Code No: A109211103 **R09** **Set No. 2**

II B.Tech I Semester Examinations,November 2010
BIOELECTRICITY AND ELECTRODES
Bio-Medical Engineering

Time: 3 hours **Max Marks: 75**

Answer any FIVE Questions
All Questions carry equal marks

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1. Write the applications of bio-electrodes in medical field. Explain about electrode-electrolyte interface. [15]
2. Explain the phases of action potential in cardiac muscle (heart) with a neat ketch? Give the action potentials at various sites of heart. [15]
3. (a) Mention various conditions during which brain waves and rhythms in EEG are generated.
   (b) Explain the placement of electrodes in 10-20 electrode system of EEG with a neat sketch. [8+7]
4. What is excited semiperineable membrane. what are the different types of transducers used for recording biopotentials? [15]
5. Describe the mechanism(s) of synaptic transmission by electrical and chemical ways and mention salient features of electrical transmission. [15]
6. (a) What is the importance of motor nerve conduction? List atleast 3 pathological conditions where the conduction velocity is abnormal.
   (b) Explain the method adopted and equipment used in the measurement of motor nerve conduction velocity? [8+7]
7. Write a short note on:
   (a) Surgical Instruments
   (b) Ion-Sensitive electrode. [8+7]
8. Write short notes on:
   (a) ion selective electrode and PH glass electrode related to Nernst equation.
   (b) Donnan equilibrium and transport of ions across membranes. [8+7]

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Code No: A109211103 **R09** **Set No. 4**

II B.Tech I Semester Examinations,November 2010
BIOELECTRICITY AND ELECTRODES
Bio-Medical Engineering

Time: 3 hours **Max Marks: 75**

Answer any FIVE Questions
All Questions carry equal marks

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1. Write a note on "Physiotherapy instruments". [15]
2. Briefly discuss man as a conductor. Discuss the gross in micro shocks. [15]
3. (a) What are precordial leads. Explain with neat circuit diagram.
   (b) Interpret the ECG as a case of Cardiac transmission waveform. [8+7]
4. (a) What is action potential? Explain the spread of potential changes in Axons.
   (b) Explain the terms membrane time and space constants. [8+7]
5. Mention the circuit properties, characteristics and diagonostical applications of micro and needle electrodes. [15]
6. (a) Explain using the necessary waveform as to how needle electrodes are used to acquire the EMG ?
   (b) What is a synapse? How it helps in neuromuscular transmission. [8+7]
7. Describe various studies conducted on nerve conduction including Galvani and Volta's experimentation, Goldman's theory and Hodgekin and huxely's observation. [15]
8. (a) What are the forward problems associated with bioelectric phenomena?
   (b) What do you mean by EEG? What is REM? [8+7]

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Code No: A109211103 **R09** **Set No. 1**

II B.Tech I Semester Examinations,November 2010
BIOELECTRICITY AND ELECTRODES
Bio-Medical Engineering

Time: 3 hours **Max Marks: 75**

Answer any FIVE Questions
All Questions carry equal marks

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1. Discuss the clinical applications of different types of bio-potentials and specify their characteristics with the help of waveforms. [15]
2. Write a note on electrodes used in surgery. [15]
3. (a) What do you mean by the process of neuromuscular transmission. Explain.
   (b) Draw and explain the EMG waveform. [8+7]
4. Write notes on:
   (a) Ion channels of biological membranes
   (b) Giant squid axonal membrane [8+7]
5. Write short notes on:
   (a) Nerve conduction.
   (b) Cathode ray oscilloscope. [8+7]
6. Explain the 10-20 electrode system used in the measurement of EEG. Plot the different brain waves and give its frequency and amplitude ranges. [15]
7. Mention different types of electrodes used to pick bio-signals? Explain equivalent circuit properties. Discuss how they are applicable diagnostically? [15]
8. (a) Highlighting the differences between unipolar limb leads and bipolar limb leads, explain them.
   (b) Give the relationship for above two leads. [8+7]

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Code No: A109211103 **R09** **Set No. 3**

II B.Tech I Semester Examinations,November 2010
BIOELECTRICITY AND ELECTRODES
Bio-Medical Engineering

Time: 3 hours **Max Marks: 75**

Answer any FIVE Questions
All Questions carry equal marks

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1. What is all or none principle? Explain how action potentials are recorded. [15]
2. Explain the Electroencephalogram with a neat block diagram showing the output as EEG and input taken from the scalp electrodes? Specify the brain waves. [15]
3. What are the different bio-potentials? Explain with their characteristics. [15]
4. Explain the various types of needle electrodes used for tapping bio-potentials with their equivalent circuit properties. Give their applications. [15]
5. (a) Discuss about physiotherapy instruments and their types with necessary examples.
   (b) Explain ion-sensitive electrodes in detail. [8+7]
6. (a) How the action potentials are helpful in contraction of chambers of heart for ejection of blood?
   (b) What is the significance of Sino-atrial node? [8+7]
7. What are diphasic and monophasic action potentials and explain how they are recorded. [15]
8. (a) Discuss the velocity of neuromuscular transmission and their changes in normal and abnormal states.
   (b) Explain the chemical significance of fatigue? [8+7]

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