U - 0290 / 2550

Printed Pages : 3 TEE-031

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

PAPER ID : 0290 Roll No.

B. Tech.

(SEM. VIII) EXAMINATION, 2007-08

BIO-INSTRUMENTATION

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

Note :
(1) Attempt all questions.
(2) All questions carry **equal** marks.
(3) Be precise in your answer.
(4) No second answer book will be provided.

1 Attempt any **four** parts of the following: **4×5=20**

(a) What is the objective of biomedical instrumentation system? Name the different societies and organizations which look after the developments and research in the area of biomedical instrumentation.

(b) What do you mean by "in vivo" and "in vitro" measurements? Which one should be preferred and why?

(c) Define the terms Anatomy and Physiology. Also explain their broad classification in brief.

(d) Discuss the following physiological systems of the body using the terminology common to the engineering analogy.
(i) Cardiovascular System
(ii) Respiratory System
(iii) Nervous System

(e) Discuss the major problems encountered in measuring - A living system.

(f) Explain basic medical instrumentation system. Also discuss about bio-medical transducers used for body temperature measurement and position/ motion transducers.

2 Attempt any **four** parts of the following: **4×5=20**

(a) What are bio-potentials? Name six types of bio-potentials sources with their amplitude and frequency range.

(b) Explain electrode theory. Discuss different types of electrode used for bio-electric potentials.

(c) Explain the term "Action/Resting" potentials with the help of a waveform.

(d) Calculate the hydrogen ion concentration of the blood with a pH of 7.4. Explain the pH electrode for it.

(e) Explain various ECG lead systems and Einthoven triangle.

(f) Draw an electrocardiogram (lead II), labeling the critical features. Include typical amplitudes and time interval for a normal person. Also name the types of interferences which occur during recording the ECG

3 Attempt any **two** parts of the following : **2×10=20**

(a) Explain the electrical and mechanical activities of the cardiovascular system with the help of neat sketch.

(b) Explain in detail about the different methods of measurement of cardiac output.

(c) Define systole and diastole. Explain the working of an electronic/automatic blood pressure measurement system with block diagram. Mention the sources of error and standard pressure in different chambers of the heart.

4 Attempt any **two** parts of the following: **2×10=20**

(a) What is the difference between a motor nerve and a sensory nerve? Explain 10-20 international electrode system used in EEG recordings. Discuss in brief instrumentation scheme for EEG recording.

(b) What is a pacemaker? Give the classifications of various pacemakers. Explain "demand" type pacemaker.

(c) What do you mean by fibrillation? How do you correct it? Draw a circuit of a direct current defibrillator and explain the working.

5 Attempt any **two** parts of the following : **2×10=20**

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

(b) What is the basic purpose of the safety measures used with the electrically susceptible patients? Why it is so important to maintain the integrity of the grounding system for protection against microshock?

(c) Write short technical notes on any **two** of the following:

(i) Role of computer in Biomedical Instrumentation.

(ii) Ultrasonic systems and its application in BME

(iii) Impedance Plethysmography.