

Name :

Roll No. :

Invigilator's Signature :

CS/B.Tech(BME)/SEM-5/BME-502/2011-12

2011

BIOMEDICAL INSTRUMENTATION

Time Allotted : 3 Hours

Full Marks : 70

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

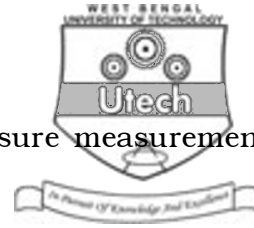
GROUP – A

(Multiple Choice Type Questions)

1. Choose the correct alternatives for the following :

10 × 1 = 10

- i) The degree to which variations in the output of an instrument follow input variations is referred to as
 - a) Sensitivity
 - b) Linearity
 - c) Hysteresis
 - d) Accuracy.
- ii) Which of the following should be as high as possible ?
 - a) Signal to Noise ratio
 - b) Hysteresis
 - c) Range
 - d) Frequency response.
- iii) Buffer amplifier has a gain of
 - a) 0.5
 - b) 1
 - c) 0
 - d) none of these.



- iv) Most indirect methods of blood pressure measurement are based on
- a) Dalton's pressure law
 - b) Riva Rocci principle
 - c) Ultrasonic principle
 - d) Rheographic principle.
- v) Plethysmography is a process to measure the
- a) all body activity
 - b) neural activity
 - c) respiratory output
 - d) cardiac output.
- vi) Which are the two limbs connected to leads in LEAD I bipolar standard lead system ?
- a) Left arm left leg
 - b) Right arm right leg
 - c) Right arm left leg
 - d) none of these.
- vii) The phonocardiograph is used for recording the sounds connected to which of the following ?
- a) Pumping action of heart
 - b) Movement of valves
 - c) Pulsations in blood vessels
 - d) None of these.
- viii) Bioamplifiers should have
- a) high output impedance
 - b) low input impedance
 - c) low output impedance
 - d) none of these.



9. a) Briefly describe a procedure for the measurement of impedance pneumography. 8
- b) What are the preventive measure to reduce the electric shock hazards ? 7
10. What is Cardiac Output (CO) ? Briefly describe a standard procedure for Cardiac Output (CO) measurement with suitable mathematical equation. What is recirculation artifact in this measurement ? How can you reduce this recirculation artifact ? 3 + 9 + 1 + 2
11. a) Describe the 12-lead ECG system with reference to the Einthoven triangle. 8
- b) Draw the block diagram of the ECG machine explaining the function of each block. 7
12. a) Explain the impedance-frequency characteristics of living tissue with a neat diagram. How does the endocrine activity modify the body impedance characteristics ? 5
- b) What is the principle behind blood volume measurement by Impedance method ? Derive an equation for the variation of blood volume in a vessel with the change in its basal resistance. 6
- c) Describe the method of Thoracic Impedance Cardiography. 4
13. Write short notes on any *three* of the following : 3 × 5
- a) Carrier amplifier
- b) Holter Monitor
- c) Cardiac Stress Test
- d) Isolation amplifier
- e) Application of microprocessor in biomedical measurement.
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