Total number of printed pages: 02

D/6/DIE602

2024

BIOMEDICAL INSTRUMENTATION

Full Marks: 100

Time: Three hours

The figures in the margin indicate full marks for the questions.

Part-A: Answer all questions

1. a) When the cell is polarized, …….. potential is obtained in it.

   b) When heart atriums are depolarized, the ventricles are .....

   c) Suction cup electrode is a type of ..... bioelectrode.

   d) Electromyogram is the electrical activity of the .....

   e) SA node is the natural …….. of heart.

   f) Listening to Korotkoff sounds helps to find ..... values in human.

   g) …….. are recorded using phonocardiograph.

   h) The electrode on …….. is connected to ground in the ECG measurement.

   i) …….. electrode penetrates through the muscles to measure its activity.

   j) …….. electrodes are used for measuring cell potentials.

   k) …….. number of bipolar limb lead configurations are in ECG measurement.

   l) Electrocardiogram is the electrical activity of the .....

   m) When heart ventricles are contracting, the atriums are .....

   n) ..... mm of Hg is the diastolic pressure of a healthy person.

   o) Electroencephalogram is the electrical activity of the .....

   p) The heart sound S1 is due to blood turbulence during .....

   q) Human heart has ..... aortic valve.

   r) The ..... limb electrode is connected to the amplifier positive terminal in the lead II configuration of ECG measurement.

   s) The heart atrial depolarization is indicated in ECG as ..... wave.

   t) The piezoelectric transducers are used in ..... imaging machine.

1*20=20

Part-B: Answer any four questions

2. a) Explain cell resting potential. 4
   b) Explain surface biopotential electrode and its types. 6
   c) With a neat diagram, explain the working of human heart. 10

3. a) Write about the following:
   (i) Action potential
   (ii) Phonocardiograph
   (iii) Pacemaker
   (iv) Instrumentation amplifier

   4*5=20

4. a) With neat diagrams, explain 12 standard lead configurations in ECG measurement. Draw an ECG waveform and label its segments and intervals. 20

5. a) Design a differential amplifier for a gain of 10. 4
   b) Explain a method to measure human blood pressure. 8
   c) With a neat diagram, explain the working of X-ray Machine. 8

6. a) Design an instrumentation amplifier for a gain of 1500. 10
   b) With a neat diagram, explain the working of defibrillator. 10

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