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B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2007.

Eighth Semester

Mechatronics Engineering

EC 041— MEDICAL ELECTRONICS

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Mention advantages of floating type skin surface electrode.

2. How does an evoked EEG response differ from a conventional EEG?

3. Define systole and diastole.

4. A person has a total lung capacity of 5.95 litres. If volume of air left in the lungs at the end of maximal expiration is 1.19 litres, what is the person's vital capacity?

5. List out any four types of pacemakers.

6. Find the dc potential across a 16 μf capacitor that is charged to store an energy of 400 w-s in a dc defibrillator.

7. What do you mean by the term diathermy?

8. Differentiate between microshock and macroshock.

9. Name the basic modulation schemes used in a biotelemetry system.

10. List out the applications of LASER in medicine.

PART B — (5 × 16 = 80 marks)

11. (a) (i) Draw an action potential waveform. Explain in detail about polarization, repolarization and depolarization. (10)

(ii) State all or nothing law. (3)

(iii) Define the term conduction velocity. (3)

Or

(b) (i) Discuss in detail about various ECG lead configurations with suitable sketches. (8)

(ii) Draw a typical ECG waveform. (3)

(iii) Write short notes on phonocardiography. (5)

12. (a) Explain the working principle of an ultrasonic blood flow meter. (16)

Or

(b) (i) Discuss the working of a flame photometer with a neat block diagram. (8)

(ii) State Beers law and explain the working of a caloriemeter. (8)

13. (a) (i) Explain the principle of operation of a Bekesy audiometer. (10)

(ii) Differentiate between internal pacemakers and external pacemakers. (6)

Or

(b) (i) Discuss working principle of a DC defibrillator with a neat circuit diagram. (10)

(ii) Write short notes on power sources and electromagnetic interference for pacemakers. (6)

14. (a) (i) Discuss in detail about single channel and multichannel telemetry systems. (10)

(ii) Mention the applications of a Biotelemetry system. (6)

Or

(b) Discuss the principle of operation of a microwave diathermy unit. Mention its applications. (16)

15. (a) (i) Explain the principle of operation of an infrared thermography unit with a neat block diagram. (10)

(ii) Write short notes on Endoscopy. (6)

Or

(b) (i) List out the physiological effects of electric current. (8)

(ii) Write short notes on ground fault interrupters and line isolation monitors. (8)