BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION)

CLASS: M. TECH. **SEMESTER : III**
BRANCH: ECE **SESSION : SP/2024**

SUBJECT: EC571 BIOMEDICAL SIGNAL PROCESSING

TIME: 3 Hours **FULL MARKS: 50**

INSTRUCTIONS:
1. The question paper contains 5 questions, each of 10 marks and total 50 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
***4*. Before attempting the question paper, be sure that you have got the correct question paper.**
5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.

			CO	BL
Q.1(a)	Explain bio-signal and its different types. Also, differentiate between the action and event potential with relevant diagrams.	[5]	1	2
Q.1(b)	Draw the block diagram of a computer-aided diagnosis system and explain each block.	[5]	1,2	2
Q.2(a)	Differentiate between Fourier series and Fourier Transform. Draw a typical ECG waveform and its corresponding frequency spectrum.	[5]	2,3	1,2
Q.2(b)	Draw a flowchart to denoise the recorded signal and generate a synthetic noise reference signal using the Fourier transform.	[5]	2,3	1,2
Q.3(a)	Explain Wavelet denoising methodology with the help of a diagram.	[5]	2,3	2
Q.3(b)	How does an Adaptive filter reduce the motion artifact from the PPG signal? Explain.	[5]	2,3	2,3
Q.4(a)	Discuss the following with suitable examples in the context of biomedical signals. i) Correlation & Regression Analysis, ii) Independent Component Analysis (ICA)	[5]	3,4	2
Q.4(b)	State the Principal component analysis algorithm with suitable applications. Justify its use in the processing of biomedical signals.	[5]	3,4	1,2
Q.5(a)	Justify using a Support Vector Machine (SVM) as a Machine learning classifier for biomedical signals.	[5]	5	1,2
Q.5(b)	Compare the supervised and unsupervised classification with examples. Write the steps to construct a neural network-based architecture for classifying the ECG signal.	[5]	5	2,3

:::::26/04/2024 E:::::