Seat No.: _____ *Enrolment No._____*

GUJARAT TECHNOLOGICAL UNIVERSITY

M. E. - SEMESTER – I • EXAMINATION – WINTER • 2014

Subject code: 2713108 **Date: 07-01-2015**

Subject Name: Medical Instrumentation and Systems

Time: 02:30 pm - 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.**

Q.1	**(a)**	Design current to voltage converters. How sensitivity of I to V converter can be improve?	**07**
	(b)	Derive equation of gain for instrumentation amplifier and why it is preferable for biomedical applications?	**07**
Q.2	**(a)**	Give short note on various Electrical safety issues in medical devices.	**07**
	(b)	Draw circuit of KRC low pass filter and Derive equation of Gain.	**07**
		OR	
	(b)	Find the equivalent impedance of a Generalized impedance converter toward ground. Draw circuits of Inductor simulator and D element realization.	**07**
Q.3	**(a)**	Explain designing of Switched capacitor filters.	**07**
	(b)	Give description about transient response of OPAMP.	**07**
		OR	
Q.3	**(a)**	Derive the equation of errors caused by input bias and offset current in op-amp.	**07**
	(b)	Derive the equation of errors caused by input offset voltage and thermal drift in op-amp.	**07**
Q.4	**(a)**	Design 4 bit switched current source type DAC. Range of output voltage is 0 to 5 volt.	**07**
	(b)	Explain working of R-2R ladder type DAC.	**07**
		OR	
Q.4	**(a)**	Design 3 bit flash type Analog to Digital converter for analog input 0 to 8 volt.	**07**
	(b)	Explain two-noise source model for a noisy ampliýers	**07**
Q.5	**(a)**	Draw and explain the noise equivalent circuit for the BJT ampliýer.	**07**
	(b)	What is the need of isolation amplifier in body parameter acquisition? And explain any one type of medical isolation.	**07**
		OR	
Q.5	**(a)**	Explain architecture of phase lock loop and their biomedical application.	**07**
	(b)	Explain balanced bridge diode type and electro mechanical chopper phase sensitive type phase sensitive rectifier circuits.	**07**

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