

Code No: 07A71003

**R07****Set No. 2**

IV B.Tech I Semester Examinations, MAY 2011  
BIO MEDICAL 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 term blood pressure .what is its importance? How is it measured.  
(b) With the help of a schematic explain the working of Doppler method of blood flow measurement. [8+8]
2. Write about artificial respiration and discuss the various types of ventilators available. [16]
3. (a) Explain the importance of measurements in a biomedical instrumentation system.  
(b) With a neat block diagram explain about various components present in a biomedical instrumentation system. [8+8]
4. (a) With a neat block diagram explain the mechanical activities of the heart.  
(b) Describe the electrical conduction system of a heart [8+8]
5. (a) Explain the significance of Nernst equation.  
(b) What are resting and action potentials? Show the wave form of action potentials and explain the various mechanisms. [6+10]
6. Explain the process of generation of EMG signal in the muscles. What type of information is obtained from EMG signals? Briefly explain the procedure of recording of surface EMG potential. [16]
7. (a) Discuss about various types of Bio chemical electrodes and give their applications.  
(b) Distinguish between external and internal electrodes and give some examples [8+8]
8. (a) Draw the schematic diagram of haemodialyser unit, and explain the working of each part in it.  
(b) With necessary equations, explain how urea concentration is reduced by the haemodialyser in each pass. [8+8]

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**R07****Set No. 4**

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BIO MEDICAL 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) Describe the refractory period, absolute and relative refractory period with a help of neat sketch.  
(b) What is stimulus? How it can be transferred from one cell to other cell. [8+8]
2. (a) Give the salient features of needle electrodes. Give their applications.  
(b) List out various bio medical electrodes and give their applications. [8+8]
3. Give the functional description of the lungs respiratory and blood- gas exchange system. [16]
4. (a) Discuss the operation of ultrasonic blood flow meter .  
(b) Explain why reflectance type is preferred than transmittance type. [8+8]
5. (a) What are the advantages of lithium battery as energy source in permanent pacemaker?  
(b) In what way demand pacemaker is different from stand by pacemaker. [8+8]
6. (a) Describe various lead configurations that can be used to record EEG signals.  
(b) List the frequency ranges of various waves of EEG, and explain how they change with different activities. [8+8]
7. (a) Bring out the relation between the electrical and mechanical activities of the heart.  
(b) Describe in detail about a heart- lung machine. [10+6]
8. (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]

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**R07****Set No. 1**

**IV B.Tech I Semester Examinations, MAY 2011**  
**BIO MEDICAL 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. Describe the parts of permanent pacemakers and indication for its use. [16]
2. Explain the principle of operation of pneumotachograph. [16]
3. (a) What is the half cell potential of an electrode and offset potential of the metals used in electrode discuss briefly.  
 (b) Discuss the formation of electrical double layer at the interface of electrode electrolyte. [8+8]
4. (a) Discuss the ECG lead configurations.  
 (b) Describe the driven RL system in the case of ECG.  
 (c) Why is the SA node called as natural pacemaker? [5+5+6]
5. (a) Discuss in detail about static characteristics of medical instruments.  
 (b) With a neat circuit diagram explain the principle of operation of an instrumentation amplifier. Also derive the expression for voltage gain (AV) of an instrumentation amplifier. [6+10]
6. (a) Explain about different types of muscles and their electro physical properties.  
 (b) Derive Nernst equation for cell membrane. [8+8]
7. While explaining electro encephalography, distinguish between agitated mind, tranquilized mind, and under meditation mind. [16]
8. (a) Describe the pulmonary circulation and systemic circulation system of the heart.  
 (b) Why SA node is called as natural pacemaker. Discuss how the signal is generated and transmitted from it. [8+8]

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**R07****Set No. 3**

IV B.Tech I Semester Examinations, MAY 2011  
BIO MEDICAL 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 different types of bio-potential electrodes used in the measurement of bio electric events.  
(b) Discuss about various errors caused by the electrodes in the measurement of the body potentials. How to reduce these errors? [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 features of different block of an EEG machine. List the specifications of an EEG amplifier. [8+8]
4. Explain the procedure to be adopted for performance evaluation of ventilators. [16]
5. Explain how blood flow can be measured using electro magnetic blood flow meter .give the advantages and disadvantages of various excitation on signals. [16]
6. Mention the principle of parallel plate dialyser. Explain in detail a Kill dialyser. [16]
7. (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]
8. (a) Describe in detail about the mechanical functioning of a heart.  
(b) With the help of a neat block diagram explain the working of cardiovascular circulation system. [6+10]

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