

Total No. of printed pages = 6

CAI-601/BI/6th Sem/2018/M

BIOMEDICAL INSTRUMENTATION

Full Marks – 70

Time – Three hours

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

The question paper consists of two parts : PART-A
and PART-B. Both are compulsory.

PART – A

Marks – 25

All questions are compulsory.

1. Answer the following questions : $1 \times 10 = 10$

- (i) Which bioelectric potential can be utilised to give a concrete idea regarding the efficacy of yoga ?
- (ii) What is meant by the term “tachycardia” ?

[Turn over

- (iii) Name the vessel through which blood is pumped away from the heart.
 - (iv) Which cardiac muscle fiber transmits the wave of depolarization from atria to ventricles ?
 - (v) State the need of the apparatus “defibrillator” in cardiology.
 - (vi) What is the function of “Nodes of Ranvier” in neuron ?
 - (vii) How the mean arterial pressure (MAP) over one cardiac cycle is calculated ?
 - (viii) What do you understand by the term “In vivo” measurement ?
 - (ix) State the duration of action potential for heart muscle.
 - (x) What is the frequency range of “beta rhythms” in EEG ?
2. State whether the following statements are true or false. If false, write the correct one. $1 \times 5 = 5$
- (i) Half of the human body is water, of this half three-fourths of the water is in the cells.

- (ii) Cartilage is a connective tissue and joints between bones.
- (iii) Several organs whose functions are interrelated constitute a system.
- (iv) Irritability is the ability of an organism to respond to an outside influence or stimulus.
- (v) Spirometer is used for the study of cardiology.

3. Fill in the blanks : 1×5=5

- (i) The human skeleton consists of ____ bones.
- (ii) The heart beats at an average rate of about ____ beats per minute.
- (iii) Inside the lungs, the gas exchange takes place in ____.
- (iv) The nervous system consists of the ____ and the ____.
- (v) The ____ gland secretes insulin that regulates the metabolism of glucose.

10. (a) Explain the set up of photodetectors for detecting the pulsatile blood volume changes. 5
- (b) Explain schematically the working of an X-ray generator. 4
11. (a) Mention some basic requirements of biomedical amplifiers used for increasing the voltage of a biopotential. 6
- (b) State the three bipolar limb lead selection which was introduced by Einthoven. 3
12. (a) Explain with diagrams the 12 standard ECG lead configurations. 7
- (b) Why the placement of FEG electrodes is called "10-20 electrode placement system"? 2