

Roll No:

--	--	--	--	--	--	--	--	--	--	--	--

BTECH
(SEM V) THEORY EXAMINATION 2024-25
BIO-MEDICAL SIGNAL PROCESSING

TIME: 3 HRS

M.MARKS: 70

Note: Attempt all Sections. In case of any missing data; choose suitably.

SECTION A

1. Attempt all questions in brief. 2 x 07 = 14

Q no.	Question	CO	Level
a.	Define bio-medical signals?	1	K1
b.	List the difficulties faced during the acquisition of bio-medical signals.	1	K1
c.	Define portable arrhythmia monitors.	2	K1
d.	Explain ST segment analysis and its clinical relevance.	2	K2
e.	Examine the main objective of data reduction in bio-medical signal processing?	3	K3
f.	Describe the linear prediction theory in the context of EEG analysis	4	K2
g.	List the general structures of adaptive filters.	5	K1

SECTION B

2. Attempt any three of the following: 07 x 3 = 07

a.	Explain the classification of bio-medical signals and their acquisition methods.	1	K2
b.	Explain the methods used for QRS detection in ECG signals.	2	K2
c.	Explore the Turning Point algorithms for data reduction.	3	K3
d.	Explain the maximum entropy method and AR method for EEG analysis.	4	K4
e.	Explain signal averaging and its role in evoked potential estimation.	5	K4

SECTION C

3. Attempt any one part of the following: 07 x 1 = 07

a.	Describe the challenges encountered during the acquisition of bio-medical signals.	1	K2
b.	Explain the basics of electrocardiography (ECG) and electroencephalography (EEG).	1	K2

4. Attempt any one part of the following: 07 x 1 = 07

a.	Illustrate the techniques used to remove baseline wander in ECG signals.	2	K3
b.	Explore the working of portable arrhythmia monitors and their clinical importance.	2	K3

5. Attempt any one part of the following: 07 x 1 = 07

a.	Explain the Fan algorithm and its application in bio-medical signal processing.	3	K4
b.	Explain Huffman and modified Huffman coding techniques.	3	K4

6. Attempt any one part of the following: 07 x 1 = 07

a.	Illustrate the dynamics of sleep/wake transition in EEG signals.	4	K4
b.	Explain the characteristics of brain waves and their relevance in epilepsy detection.	4	K4

7. Attempt any one part of the following: 07 x 1 = 07

a.	Explain the concept of adaptive wavelet detection and its advantages.	5	K4
b.	Illustrate the matched filtering technique for the detection of overlapping wavelets.	5	K4