

16/12/19 (4)

Exam. Code: 0909

Sub. Code: 6711

1129

**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

- I. Answer briefly:-
- Which rays are used in CT scan?
 - Write mathematical expression for any 1st order system.
 - Give two factors affecting EMG recording.
 - What is a constant voltage pacemaker?
 - Explain non-linearity. Give one cause due to which non-linearity occurs in a system.
 - What is a lowwave form?
 - Explain any one static characteristic of time-invariant system.
 - Give electrode placement for unipolar pacing.
 - Define the basic Principle on which a piezoelectric transducer works.
 - What are amplifiers? (10x1)

UNIT - I

- II. a) Explain the blood pressure measurement with sphygmomanometer.
b) How will you monitor the cardiac output with indicator dye? (2x5)
- III. a) Define an Analog to Digital Converter. Also give an example where it is used in bio-instrumentation.
b) Explain Signal-to-noise ratio. What are its unit of measurement? Why is it desirable to keep it minimum? (2x5)
- IV. a) Explain and differentiate between continuous time and discrete time systems.
b) Explain Linear time-invariant system in detail. (2x5)

UNIT - II

- V. a) Why is hydrogen nucleus suitable for magnetic resonance imaging? Explain the process of image formation.
b) Explain the operative mechanism of biopotential electrode. Discuss different types of bioelectrodes. (2x5)

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(2)

- VI. a) What are the indications for a pacemaker? Describe the battery used in demand pacemaker and working of R wave triggered / inhibited pacemaker.
- b) Explain the basic principle evoked response audiometry. Elucidate the functions of various components of audiometer. (2x5)
- VII. a) What is a nerve impulse? Explain the role of various channels in the generation and transmission of nerve impulse.
- b) What is the need of recording systems in a medical equipment? Describe one such system in detail. (2x5)

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Time
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