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

Question Paper Code: 99B71

B.E./B.Tech. DEGREE EXAMINATION, MAY 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. Classify the different types of electrodes that are used in biomedical instrumentation. — CO1-U

2. Illustrate the applications of medical instrumentation system. — CO1-U

3. Identify the instrument used to measure the electrical activity of heart. Explain its function briefly. — CO1-U

4. State the reason for measuring the electrical activity of heart. — CO1-U

5. Define systolic and diastolic pressure. — CO1-U

6. List the standard values of pH, pCO_2, pO_2 in a normal person. — 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) Analyze the mechanisms underlying the generation of bio-potentials in the human body, and evaluate the clinical significance of these signals in disease diagnosis and treatment. — CO3- App (16)

Or

(b) Analyze the factors that affect the selection of transducers for biomedical instrumentation, and evaluate the relative importance of each factor in specific clinical applications   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.   CO1-U   (16)

Or

(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)

Or

(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)

Or

(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) Discuss the design and components of a defibrillator in biomedical instrumentation. Analyze the advantages and disadvantages of defibrillator.   CO1- U   (16)

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

(b) Discuss the role of hemodialysis in the management of acute kidney injury, including the criteria for initiating and discontinuing therapy, and the potential benefits and risks.   CO1- U   (16)

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