Seat No.: _____ *Enrolment No._____*

GUJARAT TECHNOLOGICAL UNIVERSITY

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

Subject code: 713101N **Date: 13-06-2014**

Subject Name: Medical System Design

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 50V/1A regulated power supply with series pass element and short circuit protection circuit. Vin = 230± 20V, Ripple Voltage (qpv): 7% ripple of Vo & qpt =3msec	**10**
	(b)	Sketch Necessary Voltage Wave form at every stage of Above Power supply design.	**04**
Q.2	**(a)**	Prove that ñWhen operated with negative feedback, an ideal op-amp force V_N to track V_p but without drawing any current at either input terminal.ò	**07**
	(b)	Explain Constant current limiting circuit with necessary safe operating area.	**07**
		OR	
	(b)	Explain fold back current limiting circuit with necessary safe operating area.	**07**
Q.3	**(a)**	Explain Current ï Voltage Converters.	**07**
	(b)	Explain Instrumentation Amplifier with its advantages.	**07**
		OR	
Q.3	**(a)**	Explain Voltage-Current Converters.	**07**
	(b)	Derive Equation for V_{CM} and V_{DM} for Difference Amplifier.	**07**
Q.4	**(a)**	Explain Op-amp as a Voltage Comparator with any one application in detail.	**07**
	(b)	Explain Resistance transformer with its ideal equivalent circuit.	**07**
		OR	
Q.4	**(a)**	Derive the equation for qpV_T for Non Inverting Schmitt Trigger.	**07**
	(b)	Explain sample and Hold Circuit & determine acquisition time to 0.1% full scale or a 10V step input with C_H= 10nf and R_{ON} = 300q .	**07**
Q.5	**(a)**	Explain PLL and explain its operation in Locked Condition.	**07**
	(b)	Explain 4-bit approximation A to D converter.	**07**
		OR	
Q.5	**(a)**	Explain Logarithmic Characteristic and transdiode configuration of amplifier.	**07**
	(b)	Write a short note on Pipe Line structured ADC.	**07**

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