Code No: 07A71003 **R07** **Set No. 2**

IV B.Tech I Semester Examinations,November 2010
BIOMEDICAL INSTRUMENTATION
Instrumentation And Control Engineering

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) Explain about mechanical functioning or cardiovascular system of heart.
   (b) What is cardiac cycle? With a neat sketch explain about a cardiac cycle. [8+8]
2. (a) Explain how bioelectric potentials are produced? What are the different theories involved in the generation of bioelectric potentials? Give examples.
   (b) Explain about Nernst equation for bio electric potentials. [10+6]
3. Briefly discuss the important characteristics of various types of electrodes used for the recording of muscle potentials. Explain the working of an EMG machine with the help of block diagram. [8+8]
4. (a) Develop a model for lung ventilation.
   (b) Give a clinical significance of the respiratory model
   (c) What do you mean by lung compliance? What is its normal value? [5+5+6]
5. (a) Draw a diagram of standard ECG giving nomenclature of the deflections and intervals. What is the importance of T-wave ?
   (b) Write a brief note on PR interval. [8+8]
6. (a) What is deionizer? How is it useful for the treatment of city water?
   (b) What is acetate and bicarbonate dialysis? Discuss about the advantages and disadvantages. [8+8]
7. (a) What is bio signal? Describe some important characteristics of bio signals.
   (b) Write short notes on bio signal analysis with an example [8+8]
8. (a) Draw the electrical equivalent circuit of a micro electrode and explain its working principle.
   (b) Discuss about electrical equivalent circuit of a electrode- electrolyte interface and discuss about the interpretation of each element. [8+8]

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Code No: 07A71003 **R07** **Set No. 4**

IV B.Tech I Semester Examinations,November 2010
BIOMEDICAL INSTRUMENTATION
Instrumentation And Control Engineering

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) Explain the different wave segments of electro cardiogram. What do these correspond to?
   (b) Describe the operation of equipment used for obtaining electro cardiogram. [8+8]
2. (a) Explain the features of different body surface electrodes used in bio medical applications.
   (b) Explain about polarized and non- polarized electrodes. [8+8]
3. Describe the functioning of a cardioverter with the help of a block diagram. [16]
4. (a) With a neat sketch explain about the electrical activities of the heart
   (b) With a neat block diagram explain about cardiovascular circulation. [8+8]
5. (a) Explain about different types of muscles and their electro physical properties.
   (b) Derive Nernst equation for cell membrane. [8+8]
6. Briefly discuss the important characteristics of various types of electrodes used for the recording of muscle potentials. Explian the working of an EMG machine, with the help of a block diagram. [8+8]
7. Discuss about the various alarms that are used in ventilators. [16]
8. (a) Describe the factors influence in the design specification of Biomedical instrumentation system.
   (b) With suitable examples compare the adaption of widely used physical measuring instruments for medical applications. [10+6]

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Code No: 07A71003 **R07** **Set No. 1**

IV B.Tech I Semester Examinations,November 2010
BIOMEDICAL INSTRUMENTATION
Instrumentation And Control Engineering

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) What is EEG? Explain briefly its clinical applications.
   (b) List the different types of photic stimulators used for recording EEG. [8+8]
2. Why is artificial ventilation? How it is done? What are the characteristics of an ideal ventilator? [16]
3. With the help of a neat diagram, explain the operation of a DC-delay line defibrillator. [16]
4. (a) Give the constructional details of micro electrodes and body surface electrodes.
   (b) What are the various sources of errors in measuring body potentials using bio electrodes. [8+8]
5. (a) With neat diagrams, explain the importance of chopper amplifiers in biomedical Instrumentation .
   (b) Explain briefly about the need of following amplifiers in Bio-medical instrumentation.
      i. Bridge voltage amplifier
      ii. Buffer amplifier
      iii. Current amplifier [7+9]
6. (a) With a neat block diagram explain the mechanical activities of the heart.
   (b) Describe the electrical conduction system of a heart [8+8]
7. (a) Draw ECG and blood pressure waveforms and correlate them to the mechanical activities of the heart.
   (b) Distinguish between PCG and ECG. [8+8]
8. (a) With a neat sketch explain the function of nerve cell.
   (b) What is meant by central nervous system? Explain the different parts of it and their activity. [8+8]

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Code No: 07A71003 **R07** **Set No. 3**

IV B.Tech I Semester Examinations,November 2010
BIOMEDICAL INSTRUMENTATION
Instrumentation And Control Engineering

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) With neat sketches describe a cardiac cycle.
   (b) Explain in detail about physiology of heart. [8+8]
2. (a) Discuss in detail about dynamic characteristics of medical instruments.
   (b) With a neat block diagram explain the principle of operation of an isolation amplifier. [8+8]
3. Explain the principle of operation of pneumotachograph. [16]
4. (a) Describe various load configurations that can be used to record EEG signals.
   (b) List the frequency ranges of various waves of EEG, and how they change with different activities. [8+8]
5. (a) What are the uses of the electrode paste applied during bio medical recording
   (b) Distinguish between metallic and non metallic micro electrodes. Give their applications. [8+8]
6. (a) What are the advantages of demand pacemaker over fixed rate pacemaker?
   (b) Draw the block diagram of the telemetry type of RF energized pacemaker and explain the necessity of each block in that diagram. [8+8]
7. (a) Describe the propagation of action potential in a cell, nerve fibers, heart muscle.
   (b) List out the various types of Biopotentials originated from the Human body and brief any two with suitable figures of signals generated from them. [8+8]
8. (a) Explain any one method of direct measurement of blood pressure. The blood flow is measured for a person using indicator dilution method. The indicator is injected at the rate of 12 milligrams per minute. After sometime the concentration of the indicator reaches a constant value of 3milligrams per liter. Calculate the blood flow rate in terms of liters per minute.
   (b) With the help of a schematic explain the working of Doppler method of blood flow measurement. [10+6]

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