Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Seventh Semester B.Tech Degree Examination December 2022 (2019 scheme)

Course Code: ECT425

Course Name: BIOMEDICAL INSTRUMENTATION

Max. Marks: 100 **Duration: 3 Hours**

PART A

Answer all questions, each carries3 marks. Marks

1		Draw the structure of heart showing the major components.	(3)
2		Explain the formation of bio potential signal.	(3)
3		Write the Nernst equation and explain each term present in it.	(3)
4		Differentiate between bipolar and unipolar lead system in ECG measurement.	(3)
5		What is meant by Korotkoff sound?	(3)
6		What is the difference between electrocardiogram (ECG) and phonocardiogram (PCG) signals?	(3)
7		Define tidal volume and residual volume in respiratory cycle.	(3)
8		What is infant incubator? How does it work?	(3)
9		Explain any three applications of diathermy.	(3)
10		Explain different methods of electric accident prevention.	(3)

PART B

Answer any one full question from each module, each carries 14 marks.

Module I

11	a)	Illustrate with necessary diagrams how action potential is generated and propagated across neurons.	(7)
	b)	Explain in detail about the problems encountered in a biomedical measurement system.	(7)

OR

12	a)	Draw the general block diagram of a biomedical instrumentation system and explain the functions of each block.	(7)
	b)	Describe in detail the formation of resting potential and action potential in human body.	(7)

Module II

13 a) With neat sketches explain needle and micro electrodes used in biomedical applications. (9)

b) Describe electro-conduction system of heart. (5)

OR

14 a) Draw the block diagram of ECG machine and explain the functions of each block. (9)

b) With neat diagram explain the principle of any one transducer used in biomedical application. (5)

Module III

15 a) Explain the oscillometric method for blood pressure measurement using relevant diagrams. (8)

b) Explain the principle of impedence plethysmography with necessary sketch. (6)

OR

16 a) With neat sketch explain the working of an ultrasound blood flow meter. (8)

b) Explain phonocardiography with the help of a suitable block diagram. (6)

Module IV

17 a) With necessary illustrations, explain the placement of electrodes for recording EEG signal. (9)

b) Write short notes on tidal volume and vital capacity in breathing mechanism with the help of a respiratory plot. (5)

OR

18 a) What is a cardiac defibrillator? With a neat diagram explain DC defibrillator. (8)

b) Explain how a spirometer is used to measure lung capacity and volume with a necessary sketch. (6)

Module V

19 a) With a neat block diagram explain the working of an X-ray machine. (8)

b) Illustrate the components of bio telemetry system. (6)

OR

20 a) Explain the principle of computed tomography scanner system. (8)

b) What are the safety precautions to be taken while operating electro-medical equipments? (6)

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