Reg. No. :

Question Paper Code: 99B71

B.E./B.Tech. DEGREE EXAMINATION, NOV 2024

Open Elective

Civil Engineering

19UBM971-BIOMEDICAL INSTRUMENTATION SYSTEMS

(Common to All branches)

(Regulations 2019)

Duration: Three hours   Maximum: 100 Marks

Answer All Questions

PART A - (10 x 2 = 20 Marks)

1. Analyze the different types of medical instruments that are used in medical field.   CO1-U

2. Define Resting Potential   CO1-U

3. Classify the types of biosignals.   CO1-U

4. List the brain waves with their frequency.   CO1-U

5. List the types of heart sounds along with its sound description.   CO1-U

6. Why is pulmonary function tests done?   CO1-U

7. How telemetry can be used in transmitting stimulus signals to a patient?   CO1-U

8. Classify the biotelemetry system   CO1-U

9. State the condition of ventricular fibrillation.   CO1-U

10. Generalize the purpose of audiometers and name few tests performed using audiometer   CO1-U

PART – B (5 x 16= 80 Marks)

11. (a) Compare and contrast the different types of biomedical instruments based on their method of measurement, and evaluate the advantages and disadvantages of each type in clinical applications.   CO3- App   (16)

Or

(b)	Analyze the mechanisms underlying the generation and propagation of electrical signals in excitable cells, such as neurons and muscle cells, and evaluate their physiological significance in human health and disease.	CO3- App	(16)

12. (a) Explain the concept of biosignals and their importance in biomedical applications. Classify the different types of biosignals with examples and discuss the characteristics and applications of each category.

<div align="center">Or</div>

(b) Identify the instrument used for measurement of electric activity of heart and explain in detail with block diagram. Analyze the physiological nature of ECG waveforms.

    CO1-U   (16)

13. (a) Analyze the clinical utility of measuring pH, PCO2, and PO2 in arterial blood. Evaluate the indications for measuring these parameters, including in patients with respiratory or metabolic acidosis or alkalosis. Analyze the interpretation of the results and the potential limitations of these measurements.

    CO4- Ana   (16)

<div align="center">Or</div>

(b) Evaluate the impact of cardiac disease on cardiac output. Analyze the differences in cardiac output between healthy individuals and those with conditions such as heart failure, valvular disease, and myocardial infarction. Evaluate the impact of treatment interventions such as medication, lifestyle changes, and surgical procedures on cardiac output in these patients

    CO4- Ana   (16)

14. (a) Explain the principles of computed tomography (CT) imaging and how it differs from traditional X-ray imaging.

    CO1- U   (16)

<div align="center">Or</div>

(b) Evaluate the role of Positron Emission Tomography imaging in monitoring response to therapy and predicting treatment outcomes.

    CO1-U   (16)

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15. (a) Explain the basic working principle of a pacemaker. Discuss the   CO1- U   (16)
        different types of pacemakers and their applications.

                                    Or

    (b) Discuss the principles of diathermy and how it is used for   CO1- U   (16)
        therapeutic purposes in clinical practice.