A **Reg. No. :** | | | | | | | | | | |

Question Paper Code: 53B04

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2018

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. _____ is a small piece of metal that is used to take an electric current. CO1- R

   (a) Electrode (b) Electrolyte (c) Gel (d) Liquid

2. Glass micropipettes and metal electrodes belongs to the type CO1- U

   (a) Surface electrodes (b) Needle electrodes (c) Micro electrodes (d) None of the above

3. Extremely small DC signals can be amplified with _____ CO2- R

   (a) Chopper (b) Capacitor (c) Battery (d) None

4. _____ is the science of recording and interpreting the electrical activity of muscle's action potential. CO2- R

   (a) EMG (b) ECG (c) EOG (d) ERG

5. _____is used to convert the d.c or low frequency signal into high frequency signal. CO3- R

   (a) Isolation (b) Bistable (c) Chopper (d) None of the above

6. _____ is the device that passes frequency within a certain range and rejects frequencies outside that range. CO3-R

   (a) Band-pass fitter (b) Isolation amplifiers (c) Transformer (d) None of the above

7. The concentration of cardio green can be measured with the help of ___ CO4- R

   (a) Infra-red photocell (b) Green (c) Blue (d) None of the above

8. _____ is the product of the Heart Rate (HR), or the number of heart beats per minute (bpm) and the Stroke Volume (SV). CO4- U

(a) Cardiac output (b) Blood flow (c) Pressure Output (d) Oxygen flow

9. _____ measures the concentration of hydrogen ions (pH), partial pressure of carbon dioxide (pCO2) and partial pressure of oxygen (pO2) in whole blood. CO5- U

(a) Blood Gas analyzer (b) Blood glucose measurement

(c) Auto analyser (d) None of the above

10. In a pH measurement the glass electrode exhibits a high electrical resistance of the order of _____ milli Ohm. CO5R

(a) 100 - 1000 (b) 100 (c) 10 - 100 (d) All of the above

PART – B (5 x 2= 10Marks)

11. What are the polarizable and non-polarizable electrodes? CO1- U

12. Draw the Einthoven's triangle for defining ECG leads. CO2- R

13. Why do we require isolation amplifier in a biomedical instrument? CO3- Ana

14. Define systole and diastole. CO4- R

15. State the advantages and disadvantages of an auto analyzer. CO5- R

PART – C (5 x 16= 80Marks)

16. (a) Draw the electrical equivalent circuit of a micro electrode and explain its electrical nature. CO1- U (16)

Or

(b) Discuss the different types of surface electrodes and their uses. CO1- U (16)

17. (a) Draw the black diagram of an ECG machine and explain the functions of each block along with its characteristics. CO2- U (16)

Or

(b) Describe the 10 -20 electrode systems used in EEG and give the uses of EEG. CO2- U (16)

18. (a) Explain in detail the different types of Isolation amplifier. CO3-U (16)

Or

(b) With neat sketches, compare the characteristics of single ended and CO3- Ana (16)

differential bio-amplifier circuits.

19.	(a)	Describe the methods used for respiration rate measurement in detail.	CO4- U	(16)
		Or		
	(b)	Give the theory behind the thermodilution method and explain the measurement technique for Cardiac Output using that method.	CO4- U	(16)
20.	(a)	Describe a flame photometer and Blood gas analyzer with a suitable diagrams.	CO5- U	(16)
		Or		
	(b)	Describe with neat diagrams, the operation of a blood cell counter working on the principle of conductivity. List the drawbacks of the system.	CO5- U	(16)