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Question Paper Code : 90453

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2022.

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. Write the need for unipolar chest lead configuration used in the ECG measurement.
2. List the characteristics of different heart sounds.
3. What are the different types of blood cells?
4. Write the merits of indirect method for blood pressure measurement.
5. List the characteristics of a B-mode display.
6. Mention the drawbacks of AC defibrillation.
7. Define 'desiccation' with respect to electro surgery.
8. Write the principle of short wave diathermy.
9. Write the need for brain-machine interface.
10. List the applications of virtual endoscopy.

PART B — (5 × 13 = 65 marks)

11. (a) (i) What are the factors affecting electrode potential. Explain the electrode model for bio-potential surface electrode in contact with the electrolyte. (1 + 7)
- (ii) Explain the structure of a floating electrode. (5)

Or

- (b) (i) Explain the characteristics of different waves recorded in EEG signals. (7)
- (ii) With neat diagrams, explain the different types of needle electrodes. (6)
12. (a) (i) Explain the method of blood flow measurement using ultrasound. (6)
- (ii) Explain the unit used to measure oxygen saturation in blood. (7)

Or

- (b) (i) Explain the automatic optical method of counting blood cells. (6)
- (ii) With a neat diagram, explain the electromagnetic blood flowmeter. (7)
13. (a) (i) Differentiate external and internal defibrillation? Also, draw and explain the capacitive discharge DC defibrillator in detail. (3 + 5)
- (ii) Explain the asynchronous pacemaker in detail. (5)

Or

- (b) (i) With a neat diagram, explain the ultrasound transducer in detail. (8)
- (ii) Explain the types of ventilators based on the mode of cycling between inspiration and expiration. (5)
14. (a) (i) Explain the monopolar and bipolar technique used in Electro surgical unit. Which technique is better and why? Also, explain the three main categories of risks associated with ESU. (8)
- (ii) What are the safety precautions to be considered while using electro surgery? (5)

Or

- (b) (i) Write a note on the different electrodes used in surgical diathermy. (8)
- (ii) Explain the different waveforms used in surgical diathermy. (5)

15. (a) What is modulation? Explain with a block diagram a single channel telemetry system. Also, mention the requirements for distortion-free transmission of ECG. (2 + 5 + 6)

Or

- (b) With a block diagram, explain the telemetry system for transmission of ECG and respiration signal. (13)

PART C — (1 × 15 = 15 marks)

16. (a) Interpret the code 'VVT' and explain the pacemaker identified by this code.

Or

- (b) Identify and explain the defibrillator that is synchronized with the heart's activity.