

2074  
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 Section.

x-x-x

1. Answer the following questions briefly:

- a) Define resting membrane potential.
- b) Explain acoustic impedance.
- c) Define unit pulse function.
- d) What are Korotkoff sounds.
- e) Define T1 relaxation.
- f) Explain monopolar pacing.
- g) Define Hounsfield unit.
- h) Define piezoelectric effect.
- i) What is low waveform.
- j) What are the major classifications of the signal.

1x10=10

**SECTION A**

2. With a neat block diagram explain and illustrate the biomedical instrumentation system. Further write about the unique problems associated with the bioinstrumentation system. 10
- 3a Distinguish between 5
  - i) Even and Odd Signals
  - ii) Periodic and nonperiodic signals
- b Determine whether the following signals are periodic, if periodic determine the fundamental period. 5
  - i)  $x(t) = \cos 2t + \sin 3t$
  - ii)  $x[n] = \sin 2n$ .
- 4a Explain the dye dilution method for measurement of cardiac output. 5
- b Elucidate the auscultatory method of blood pressure measurement using mercury sphygmomanometer. 5

**SECTION B**

- 5a Elucidate the basic principle, components and working of a pacemaker. 5
- b Explain the basic principle, mechanism and applications of ultrasonic imaging. 5
6. Write short note- 5,5
  - i. Components of ECG waveform and electrode placement
  - ii. Mechanism of defibrillation and battery used in defibrillator
7. How is nerve impulse generated in neuron. Explain the mechanism of propagation of nerve impulse. 10

x-x-x