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EIB

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**Question Paper Code : 91472**

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2014.

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)

(Regulation 2008/2010)

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

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Name two active and two passive transducers.

2. Draw a typical ECG waveform and give the important ECG parameters.

3. What is the major advantage of Skin surface electrodes and where are they used?

4. Differentiate between macro shock and micro shock.

5. Why is partial pressure of oxygen and carbondioxide in the blood important?

6. Differentiate between first, second and third heart sound.

7. What is fluoroscopy?

8. List the applications of CT.

9. What is a demand pacemaker? When is it used?

10. Define hemodialysis.

PART B — (5 × 16 = 80 marks)

11. (a) Explain the following types of transducers.

(i) Piezoelectric.

(ii) Bonded strain gauge.

(iii) Potentio metric transducer.

(iv) Induction type transducer.

Also state where they are used. (4 × 4 = 16)

Or

(b) (i) Explain the structure of nervous system and discuss how a neuronal spike is transmitted from one neuron to another. (10)

(ii) Draw an action potential waveform, label and explain polarization, depolarization and repolarization. (6)

12. (a) (i) Explain the ECG lead system with neat diagrams. (8)

(ii) Discuss the physiological effects of electrical current from 1–second external contact with the body. (8)

Or

(b) (i) With neat schematic, discuss the different types of electrodes used for measuring bioelectric events. (10)

(ii) Explain the use of chopper amplifiers and isolation amplifiers with circuit. (6)

13. (a) (i) Explain the schematic of blood gas analyser and discuss how it is used in determining $pCO_2$, pH, $pO_2$ of blood. (10)

(ii) Discuss any one technique for measurement of cardiac output. (6)

Or

(b) (i) Define the various lung volumes and capacities. (8)

(ii) Explain the photo plethysmograph instrument. (8)

14. (a) (i) Draw the block diagram of a typical tele-medicine system and explain. (8)

(ii) Explain the X–ray image intensifier system. (8)

Or

(b) (i) Discuss the principles of magnetic resonance imaging with relevant expressions and figures. (8)

(ii) What is a thermograph? Explain the imaging system related. (8)

15. (a) (i) Draw and explain the features of heart lung machine. (8)

(ii) Explain the Bekesky audiometer. (8)

Or

(b) (i) Draw the block diagram of a microprocessor controlled ventilator and explain the features. (10)

(ii) Explain the store disease problem and the role of lithotriptor in curing the problem. (6)