JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -3 EXAMINATION- 2025

B.Tech-VII Semester (ECE)

COURSE CODE (CREDITS): 19B1WEC836 (3) MAX. MARKS: 35

COURSE NAME: Applied Medical Signal Processing

COURSE INSTRUCTORS: Dr. Nishant Jain MAX. TIME: 2 Hour

Note: *(a) All questions are compulsory.*
(b) The candidate is allowed to make Suitable numeric assumptions wherever required for solving problems

Q.No	Question	CO	Marks
Q1	Describe the various components of a man-instrument system, including: a. Subject, b. Stimulus, c. Transducer, d. Signal conditioning circuit, e. Display device, and f. Recording, data processing, and transmission equipment.	CO1	4
Q2	What is the origin of the bioelectric potential difference observed in the heart? Describe the significance of bioelectric potentials in medical diagnostics.	CO2	4
Q3	Describe how the following types of filtering assist in eliminating noise from biomedical signals: a. Adaptive filtering, b. Filtering in the time domain.	CO2	4
Q4	Explain the process of modeling biometric signals with a focus on EMG signals, including the role of motor unit firing patterns and the significance of summation of neural activity.	CO2	4

Q5	Explain how the covariance method differs from the autocorrelation method in spectral estimation of biomedical signals, and discuss the roles of spectral matching and parameterization in modeling the spectral characteristics of these signals?	CO3	4
Q6	Explain how the Autoregressive (AR) model and the autocorrelation method are used to analyze and interpret biomedical signals?	CO3	4
Q7	Describe the difference between supervised and unsupervised learning, and provide an example from biomedical signals to illustrate each type.	CO3	4
Q8	Describe how statistical parameters can be utilized to extract and identify key features from biomedical signals.	CO4	4
Q9	Explain how artificial neural networks assist in predicting abnormalities in ECG signals.	CO4	3