5E 5026

B. Tech. V Semester (Main/Back) Examination, Dec., 2014

ELECTRONICS & COMMUNICATION ENGINEERING # 5EC6.1

BIOMEDICAL INSTRUMENTATION

Time : 3 Hours **Min. Passing Marks : 24** **Maximum Marks : 80**

Instruction to Candidates :

Attempt any five questions, selecting one question from each unit. All questions carry equal marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.)

Unit-I

1. Explain the physiology the engineering analogous and important parameters of measurement for the following human body subsystems:
   (*a*) Neural system [8]
   (*b*) Cardiovascular system [8]

OR

1. (*a*) Give the classification of transducers used for bio-medical applications. [8]
   (*b*) What are electrodes? Classify them and discuss the selection criteria for transducers & electrodes. [8]

Unit-II

2. (*a*) Explain the action and resting potentials with suitable diagram. Also explain the propagation of action potentials. [10]
   (*b*) What is an electroencephalogram (EEG)? What are various frequency bands present in an EEG? Give the condition for their generation. [6]

OR

2. (*a*) Give the construction and working of a sphygmomanometer with the help of a block diagram. [8]
   (*b*) Explain the working principle of magnetic blood flow with help of suitable block diagram. [8]

Unit-III

3. (*a*) Describe the hematology of blood. Explain the working of a Coulter model STKS type blood analyzer with the help of suitable diagram. [10]
   (*b*) Explain the construction and working of a Gas - Liquid Chromatograph with the help of black diagram. [6]

OR

3. (*a*) Explain the optical methods of blood pH measurement used for continuous monitoring. [8]
   (*b*) What is Magnetic Resonance Imaging (MRI)? Compare the MRI & CT Techniques. [8]

Unit-IV

4. (*a*) What are physiological effects of electric current on human body? [6]
   (*b*) What are cardiac pacemakers? Classify them in detail. [10]

OR

4. (*a*) Describe with the help of black diagram, a multi channel biotelemetry system. [8]
   (*b*) What is hemodialysis? Explain the working of an artificial Kidney with the help of black diagram. [8]

Unit-V

5. (*a*) What is Ischemia? Discuss the ECG pattern of a patient suffering from Ischemia. [8]
   (*b*) Describe the criteria for identification of cardiac disorders. [8]

OR

5. (*a*) Explain the data acquisition and processing system used for patient monitoring. [6]
   (*b*) Explain the clinical applications of following bio potentials:
   (i) E M G [5]
   (ii) E R G [5]