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

Question Paper Code : 50470

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

Fifth Semester

Electronics and Communication Engineering

EC 8073 – MEDICAL ELECTRONICS

(Common to: Electronics and Telecommunication Engineering)

(Regulations 2017)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Differentiate the EEG waveform with type and frequency.
2. Draw a cell bio potential wave showing the polarization and depolarization states with time and amplitude
3. Calculate the cardiac stroke volume and blood flow rate to the heart for a pulse rate of 75 per minute with 5 liters of blood circulation.
4. Is blood acidic or base? Justify your answer by mentoring the standard pH value of blood
5. Compare the ventilator with the respirator.
6. Brief about the source of brain waves and list the types with the frequency.
7. Interpret the various ways of regulating the intensity of current supplied to the patient from a short-wave diathermy machine.
8. List the various elements in bio-telemetry.
9. Recall the working principle of the radio pill.
10. Justify the statement, "Telemedicine for remote diagnosis and treatment in hospital."

PART B — (5 × 13 = 65 marks)

11. (a) Infer the source of the EEG signal and analyze the 10-20 electrode system used in EEG measurement.

Or

(b) Draw a standard ECG waveform with time interval and amplitude and describe the chest bipolar lead system for ECG signal acquisition.

12. (a) Draw a standard heart bio-electric signal with standard time and amplitudes of a normal human and discuss the various abnormalities of the heart with respect to the variation in the signal.

Or

(b) Explain the working of an electromagnetic flow meter used for blood flow measurement.

13. (a) Discuss the significance of heart fibrillation and explain an AC defibrillator circuit treatment to overcome the fibrillation state.

Or

(b) Evaluate the principle of dialysis in the artificial kidney. Categorize the different types of dialyzers. Explain their construction and principle of operation.

14. (a) Categorize the different types of diathermy techniques and explain short-wave diathermy for treating injured tissues.

Or

(b) Illustrate the functions of ultrasonic diathermy with a block diagram.

15. (a) Summarize the need for each essential component in an endomicroscopy and its applications.

Or

(b) Compile the basic application of Brain Machine Interface to implement different motor function interconnection between brains to hand and leg.

PART C — (1 × 15 = 15 marks)

16. (a) Discuss the different stages in human body bioelectrical measurement with a block diagram representation and brief on each block.

Or

(b) List various implantable pacemakers and explain their functions with necessary diagrams.