Total No. of printed pages = 4

CAI-601/Bio. Inst./6th Sem/2015/M

BIOMEDICAL INSTRUMENTATION

Full Marks – 70

Pass Marks – 28

Time – Three hours

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

Answer any *seven* questions.

1. (a) State the potential range (peak to peak amplitude) and bandwidth of the following bioelectric signals :

   ECG, EEG, EMG, ERG, EOG. 5

   (b) Describe the electrical action of SA-node. 5

2. (a) Draw a simplified block diagram of the circulatory system. 4

   (b) State the difference between in-vivo and in-vitro measurement. 4

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(c) State what the following medical names mean: 2

Bradycardia, Precordial.

3. (a) Draw an action potential waveform and also label the time and amplitude values. 5

(b) Explain the difference between a motor nerve and a sensory nerve. 3

(c) What is a 10-20 electrode placement system and with what bioelectric instrument it is used ? 2

4. (a) What are axon and dendrite ? 3

(b) Draw an electrocardiogram in lead-II configuration. 3

(c) What is the major advantage of floating type skin surface electrode ? 2

(d) Define the terms : absolute refractory period and net height. 2

5. (a) State the general characteristics of human cell. 7

(b) What are the nodes of Ranvier and what useful purpose do they serve ? 3

6. (a) Explain in brief the operation of the heart and the cardiovascular system. 7

(b) Name the three basic electrodes used to measure bioelectric events. 3

7. (a) Draw the waveshape of blood pressure on a time base and explain it. What is the dicrotic notch ? 7

(b) What are the basic requirements of a biomedical amplifier ? 3

8. (a) Explain what is meant by 'Plethysmography'? Discuss one way to make measurements and clinical applications. 7

(b) Explain the difference between indirect and direct measurement of blood pressure. 3

9. (a) Draw the block diagram of an X-ray machine and explain the different controls in it. 7

(b) What are the three different kinds of muscles found in our body ? 3

10. Write short notes on the following. (any *two*) : 5×2=10

(a) Einthoven's triangle

(b) Microelectrode

(c) Gauge factor

(d) Central nervous system.