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

Question Paper Code : 51080

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2023.

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. What is Nernst potential?
2. Draw the schematic diagram of origin of biopotentials.
3. Write short note on floating electrodes.
4. Write short note on the Einthoven's triangle.
5. Mention the unique characteristics of EEG amplifiers.
6. Write short note on artifact reduction.
7. Define mean arterial pressure.
8. Define spirometry.
9. Mention the basis of pulse oximetry.
10. Write short note on hematocrit.

PART B — (5 × 13 = 65 marks)

11. (a) Describe the types of microelectrodes and their equivalent circuits used for the measurement of biopotentials. (13)

Or

(b) Write a detailed account of various types of biopotentials, their origin and their propagation characteristics. (13)

12. (a) Explain in detail about the basis of ECG, methods of ECG signal acquisition, and characteristic of electrocardiographic signals. (13)

Or

(b) Elaborate about EEG, methods of EEG signal acquisition, and characteristics of EEG signals. (13)

13. (a) Describe the circuit enhancements for biopotentials measurements with a note on electrical interference reduction. (13)

Or

(b) With a neat sketch, explain the method employed by the right-leg driven circuit to reject common-mode signals in ECG.

14. (a) Describe the non-invasive methods of blood pressure measurement. (13)

Or

(b) Write a detailed note on the measurement of blood flow using :

(i) Ultrasound Doppler flowmetry (7)

(ii) Laser Doppler flowmetry. (6)

15. (a) Discuss the instrumentation principles of respiratory volume measurement. (13)

Or

(b) Write a detailed note on :

(i) blood gas analyzers (7)

(ii) blood cell counter. (6)

PART C — (1 × 15 = 15 marks)

16. (a) Elucidate the functions of signal conditioning circuits with a detailed account of Zener diode. (15)

Or

(b) Discuss in detail about the non-invasive monitoring of serum electrolytes and metabolites. (15)

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