

Exam.Code:0909
Sub. Code: 6711

1078
B.E. (Biotechnology)
Fifth Semester
BIO-515: Bio-Instrumentation

Time allowed: 3 Hours

Max. Marks: 50

NOTE: Attempt five questions in all, including Question No. 1 which is compulsory and selecting two questions from each Unit.

x-x-x

I. Answer the following briefly: -

- a) What is a Hounsfield unit?
- b) What is unipolar pacing?
- c) What is a non polarizable electrode?
- d) What do you mean by time invariant systems? Explain.
- e) Give two examples each of causal and noncausal systems.
- f) Draw the waveform for the ramp signal.
- g) Explain the significance of amplifier in electrical systems.
- h) What is LabVIEW.
- i) Define systolic pressure.
- j) Define decibel. (10x1)

UNIT - I

- II. a) Explain with proper diagram the working of wave analyzer.
b) Why the bioinstrumentation field is said to possess some unique problems. Elaborate. (5,5)
- III. a) Distinguish between the term Fourier series and Fourier transform, with proper mathematical relations using commonly used signals in bioinstrumentation.
b) Classify the different types of transducers based on the underlying principle in detail. (5,5)
- IV. a) Draw the process of conversion of signal from analog to digital domain with proper diagram.
b) Explain the indicator dilution method for cardiac output detection. Give properties of indicator used. (5,5)

P.T.O.

(2)

UNIT - II

- V. a) Explain the generation of resting **membrane potential** and action potential in neuron.
- b) Explain the basic principle and working of a defibrillator. (5,5)
- VI. What are asynchronous and synchronous **pacemakers**? Describe atrial and ventricular synchronous pacemaker.
- a) Explain the basis of image reconstruction in CAT scan. (5,5)
- VII. a) How is the electrical activity of the **heart recorded**? How are these represented on ECG?
- b) Explain the working of different types of **bioelectrodes**. (5,5)

x-x-x