U.S.N.										

B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

July 2023 Semester End Main Examinations

Programme: B.E. **Semester: VI**
Branch: Medical Electronics Engineering **Duration: 3 hrs.**
Course Code: 19ML6PCBSP **Max Marks: 100**
Course: Biomedical Signal Processing **Date: 12.07.2023**

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

Important Note: Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. Revealing of identification, appeal to evaluator will be treated as malpractice.

		UNIT - I	CO	PO	Marks
1	a)	Justify why optimal filtering using weiner/matched filter is not possible when priori information is unavailable or noise is non-stationary.	*CO1*	*PO1*	**10**
	b)	Identify the primary and reference signals in case of adaptive cancellation of interferences in processing myo electric activity of respiratory muscle s and indicate how are they acquired?	*CO1*	*PO1*	**07**
	c)	There are two critical parameters which determine the stability of LMS algorithm what are they? Specify.	*CO1*	*PO1*	**03**
		UNIT - II			
2	a)	What are the advantages and shortcomings of utilizing the smoothing process in AZTEC reconstructed waveforms?	*CO1*	*PO1*	**10**
	b)	Is FAN algorithm an interpolator (or) Predictor? Explain with a neat sktech	*CO1*	*PO1*	**10**
		UNIT - III			
3	a)	Based on some of the techniques discussed suggest a suitable QRS detection algorithm that can detect QRS complexes from the ECG in real time.	*CO2*	*PO1*	**10**
	b)	Suggest a suitable method (or) technique of measuring the ST-Segment level. Justify your choice of this method. What is its shortcoming elucidate?	*CO2*	*PO1*	**10**
		UNIT - IV			
4	a)	Why are model based approaches preferred in EEG analysis? Explain with suitable examples	*CO2*	*PO1*	**08**
	b)	Differentiate and distinguish between the different kinds of Transients in EEG	*CO1*	*PO1*	**12**
		OR			

	5	a)	Justify the use of linear prediction analysis in EEG modeling.	*CO2*	*PO2*	**06**
		b)	Where does one use Yule-walker equation in EEG analysis? Why? Explain in detail.	*CO1*	*PO2*	**08**
		c)	How does one segmentize the EEG waveform?	*CO1*	*PO1*	**06**
			UNIT - V			
	6	a)	Describe the characteristics of different stages of sleep in terms of frequency, voltage levels, rhythms and transients.	*CO1*	*PO1*	**10**
		b)	How does one estimate the transition rates from the hypnograms? Explain how one can obtain the transition probabilities from there.	*CO2*	*PO1*	**10**
			OR			
	7	a)	What are the three important characteristics of REM sleep? Specify them.	*CO1*	*PO1*	**06**
		b)	What do you understand by the phrase a simple Markov chain? Explain.	*CO1*	*PO1*	**08**
		c)	Obtain an expression for the probability that the random variable X in a Markov process will change its state from x_i to x_m in three steps given that the system has n states.	*CO2*	*PO2*	**06**

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