

II B.Tech I Semester Supplementary Examinations, November 2006
BIO-ELECTRICITY AND ELECTRODES
(Bio-Medical Engineering)

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions
All Questions carry equal marks

1. What is refractory period and explain absolute and relative refractory periods.[16]
2. Give an account of local circuit theory related to nerve impulse and explain saltatory conduction. [16]
3. Explain about the mechanical activity of the heart in detail? [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. Mention the applications of analytical instruments in medicine with necessary examples. [16]
7. (a) What do you mean by gradation of muscular activity? Explain. [8+8]
(b) What is chemical significance of fatigue. Explain.
8. Discuss the different waves and rhythms in Electroencephalogram. Explain. [16]

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1. Describe local excitatory state (LES) and rheobase . Explain the relation between the stimulus strength and duration. [16]
2. Give an account of local circuit theory related to nerve impulse and explain saltatory conduction. [16]
3. (a) Explain as to how you can relate action potentials to the electrical activity of heart? [8+8]
(b) Draw a neat schematic to show the conduction pathway.
4. Explain in brief the significance of Einthoven triangle? [16]
5. What are the bioelectric sources used in volume conductor fields? [16]
6. In brief, discuss the application of analytical instruments in medicine. [16]
7. How are motor unit potentials generated? Explain. [16]
8. Explain the 10-20 electrode system used in the measurement of EEG. Plot the different brain waves and give its frequency and amplitude ranges. [16]

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1. Write short notes on:
 - (a) ion selective electrode and PH glass electrode. [8]
 - (b) Donnan equilibrium and transport of ions across membranes. [8]
2. Describe the physiology of impulse transmission over the synapse. [16]
3. Explain how the electrical impulses are generated in the 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. (a) Explain the bio-potential electrodes used for surgery? [8+8]
(b) Using a circuit diagram, discuss about Electrode-Electrolyte interface.
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. What are the alpha and beta rhythms in EEG? Give their normal frequency range. How is EEG used in disorders like Epilepsy for early detection? [16]

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1. Write short notes on:
 - (a) ion selective electrode and PH glass electrode. [8]
 - (b) Donnan equilibrium and transport of ions across membranes. [8]
2. What is all or none principle related to nerve impulse . Add Intensity -frequency relationship of impulse. [16]
3. Discuss about the role played by valves of heart in mechanical activity of heart in detail. [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. What is an electrode potential with reference to bio-potential recording? What are Different types of electrodes used for recording bio-potentials? Write their important Characteristics. [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.
