

JAMIA HAMDARD
Department of Computer Science & Engineering
School of Engineering Sciences & Technology, New Delhi-110062

Odd Semester Examination 2024
Programme Name: B. Tech (ECE)

Paper Name: Bio Medical Electronics
Paper Code: BTECE DEI32/ BTECE DEI32(Lateral Entry)
Course outcomes (CO)

Time: 3 Hours
Maximum Marks: 75

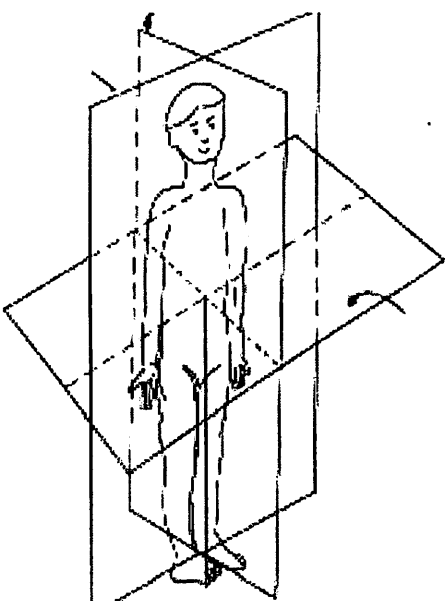
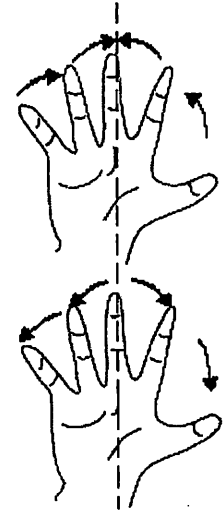
- CO1: Became familiar with the anatomical terms, planes, movements and human physiology.
 CO2: Understand transducers, bioelectric potentials, electrodes and biomedical instrumentation system.
 CO3: Understand the working mechanism and design guidelines of different bio- potential amplifiers for ECG, EMG, EEG, etc.
 CO4: Understand and analyze various diagnostic techniques and patient care and monitoring.
 CO5: Evaluate and analyse prosthetic devices and therapies.

Note: Follow proper numbering for answering the questions.

Section A

All questions are compulsory in this Section.

7 X 5 = 35

Q No.	Questions	Marks	CO	BL
1.	Define and mark the planes/movements in Figure 1 and Figure 2 respectively.   Figure 1 Fingers Figure 2	5	1	3
2.	How the physiological signals classified on the basis of energy?	5	1	2
3.	Write in detail about underlying principles in different types of transducers. Also discuss their functions in the biomedical.	5	2	5
4.	Explain polarization, depolarization and repolarization.	5	3	2
5.	What are the objectives and components of man- instrumentation system?	5	2	4
6.	Explain the working of sphygmomanometer.	5	4	4
7.	A strain gauge with a length of $L=0.20$ m is bonded to a surface with an area of $A=10$ cm ² and a modulus of elasticity $E=150 \times 10^9$ N/m ² . The unstrained resistance	5	2	5

of the strain gauge is $R=300\ \Omega$ and the gauge factor is $G=15$. When a load is applied, the resistance changes by $\Delta R=0.020\ \Omega$. Calculate: 1. The stress applied to the material. 2. The load applied to the surface.			
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Section-BAttempt any **FOUR** Questions from this Section**4 X 10 = 40**

Q No.	Questions	Marks	CO	BL
1.	Explain the role of signal processing in bioinstrumentation. Describe the methods of signal processing used in bioinstrumentation.	10	4,5	4
2.	Explain and draw diagram of ECG. How does ECG help in the diagnosis of malfunctioning of the heart?	10	3	5
3.	Draw the diagram of ECG amplifier. What are the important requirements of such an amplifier in terms of gain and frequency?	10	3	6
4.	Explain ANY TWO of the followings: a. Variable Inductance Transducers b. Scanning modes in Ultrasound imaging c. Strain Gauge d. Electroencephalogram recording configurations and Applications e. Electromyogram recorder	10	2,3,4,5	5
5.	Explain how an artificial kidney (dialysis machine) works. What are the different dialysis methods, and what are the criteria for choosing a particular method for a patient?	10	5	5
6.	What is Electroencephalogram? What are the different waveforms and diagnoses made from it?	10	3	5

BL-Bloom's Taxonomy Levels (1-Remembering,2-Understanding,3-Applying,4-Analysing,5-Evaluating,6-Creating)