

III B.Tech. II Semester Regular Examinations, April/May -2005
BIO-MEDICAL INSTRUMENTATION
(Electronics & Instrumentation Engineering)

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions
All Questions carry equal marks

1. (a) Explain the terms Resting Potential and Active potential . How are these generated in Muscles
(b) With the help of sketches explain about polarized cell and depolarized cell
2. (a) Bring out the salient features of phonocardiography.
(b) Explain in detail the origin of different heart sounds.
3. (a) Draw the electrical equivalent circuit of a microelectrode and explain its electrical nature.
(b) Distinguish between metallic microelectrode and non-metallic microelectrode.
4. (a) Explain the qualitative requirements of the different blocks of a muscle stimulator.
(b) Explain the various types of stimulating and recording electrodes used in a muscle stimulator.
5. (a) Explain the lead configuration in ECG with neat sketches
(b) Draw the basic building blocks of electro cardiograph and explain.
6. (a) With neat circuit diagrams explain the principle of operation of the following EEG preamplifiers.
 - i. Single ended preamplifier
 - ii. Differential preamplifier
(b) With neat diagrams distinguish between unipolar, average and bipolar EEG recording modes.
7. (a) With the help of a neat block diagram explain the working of an external pacemaker.
(b) Write short notes on short wave diathermy.
8. (a) Explain the single channel telemetry system.
(b) Describe the working of FM Telemetry transmitter used in medical field.

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1. (a) With a neat sketch explain the functioning of a human cell. What is meant by cell repolarization and depolarization.
(b) What are resting and action potentials.
2. (a) Explain clearly the following terms:
 - i. Ventricular repolarization
 - ii. Ventricular depolarization
 - iii. Atrial repolarization
 - iv. Atrial depolarization(b) Distinguish between the functioning of SA mode and AV mode.
3. (a) With necessary waveforms explain the generation of bioelectric potential?
(b) What is a direct writing recorder. Explain the construction and principle of operation.
4. (a) Describe the components of a typical EMG recording system.
(b) What are the technical differences between the recorders used for EMG and ECG?
5. (a) Draw an ECG waveform and label it.
(b) Explain in detail the different waves, segments and intervals associated with the ECG waveform. Also give their normal values.
6. (a) Explain the clinical value of the EEG and also describe the various characteristics of an abnormal EEG.
(b) Discuss about the type of electrodes used in the measurement of EEG and also different locations of these electrodes on the skull in order to take the EEG
7. (a) With the help of a neat block diagram explain the working of an external pacemaker.
(b) Write short notes on short wave diathermy.
8. (a) Explain the types of leakage currents.
(b) What are the precautions to be taken to minimize electric shock hazards?

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1. (a) What is meant by central neurons system? Explain the different parts of it and their activity.
(b) What are bioelectric potentials? Discuss the frequency and voltage range of ECG, EEG, EMG and ERG signals.
2. (a) With the help of a neat block diagram explain the principle of operation of heart lung machine.
(b) Explain how the ECG wave form helps in assessing the functioning of the heart.
3. (a) Explain any one type of amplifier used for biomedical amplification?
(b) What are the different elements of electrostatic recorder. Explain briefly with a neat diagram?
4. (a) Explain the measurement of conduction velocities in motor nerves.
(b) Discuss any two types of FM transmitters with their merits & demerits, used for the transmission of EMG signal.
5. (a) Explain the lead configuration in ECG with neat sketches
(b) Draw the basic building blocks of electro cardiograph and explain.
6. (a) What is the origin of the physiological parameter (EEG signal) measured by the EEG machine.
(b) Give the various frequency bands usually specified for EEG signals
7. (a) Write a note on the power sources employed in implantable pacemakers.
(b) With a functional block diagram, explain programmable pacemaker.
8. (a) With a neat block diagram explain the different elements involved in the bio-telemetry.
(b) What are the problems associated with the implant telemetry circuits.

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1. (a) What is meant by central neurons system? Explain the different parts of it and their activity.
(b) What are bioelectric potentials? Discuss the frequency and voltage range of ECG, EEG, EMG and ERG signals.
2. (a) With the help of a neat sketch explain about the physiology of the heart. With the help of a neat sketch explain about the physiology of the heart.
(b) What are the different parts and how bioelectrical potentials are generated within it?
3. Give the basic classification of electrodes used to measure bio electric events. Discuss in detail the electrode used to measure ECG and EMG.
4. (a) Describe the components of a typical EMG recording system.
(b) What are the technical differences between the recorders used for EMG and ECG?
5. (a) Discuss about the computer analysis of ECG.
(b) With a neat block diagram explain the operation of an ECG equipment.
6. (a) Discuss in detail about the various types of electrodes used in EEG measurements.
(b) Discuss in detail about the standard amplitudes and frequency bands of EEG signals.
7. (a) Explain the fibrillation and defibrillation in the heart and hence explain the need for defibrillation with neat circuit diagrams.
(b) Discuss the computer analysis of ECG.
8. (a) With a neat block diagram explain the different elements involved in the bio-telemetry.
(b) What are the problems associated with the implant telemetry circuits.
