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

Question Paper Code : 31124

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2024.

Fifth Semester

Computer Science and Engineering

OMD 551 – BASIC OF BIOMEDICAL INSTRUMENTATION

(Common to : Computer and Communication Engineering/Electrical and Electronics Engineering/Electronics and communication Engineering/ Electronics and Telecommunication Engineering/Artificial Intelligence and Data Science/Computer Science and Business Systems/Information Technology)

(Regulations 2017)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Define: Refractory period.

2. List the different types of Micro electrodes.

3. Specify the frequency and amplitude range of any four bio electric signals.

4. What is Unipolar and Bipolar mode of EMG?

5. Mention the basic characteristics of bio amplifiers.

6. Indicate the techniques adopted to eliminate power line interferences in ECG signal.

7. Define : Cardiac output.

8. List the different types of method used to measure respiration rate.

9. Give the principal components of auto analyzer.

10. Distinguish between spectrophotometer and calorimeter.

PART B — (5 × 13 = 65 marks)

11. (a) Describe the generation and features of action potential and resting potential with necessary illustrative diagrams.

Or

(b) Explain in detail about various types of electrodes used for the measurement of biopotential signals. Explain the construction and features of each electrode with examples.

12. (a) Describe the 10-20 electrode system used in EEG and give the uses of EEG waveforms.

Or

(b) Draw the ECG waveform indicating typical tine intervals and amplitude of the waves? Explain how these waves are physiologically correlated with heart's activity.

13. (a) Explain how the common mode voltage can be reduced in the right leg driven ECG amplifier with neat circuit diagram.

Or

(b) Why isolation amplifiers are needed in the biomedical instrumentation? Explain the construction and working of Transformer type and optical isolation amplifiers.

14. (a) What are systolic, diastolic and mean pressure? Mention its normal values. Sketch the block diagram of automated sphygmomanometer for blood pressure measurement and explain its operation.

Or

(b) Discuss the principle and working of ultrasound blood flow meters.

15. (a) Explain in detail about blood gas analyzer with a neat block diagram.

Or

(b) Explain the working principle of spectrophotometer. Discuss its applications in clinical laboratory.

PART C — (1 × 15 = 15 marks)

16. (a) Design an ECG amplifier with differential amplifier circuit for the corresponding characteristics of ECG.

Or

(b) Give the theory behind the indicator dilution and dye dilution method and explain the measurement technique for cardiac output.

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