

Different parts of the same question should be answered together.

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- CO1 Answer any **one** from (a) and (b) in this block [20]
[20] [1] (a) What do you mean by active and passive transducers? Name two active and two passive transducers and briefly describe their principle of operations. Explain how they can be utilized in Biomedical applications.
(b) What do you understand by the term "Gauge Factor"? Draw a neat sketch and describe the operation of a strain gauge and give a suitable biomedical application. With the help of some examples explain the difference between isometric and isotonic transducers.
- CO2 Answer any **one** from (a) and (b) in this block; [20]
[20] [2] (a) What do you mean by the Resting Potential of a Bio-cell? Draw a Voltage -Time waveform of a Bio-cell and briefly discuss about the electrochemical activities with respect to different segment of the curve. What do you mean by artifact? What is all-or-nothing law? Discuss about the roll of Refractory periods of an excited Bio-cell.
(b) Name six types of Biopotential sources. 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.
- CO3 Answer any **two(2)** from (a), (b) and (c) in this block; [20+20]
[40] [3] (a) 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.
(b) 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.
(c) Why artificial pacing is needed? State the various types of pacing modes and describe their principles briefly. Describe with the help of a block diagram showing the components of the circuitry of an artificial pacemaker and hence discuss the principles of operations of each block.
- CO4 Answer any **one(1)** from (a) and (b) in this block. [20]
[20] [4] (a) With the help of a neat block diagram describe the principles of operations of an X-ray machine in detail that is used for Medical purpose.
(b) With the help of a block diagram describe the principle of a Transmitter and a Receiver used for bio-telemetry purpose. Explain how four physiological parameters can be monitored and telemetered simultaneously.