Give short explanation of following words • Gain bandwidth product • Slew rate limiting • Transient response • Input & output impedance	**07**
		OR	
	(b)	Design a second-order notch filter with f_0=60Hz and bandwidth 5Hz.	**07**
Q.3	**(a)**	Explain design concepts of multiple feedback band pass filter.	**07**
	(b)	Give technical aspects of magnetically isolated isolation amplifier.	**07**
		OR	
Q.3	**(a)**	Explain concepts of generalized impedance converters (GIC).	**07**
	(b)	Explain model of resistance simulation using a switched capacitor.	**07**
Q.4	**(a)**	Write an introductory note on certification criteria for Medical electronic systems.	**07**
	(b)	Draw and explain the noise equivalent circuit for the BJT amplifier.	**07**
		OR	
Q.4	**(a)**	Explain the two-source noise model for amplifier.	**07**
	(b)	Explain design of photo-optic coupling based isolation amplifier	**07**
Q.5	**(a)**	1. Draw the circuit of sample & Hold circuit. 2. explain sampling theorem	**07**
	(b)	1. Explain operational principle of Phase-locked loop. 2. Draw phase detector circuit	**07**
		OR	
Q.5	**(a)**	Explain binary-weighted resistor type digital to analog converter (DAC).	**07**
	(b)	Write a brief note on electrical safety issues in medical devices.	**07**

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