

Code :R7420403

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IV B.Tech II Semester(R07) Regular Examinations, April 2011
BIOMEDICAL INSTRUMENTATION
(Electronics & Communication Engineering)

Time: 3 hours

Max Marks: 80

Answer any FIVE questions
All questions carry equal marks

1. (a) Explain the role of the following amplifiers in biomedical instrumentation.
 - i. Bridge voltage amplifier
 - ii. Buffer amplifier
 - iii. Current amplifier
- (b) Mention the precautions to be taken to overcome the problems encountered while performing measurements on human body.
2. (a) Explain the organization of a cell with neat structural diagram describing its various constituents.
- (b) With neat sketch explain the terms relative refractory period and absolute refractory period.
3. (a) What are the uses of the electrode paste applied during biomedical recording.
- (b) Give the constructional detail of body surface electrodes and micro electrodes.
4. (a) Describe the non electrical activities of the heart.
- (b) Explain how bioelectric potentials are generated within heart.
5. Discuss the principle of different types of blood flow measuring instruments using ultrasonic transducers.
6. (a) Explain the fibrillation and defillation in the heart.
- (b) Describe the working of short wave diathermy.
- (c) How is demand pacemaker different from stand by pacemaker?
7. (a) Explain EMG using a block schematic.
- (b) Brief on the different types of electrodes used for EMG recording.
8. Discuss different technique that can be used to measure the oxygen gas with ventilators.

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1. (a) Discuss in detail the static characteristics medical instruments.
(b) Explain the operation of a instrumentation amplifier with a relevant circuit diagram. Also derive the expression for voltage gain of an instrumentation amplifier.
2. (a) With neat sketches explain the terms action potential and resting potential.
(b) Explain polarized and depolarized cells with relevant sketches.
3. (a) Discuss the different types of surface electrodes and their applications.
(b) Draw the electrical equivalent circuit of a microelectrode and explain.
4. (a) With the help of a neat sketch explain about the physiology of the heart.
(b) What are the different parts and how bioelectric potentials are generated within it?
5. With neat sketches and block diagrams explain the working of a ECG machine. Draw the typical electrocardiogram and explain its different parts.
6. (a) Write notes on pace makers.
(b) Write notes on defibrillators.
7. (a) Explain the working and applications of pre amplifier in EEG recording.
(b) Brief on the electrodes used in EEG recording.
8. Write detailed notes on spirometry.

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1. (a) Discuss in detail the dynamic characteristics of medical instruments.
(b) Discuss the characteristics of bio signals in detail.
2. (a) Derive Nernst equation for membrane and present its significance.
(b) Explain how action potentials are transmitted through the membrane.
3. (a) Discuss the electrical equivalent circuit of a micro electrode and explain its working principle.
(b) What are the different interfaces established when a surface electrode is used? Explain.
4. (a) Deduce the relations between electrical and mechanical activities of the heart.
(b) Explain in detail the origin of different heart sounds.
5. (a) Explain in detail about 12-lead ECG recording system.
(b) Why 12 leads are used instead of one in the system?
(c) Describe the various noise problems in an ECG machine.
6. (a) With the help of a block diagram explain the working of an external pace maker.
(b) Write notes on hemodialysis.
7. (a) List typical characteristics of EEG preamplifier.
(b) Describe the block schematic of a typical EEG and describe the flow of signals.
8. Write detailed notes on ventilators.

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1. (a) Mention the problems encountered with measurements from human beings.
(b) Discuss the types of bio amplifiers used in medical instruments.
2. (a) Discuss the different ways of transport of ions through the cell membrane.
(b) Explain about electro physical properties of different muscles.
3. (a) Discuss about various types of bio chemical electrodes and give their applications.
(b) Distinguish between external and internal electrodes and give some examples.
4. (a) Describe in detail mechanical functioning of the heart.
(b) With the help of a neat block diagram explain the working of cardiovascular circulatory system.
5. (a) Differentiate electrocardiograph and electrocardiogram.
(b) Describe the colour coding ECG electrodes.
(c) Explain different waves, segments and intervals associated with the ECG waveform.
6. (a) Describe the function of DC defibrillator with suitable diagram.
(b) Write notes on short wave diathermy.
7. (a) Discuss the type of electrodes used in measurement of EEG and also different locations of these electrodes on the skull in order to take the EEG.
(b) Write notes on interpretation of EMG.
8. Write detailed notes on spirometry?
