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H 2149

B.E./B.Tech. DEGREE EXAMINATION, MAY/JUNE 2009.

Sixth Semester

Electronics and Communication Engineering

EC 041 — MEDICAL ELECTRONICS

(Common to Eighth Semester Mechatronics Engineering)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What is absolute refractory period?
2. Draw the electrical equivalent circuit of a surface electrode.
3. Name two devices for skin temperature measurements.
4. What are the methods adopted for direct measurement of blood pressure?
5. What is meant by defibrillation?
6. Why do we require a Heart-Lung machine?
7. What is Diathermy?
8. What are the different types of waveforms used in stimulators?
9. What is the frequency of currents used in surgical diathermy units? Why?
10. Define Let-go current.

PART B — (5 × 16 = 80 marks)

11. (a) Draw an Electrocardiogram waveform labeling the critical features. Include typical amplitude and time intervals for a normal person. With neat diagrams explain the 12 lead system in ECG with suitable diagrams. (16)

Or

- (b) (i) Classify the EEG frequency bands and discuss when they are developed. (8)
- (ii) Describe the 10-20 electrode system used in EEG. (8)
12. (a) What is the use of a blood flow meter? With neat diagrams explain how an Ultrasonic blood flow meter is used to measure the velocity of blood flowing in the blood vessels. (16)

Or

- (b) (i) Describe the measurement of cardiac output by Indicator dilution method. (10)
- (ii) Describe any one Indirect method to measure Blood pressure. (6)
13. (a) With the help of a block diagram explain in detail the working of a Heart-lung machine. (16)

Or

- (b) (i) Distinguish between Hemodialysis and Peritoneal Dialysis. (4)
- (ii) Describe the procedure for Peritoneal Dialysis with a suitable block diagram. (12)
14. (a) With the help of a block diagram explain a Single Channel Telemetry system suitable for transmission of Electrocardiogram. (16)

Or

- (b) Write short notes on :
- (i) Electrodiagnostic/Therapeutic Stimulator (8)
- (ii) Ultrasonic Diathermy. (8)
15. (a) Describe the various medical Thermographic techniques. State its different medical applications.

Or

- (b) (i) What are the uses of Endoscopes in medicine? (4)
- (ii) Write a note on Cryogenic surgery. (4)
- (iii) Describe the possibilities of occurrence of electrical accidents for a patient in a hospital. (8)