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GUJARAT TECHNOLOGICAL UNIVERSITY ME SEMESTER – I (NEW) EXAMINATION – SUMMER 2017

Subject Code: 2713108 Date:09/05/2017 **Subject Name: Medical Instrumentation & systems** Time:02:30 p.m. to 05:00 p.m. **Total Marks: 70 Instructions:** 1. Attempt all questions. 2. Make suitable assumptions wherever necessary. 3. Figures to the right indicate full marks. (a) Draw the circuit of grounded load current amplifier and derive equation of gain. 07 0.1 What is ground loop interface? Discuss possible solution for elimination of it. 07 0.2 Discuss the errors caused by input bias current and input offset current. 07 What is slew rate? Discuss effect of slew rate limiting for a pulse input and sine **07** wave input. OR**(b)** Draw the circuit of low pass KRC filter and derive necessary equations. 07 **Q.3** (a) Design multiple feedback band pass filter with f₀= 1Khz, Q=10, and H₀=20dB. **07** Show the final circuit. (b) Explain generalized impedance converter (GIC) concepts and finding the 07 equivalent impedance of a GIC towards ground. 0.3 Explain switch capacitor filters and their practical limitation. 07 (a) Design 3 bit flash type Analog to Digital converter for analog input 0 to 8 volt. 07 Explain common types of medical isolation amplifier. 0.4 07 (a) Explain two-noise source model for a noisy amplifiers. **07 (b)** OR 0.4 Draw noise equivalent circuit for any JFET amplifier. And derive necessary (a) **07** equation for noise. **(b)** Explain architecture of phase lock loop and their biomedical application. 07 Q.5 (a) Explain following 07 Sample and Hold circuits Aliasing Gain bandwidth product (b) Discuss various technical aspects for the design of Low-Noise amplifiers for 07 Biomedical Applications. OR (a) Enlist various electrical safety issues in medical devices and give detail **Q.5** 07

(b) Write details notes on Modulation and Demodulation techniques for Signals.

explanation of any two.

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