

II B.Tech I Semester Regular Examinations, November 2005
BIO-ELECTRICITY AND ELECTRODES
(Bio-Medical Engineering)

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions
All Questions carry equal marks

1. Write short notes on:
 - (a) Nerve conduction [8]
 - (b) Cathode ray oscilloscope. [8]
2. What is cathode ray oscilloscope (CRO) ? Explain and also enumerate the properties of nerve fibres. [16]
3. Discuss the characteristics of action potentials at various sites of conduction system of heart. [16]
4. Define “lead”? Explain the ECG leads with neat circuit diagrams. [16]
5. What are the bioelectric sources used in volume conductor fields? [16]
6. Write a note on “ Physiotherapy instruments”. [16]
7. (a) Discuss the velocity of neuromuscular transmission and their changes in normal and abnormal states. [8+8]
(b) Explain the chemical significance of fatigue?
8. (a) Explain the placement of electrodes used in the measurement of EEG? [8+8]
(b) Specify different EEG rhythms? Define REM.

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1. What is resting potential ? Explain how the membrane potential is measured in Squid axon. [16]
2. Give an account of local circuit theory related to nerve impulse and explain saltatory conduction. [16]
3. Discuss about the generation and conduction of impulses (action potentials) in the heart? [16]
4. (a) What are ECG complexes. Explain in detail. [8+8]
(b) Explain Chest leads with a circuit diagram.
5. What are the bioelectric sources used in volume conductor fields? [16]
6. Explain the mechanical properties of microelectrodes? [16]
7. How are motor unit potentials generated? Explain. [16]
8. Discuss the different waves and rhythms in Electroencephalogram. Explain. [16]

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1. What is refractory period and explain absolute and relative refractory periods.[16]
2. Describe the excitatory and inhibitory synapses and add a note on summation of EPSP and IPSP. [16]
3. Describe the conduction system of heart. Explain the auto generation of action potentials in sino-atrial node. [16]
4. (a) Drawing the Einthoven's triangle, explain the electrical activity of the heart? [8+8]
(b) What do you mean by augmented limb leads?
5. What are the bioelectric sources used in volume conductor fields? [16]
6. Explain the mechanical properties of microelectrodes? [16]
7. How are motor unit potentials generated? Explain. [16]
8. (a) Explain any two important applications of bio-electric phenomena. [8+8]
(b) Give a scheme for measurement of tissue resistance.

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1. Write on account of propagation of action potential and add a note on ion influx and ion efflux. [16]
2. What are diphasic and monophasic action potentials and explain how they are recorded. [16]
3. (a) How the action potentials are helpful in contraction of chambers of heart for ejection of blood? [8+8]
(b) What is the significance of Sino-atrial node?
4. (a) Drawing the Einthoven's triangle, explain the electrical activity of the heart? [8+8]
(b) What do you mean by augmented limb leads?
5. What are the bioelectric sources used in volume conductor fields? [16]
6. (a) Explain a case for Electrode-Electrolyte interface? [8+8]
(b) Also explain, in what ways the study of electrode-electrolyte interface helps in Understanding the volume conductor fields.
7. (a) Explain as to how you can relate motor unit potentials to the electrical activity of skeletal muscles? [8+8]
(b) What is gradation of muscular activity?
8. What are various rhythms in EEG waveforms? How does REM affect the EEG signals? Discuss the clinical utility of EEG in early detection of Epilepsy? [16]
