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

Autonomous Institute Affiliated to VTU

October 2024 Supplementary Examinations

Programme: B.E.

Branch: Medical Electronics Engineering

Course Code: 22MD6PCBSP

Course: BIOMEDICAL SIGNAL PROCESSING

Semester: VI

Duration: 3 hrs.

Max Marks: 100

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

UNIT - I			CO	PO	Marks
1	a)	What are several Statistical preliminaries, key concepts and techniques that involved in bio signal processing?	<i>CO1</i>	<i>PO1</i>	06
	b)	Provide examples or scenarios where Moving Average filters are particularly effective in processing specific types of bio signals.	<i>CO1</i>	<i>PO1</i>	06
	c)	Explain adaptive noise canceller for elimination of interferences.	<i>CO1</i>	<i>PO1</i>	08
UNIT - II					
2	a)	Explain ECG Data Reduction using Turning point technique.	<i>CO2</i>	<i>PO1</i>	10
	b)	Describe AZTEC Compression. And let illustrate how an Amplitude Zone Time Epoch Coding (AZTEC) encodes a signal as {12, 80, 7, 100, -6, -120, -6, 125, 25, 150}. How many data points were originally sampled?	<i>CO2</i>	<i>PO2</i>	10
OR					
3	a)	Illustrate FAN algorithm for ECG data reduction.	<i>CO2</i>	<i>PO1</i>	10
	b)	Explain how Huffman coding can be applied to reduce the size of bio signal data for efficient storage and transmission without compromising diagnostic accuracy.	<i>CO2</i>	<i>PO2</i>	10
UNIT - III					
4	a)	With a relevant equations and sketches illustrate Pan-Tompkin's method of QRS detection.	<i>CO3</i>	<i>PO1</i>	10
	b)	Discuss the ST segment of a cardiac cycle for the analysis of cardiac diseases.	<i>CO3</i>	<i>PO1</i>	10
UNIT - IV					
5	a)	Characterize the Auto- Regressive (AR) parameters (prediction coefficients) obtained from a third linear predictor.	<i>CO4</i>	<i>PO2</i>	10

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.

	b)	Examine how transients are detected and eliminated for epileptic patients.	CO4	PO1	10
UNIT - V					
6	a)	Explain characteristics of EEG for various sleep stages and draw the EEG waveforms.	CO5	PO1	10
	b)	Discuss about the dynamics of sleep wake transitions.	CO5	PO1	10
OR					
7	a)	Analyze hypnogram model parameters.	CO5	PO1	06
	b)	How to investigate sleep EEG signal based on frequency band?	CO5	PO1	06
	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.	CO5	PO1	08
