Reg. No. : | | | | | | | | | | |

Question Paper Code: 53114

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2017

Third Semester

Biomedical Engineering

15UBM304 - BIOMEDICAL INSTRUMENTS

(Regulation 2015)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. During the initial portion of the action potential, the membrane cannot respond to any stimulus, no matter how intense the stimulus is. This interval is called

   (a) Absolute refractory period (b) Relative refractory period
   (c) current refractory period (d) stimulus

2. The intensity of the stimulus, which is assumed to be greater than the threshold of stimulus, the action potential is always the same for any given cell, this is stated as

   (a) All are nothing law (b) all and nothing law
   (c) All or nothing law (d) none of these

3. _____ are the potentials developed in the brain as the responses to external stimuli like light, sound.

   (a) biopontentials (b) action potentials
   (c) Evoked potentials (d) membrane potentials

4. An instrumentation amplifier can have _____stage.

   (a) inverting input (b) differential input
   (c) Non inverting input (d) Integrator

5. _____ circuit reduces interference and makes electrical safety in ECG amplifier.

   (a) Driven right leg system (b) Driven left leg system
   (c) electrode placement system (d) Isolation amplifier system

6. _____ is the period of contraction of the ventricular muscles during that time blood is pumped into the pulmonary artery and the aorta.

(a) Diastole (b) Cardiac output (c) Systole (d) Total heart rate

7. The technique of listening to sounds produced by organs and vessels of the body is called

(a) Monitoring (b) auscultation (c) pectoris (d) none of these

8. Electronic manometer measures a_____ pressure.

(a) single (b) differential (c) atmospheric (d) gauge

9. The spectrophotometer technique is to measures light intensity as a function of

(a) Current (b) Time (c) wavelength (d) absorbance

10. pCO_2 measure _____ concentration of gas in air/fluid.

(a) total (b) relative (c) Direct (d) indirect

PART - B (5 x 2 = 10 Marks)

11. Compare between perfectly polarized electrodes & perfectly non polarized electrodes.

12. Define the term latency in EMG.

13. List out the relative merits of the three types of isolation techniques.

14. What is cardiac output?

15. Write the principle behind working of flame photometer.

PART - C (5 x 16 = 80 Marks)

16. (a) Explain in detail about Origin of bio potential and its propagation. (16)

Or

(b) Construct an electrical equivalent circuit of a microelectrode and explain in detail. (16)

17. (a) (i) List the types of brain waves with their amplitude of frequency parameters. (6)

(ii) Sketch and summarize 10-20 electrode system for EEG recording. (10)

Or

(b) Explain in detail about Einthoven triangle and lead system in ECG. (16)

18. (a) (i) Write a short note on Bio-amplifier and its requirements. (8)

(ii) Explain about need and use of Right leg driven circuit. (8)

Or

(b) (i) Explain in detail about Instrumentation amplifier. (8)

(ii) List out few Interference reduction techniques. (8)

19. (a) How cardiac outputs measured using dye dilution technique and describe it in detail. (16)

Or

(b) Explain any two indirect methods of blood pressure measurement techniques. (16)

20. (a) Write a short note on

(i) Blood glucose sensors (8)

(ii) Immunologically sensitive FET (IMFET) (8)

Or

(b) Construct a blood cell counter which works under principle of conductivity and explain in detail. (16)