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Question Paper Code : 71102

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2023.

Fifth Semester

Electronics and Telecommunication Engineering

OMD 551 – BASIC OF BIOMEDICAL INSTRUMENTATION

(Common to Computer Science and Engineering / Computer and Communication Engineering / Electrical and Electronics Engineering / Electronics and Communication 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. What are bioelectric signals? List two examples.
2. Draw the electrical equivalent circuit of a surface electrode.
3. Draw Einthoven's triangle.
4. What are the three modes of recording EEC?
5. State the requirements of biological amplifiers.
6. Mention the use of right leg driven ECG amplifier circuit.
7. What are systolic and diastolic blood pressure?
8. Write the principle behind pulse rate measurement.
9. How does a blood gas analyzer work?
10. What is the use of auto analyzer?

PART B — (5 × 13 = 65 marks)

11. (a) With neat diagrams, explain the origin of bioelectric potentials.

Or

- (b) (i) Describe the concepts involved in electrode-tissue interface.
(ii) Explain any one of the electrode used for recording ECG. (8 + 5)

12. (a) (i) Depict an ECG waveform and correlate with the electrical and mechanical activity of the heart.
(ii) Draw a typical EMG waveform and write about its characteristics. (8+5)

Or

- (b) Give the origin of brain waves and describe the 10-20 electrode system used in EEG.
13. (a) Write short notes on (i) impedance matching circuit and (ii) power line interference.
- (b) With a neat block diagram, explain the isolation amplifier circuit.
14. (a) Showcase the ultrasound principle and its application for blood flow measurement with neat sketches.

Or

- (b) (i) Explain the measurement of cardiac output by indicator dilution method.
(ii) Explain how the respiration rate is measured. (8+5)
15. (a) With neat diagram explain how spectrophotometer is used to determine the ten composition of blood serum.

Or

- (b) Describe in detail the principle of colorimeter with neat diagram.

PART C — (1 × 15 = 15 marks)

16. (a) Explain the international standard 12 lead system used to record ECG. Discuss the effects of artefacts on ECG recordings.

Or

- (b) Analyze the direct and indirect method of measurement of blood pressure.