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Question Paper Code : 21534

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2015.

Seventh Semester

Electrical and Electronics Engineering

EI 2311/EI 65/10133 EI 606 — BIOMEDICAL INSTRUMENTATION

(Common to Sixth Semester Electronics and Instrumentation Engineering and Fifth Semester – Instrumentation and Control Engineering)

(Regulations 2008/2010)

(Common to PTEI 2311 – Biomedical Instrumentation for B.E. (Part-Time) Sixth Semester – EEE – Regulations 2009)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What are resting and action potentials?
2. What is the difference in the information contained in a phonocardiogram and electrocardiogram?
3. Name the three basic types of electrodes for measurement of bioelectric potentials.
4. What are the ways by which macro shocks can be induced?
5. Define systole and diastole.
6. What is meant by arterial pressure? How is it measured?
7. What are the advantages of digital thermometer?
8. What are the anticipated problems of telemetrized systems in the future?
9. What is a demand pacemaker and when is it used?
10. What is a ventilator? Give its importance in respiratory failures.

PART B — (5 × 16 = 80 marks)

11. (a) (i) With an action potential waveform explain the action of the sinoatrial node. (8)
- (ii) Discuss the different ways of transport of ions through the cell membrane. (8)

Or

- (b) (i) Explain the action of piezoelectric transducer as a pressure sensor. (8)
- (ii) How does the piezoelectric transducer produce ultrasonic waves? Explain its electric equivalent near resonance? (8)
12. (a) Discuss the usage of the various types of electrodes used to measure biopotentials. (16)

Or

- (b) Draw an ECG of a normal person, labeling the critical features and explain the working of an ECG machine. (16)
13. (a) (i) Discuss the automatic and semiautomatic methods of measuring blood pressure. (8)
- (ii) For what measurements can the spirometer be used? Explain why basic lung volumes and capacities cannot be measured with a spirometer? (8)

Or

- (b) (i) What part of electrocardiogram is the most useful for determining heart rate? Explain. (8)
- (ii) Define the important lung capacities and explain them. (8)
14. (a) (i) Discuss the properties of ultrasound and how ultrasound can be used for diagnosis. (6)
- (ii) What are the four basic modes of transmission of ultrasound? Describe briefly. (10)

Or

- (b) (i) What are medical transmitting frequencies? Why is it necessary to specify them? (6)
- (ii) Discuss how the various physiological parameters can be monitored and telemetered and usage of telemetry as an emergency tool. (10)

15. (a) With a block diagram of a ventilator along with its accessories, explain its functioning. (16)

Or

- (b) (i) With a block diagram of automatic audiometer, explain its measurement procedure. (10)
- (ii) Write notes on nerve and muscle stimulates. (6)
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