Exam. Code: 0909
Sub. Code: 33372

2076
B.E. (Biotechnology) Fifth Semester
BIO-515: Bio-Instrumentation

Time allowed: 3 Hours **Max. Marks: 50**

NOTE: ***Attempt <u>five</u> questions in all, including Question No. I which is compulsory and selecting two questions from each Section.***

x-x-x

1. Answer the following questions briefly: 1x10=10

a) Define LabVIEW and give one application.
b) What is bipolar pacing.
c) Define stroke volume.
d) Give application of strain gauge transducer.
e) How does T_1 relaxation occur in MRI?
f) Give examples of piezoelectric transducer.
g) State the frequency range used in ultrasonic imaging.
h) Define the term – graded potential.
i) What are polarizable electrodes.
j) Define signal modulation.

SECTION A

2. Explain the basic principle, construction, and working of an active transducer. Give suitable example. 10

3a. Differentiate between causal and non causal system with example. 5

b. Explain the basic principle and working of ultrasonic blood flowmeter. 5

4a. Explain the indirect blood pressure measurement using Korotkoff sound. 5

b. Discuss the dye dilution technique employed for cardiac output measurement. Give advantages of indocyanine green. 5

Section B

5a. Explain the generation of action potential in a neuron. Briefly explain the role of channels involved. 5

b. Explain different type of electrodes used for recording and stimulation with example. 5

6a. Explain the basic principle and working of electrocardiograph(ECG). 5

b. Explain various components of defibrillator. Draw Lown waveform and give clinical significance of its shape. 5

7a. Give basic principle of magnetic resonance imaging. Differentiate between MRI and CT scan. 5

b. Explain the working principle of a synchronized pacemaker with the help of a block diagram. 5

x-x-x