## **GUJARAT TECHNOLOGICAL UNIVERSITY** ME – SEMESTER-1 (NEW) EXAMINATION – WINTER 2016

Subject Code: 2713109 Date:05/01/		2017		
Ti Inst	Time: 2:30 pm to 5:00 pm Total Marks:		70	
	1.	Attempt all questions.		
	2. 3.	Figures to the right indicate full marks.		
Q.1	<b>(a)</b>	Give introductory note on difficulties encountered in biomedical signal	07	
	(b)	Enlist and Explain three common types of artifact's sources in a biomedical instrument.	07	
Q.2	(a)	What do you mean by random signal? How to determine the randomness of signal?	07	
	(b)	<ul> <li>Define or explain following terms</li> <li>Ensemble averages</li> <li>Nonstationary process</li> <li>Autocorrelation function</li> </ul>	07	
		OR		
	<b>(b)</b>	Explain Concurrent, coupled and correlated processes with example.	07	
Q.3	(a)	Explain concepts of adaptive filters for removal of interference and their applications.	07	
	<b>(b</b> )	Explain basic of signal averaging. How it helps to improve SNR?	07	
Q.3	(a) (b)	<ul> <li>Explain any time domain filter for smoothing of signals with signal flow graph</li> <li>Explain following terms</li> <li>The root mean-squared value,</li> <li>Zero-crossing rate,</li> <li>Turns count</li> </ul>	07 07	
Q.4	(a) (b)	Explain all stages of Pan-Tompkins algorithm for QRS detection. Explain all pole modelling with necessary signal flow graph.	07 07	
Q.4	(a) (b)	Write a short note on Neural Network structure and its applications. Explain concepts of DSP for Morphological analysis of ECG.	07 07	
Q.5	(a) (b)	Explain concept of curve fitting to biomedical database for modelling. Explain with one pole example how location of pole is affecting to stability of IIR filter.	07 07	
Q.5	(a) (b)	Explain supervised and unsupervised learning concepts of Neural network. A band pass filter required to meet following specifications A complete signal rejection at dc and 250 Hz A narrow bandpass centered at 125Hz A 3 dB bandwidth of 10Hz. Assuming sampling frequency of 500Hz, obtain transfer function by suitably placing pole-zero. Also derive its difference equation.	07 07	

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