

(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 3052

Roll No.

B.Tech.

EIGHTH SEMESTER EXAMINATION, 2004-2005

BIOMEDICAL INSTRUMENTATION

Time : 3 Hours

Total Marks : 100

Note : (i) Answer **ALL** the questions.

(ii) All questions carry equal marks.

1. Attempt *any two* parts of the following : (10x2=20)

(a) Define Bioelectric potential. What is resting potential? When a cell is polarized? How action potential propagates?

(b) How many types of biopotential electrodes are generally used? Explain with neat diagram any one of them. Which type of electrode would be the least traumatic for a patient?

(c) (i) Calculate the potential across a membrane separating two very dilute solutions of a monovalent ion, one concentration being 100 times as great as the other. Assume the body temperature of 37°C.

(ii) What is the major advantage of floating-type skin surface electrodes?

2. Attempt *any two* parts of the following : (10x2=20)

- (a) (i) Explain any two types of recorders with the help of suitable diagram.
- (ii) Explain with neat diagram the video monitors.
- (b) A differential amplifier has positive and negative input terminals and a ground connection. ECG electrodes from a patient are connected to the positive and negative terminals and a reference electrode is connected to ground. A disturbance signal develops on the patient's body. This will appear as a voltage from the positive terminal to ground and a similar voltage from negative terminal to ground. How does the differential amplifier amplify the ECG signal while not essentially amplifying the disturbance signals? Draw a sketch showing the patient connected to the amplifier.
- (c) Explain the neuronal communications. Give the anatomy of nervous systems.

3. Attempt *any four* parts of the following : (5x4=20)

- (a) Explain neuronal firing and how it can be measured? Explain EPSP and IPSP.
- (b) Explain the working of colour printers.
- (c) If a person stands up, does his blood pressure increase? Why?
- (d) What is EEG and what does it measure? Explain.
- (e) What is pacemaker? Explain different pacing mode of operation.
- (f) Explain the clinical application of a multichannel ECG.

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4. Attempt *any two* parts of the following : (10x2=20)

- (a) Explain the working of ophthalmoscope.
- (b) Explain electro-oculogram.
- (c) Explain the applications of Laser in medicine.

5. Write short notes of four of the following : (5x4=20)

- (a) Electrodes used for biological applications
- (b) Defibrillator
- (c) Stimulators
- (d) Clinical applications of X-ray
- (e) Diathermy
- (f) Radiation therapy

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