EX/IEBE/T/423A/2018

B.E. INSTRUMENTATION AND ELECTRONICS ENGINEERING FOURTH YEAR SECOND SEMESTER EXAMINATION - 2018

Subject: BIOMEDICAL INSTRUMENTATION

Time : Three hours **Full Marks: 100**

Different parts of the same question should be answered together.

[20]	Answer any **one** from **(a) and (b)** in this block [20] [1] (a) With the help of a characteristic curve explain the electrical activities of a Bio-cell and write down the name of the characteristic curve. What do you mean by artifact? (b) What is a Biopotential? Name six types of Biopotential sources. How these Biopotentials are sensed?
[20]	Answer any **one** from **(a) and (b)** in this block: [20] [2] (a) How all types of Biopotential electrodes are classified? Explain with the help of the equivalent circuits of a skin and Biopotential electrode interface, (i) for single electrode system and (ii) for two electrodes system. With the help of schematic diagram describe the construction and operations of two types of surface electrodes and microelectrodes. {b} With the help of a neat block diagram describe the functions of Heart and Lung in the Cardio-Vascular circulatory system. Discuss briefly about 'AV' and 'SA' nodes.
[40]	Answer any **two(2)** from **(a), (b)and (c)** in this block: [20+20] [3] (a) With the help of a neat block diagram describe the principle of operation of an ECG Machine and hence also discuss normal types of Lead connections. Discuss and draw a neat circuit diagram of Wilson`s augmented unipolar limb leads and unipolar chest leads system. (b) Why artificial pacing is needed? State the various types of pacing modes and describe their principles briefly. With the help of a block diagram showing the components of the circuitry of an artificial pacemaker, discuss the principles of operation of each block. (c) With the help of a neat block diagram describe the principle of operations of an X-ray machine in detail that is used for Medical purpose.
[20]	*Answer any* **one(1) from (a) and (b)** *in this block:* [20] [4] (a) With the help of a neat sketch discuss the hospital electric-power-distribution system and also describe how a modern ECG machine isolated from the hot line. (b) With the help of a block diagram describe the principle of a Transmitter and a Receiver used for bio-telemetering purpose. Explain how four physiological parameters can be monitored and telemetered simultaneously.