

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -3 EXAMINATION- 2023

B.Tech-VII Semester (CSE/IT/BT/BI/CE)

COURSE CODE(CREDITS): 18B1WEC741 (3)

MAX. MARKS: 35

COURSE NAME: Biomedical Signal Processing

COURSE INSTRUCTORS: Dr. Nishant Jain

MAX. TIME: 2 Hour

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*Note: (a) All questions are compulsory.*

*(b) Marks are indicated against each question in square brackets.*

*(c) The candidate is allowed to make Suitable numeric assumptions wherever required for solving problems.*

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1. (a) Draw a labelled diagram of the Man-Instrumentation system. Explain all its components in detail.

(b) With the help of a labelled diagram explain the generation of bioelectric potential in the human cell.

[4+3=7, CO1]

2. With respect to recording of ECG from the heart, answer the following questions:

(a) How many electrodes are required to obtain a complete ECG signal.

(b) Give details about the position of all the electrodes placed to measure ECG and colour of the wire connected.

(c) In how many ways all the Electrodes used to measure ECG are connected to ECG Machine. Summarise all the configuration of electrodes.

[1+3+3=7, CO1]

3. (a) Explain how mean and standard deviation of a biomedical signal can be used as a feature extraction technique.

(b) Draw a diagram to represent the working of a single artificial neuron. Explain how it can be used to make a decision boundary that classifies a data into two categories.

[3+4=7, CO3,4]

4. (a) With the help of a block diagram explain a method that can be used to detect QRS waveform in ECG signal.

(b) Draw and explain different components in the computer aided diagnosis system used for the classification of ECG signals as the normal and abnormal.

[4+4=8, CO2,4]

5. Write a short note on the following:

- a. Electroencephalography (EEG).
- b. 10-20 Electrode System for acquisition of EEG.

[3+3=6, CO1]