Printed Pages : 4

EIC802

(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 132802

Roll No. | | | | | | | | | | |

B. Tech.

(SEM. VIII) THEORY EXAMINATION, 2014-15

BIOMEDICAL INSTRUMENTATION

Time : **3** Hours] [Total Marks : **100**

Note : Attempt all questions. All questions carry equal marks.

1 Attempt any four parts of the following. **5x4=20**

(a) Which one of the components should be determined first in designing an instrumentation system for measurement of physiological variables? Why? Which would you next determine?

(b) Differentiate between clinical instruments and research instruments? Explain the purpose of body surface electrodes and give their advantages with applications?

(c) Draw the block diagram of Man-instrumentation system and explain its various system components. Enlist the problems encountered in the Man instrumentation system.

(d) How does potential propagate in cell? Explain the role of refractory period?

(e) Explain the piezoelectric transducer, what are their limitations ? Give its dynamic model and also its output equation under steady state condition.

2 Attempt any four parts of the following : **5x4=20**

(a) How are the potential in muscle fibers measured and what is the record called that is obtained thereform? Also draw the nature of the potentials recorded.

(b) What are the problems involved in using flat electrodes in terms of interference or high impedance between electrode and skin? How could you help to eliminate this problem?

(c) What is bio-potential ? Name six types of bio-potential sources. Also explain polarization, depolarization and repolarization.

(d) Explain term EPSP and IPSP.

(e) What do you understand by fibrillation? How do you correct it? Explain DC defibrillator with neat diagram.

(f) Explain the vector cardiograph? How does it differ from electrocardiograph?

3 Attempt any four parts of the following : **5x4=20**

(a) Draw the ECG waveform and explain important points in it. What does 1020 ECG measurement?

(b) Draw the wave shape of blood pressure on a time base and explain it? How is the blood pressure measurement done by sphygmomanometer ?

(c) What is meant by "plethysonography"? Discuss any one method to implement it clinically?

(d) Explain the working of ultrasonic spirometer?

(e) Explain the procedure of measurement of neuronal firing with the suitable diagram.

(f) Write short note on humidifiers and nebulizers.

4 Attempt any two parts of the following : **10x2=20**

(a) Explain the principle of computerized axial tomography and compare its method of visualization with conventional x-ray methods.

(b) How the pacemaker works and explains the difference between the artificial pacemakers with heart's natural pacemaker.

(c) With diagram explain tonometer operation for eye pressure measurement.

5 Attempt any two parts of the following. **10x2=20**

(a) In both X-ray and Radioisotope procedure, potentially harmful ionizing radiation is used for diagnostic purposes. Why is the safe intensity of radiation of X-ray much higher than that for isotopes methods? Describe X-ray production arrangement.

(b) Draw a sketch of neuron and level the cell body, dendrite, axon and axon hillock. Also explain the difference between a motor nerve and a sensory nerve.

(c) How is the telemetry used as an emergency patient care tool? Explain how four physiological parameters can be monitored and telemetered simultaneously.