COURSE CODE(CREDITS): 18B1WEC741 (3)   MAX. MARKS: 25

COURSE NAME: Biomedical Signal Processing

COURSE INSTRUCTORS: Dr. Nishant Jain   MAX. TIME: 1.5 Hour

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. Draw a labelled diagram and explain in detail the working of the heart from the biomedical engineering perspective.

[4, CO1]

2. Explain the generation of ECG Wave from the heart. Also draw a labelled ECG waveform and explain the significance of all the peaks and segments present in the wave.

[5, CO1]

3. List and explain any four types of Interferences in ECG signals.

[4, CO2]

4. With respect to continuous signals, draw the shape and write a mathematical expression for the following signals:
   a. Unit Step function
   b. Parabolic signal
   c. Signum function
   d. Exponential Signals

[1X4 = 4, CO2]

5. With the help of a labelled diagram, explain the process of converting analog signals into Digital signals.

[4, CO2]

6. (a) If a continuous signal contains mixed frequencies of 10Hz, 25Hz and 50Hz, then to convert the signal into a discrete signal, what minimum sampling frequency should be used to recreate the signal back to continuous signal without distortions. Also determine the time interval between the two samples.

(b) Amplitude of a sampled signal is quantized to have 21 levels. Determine the number of bits required to encode the quantized level into binary value.

[2+2=4, CO2]