



B.TECH DEGREE EXAMINATIONS: NOV 2015

(Regulation 2009)

Seventh semester

BIOTECHNOLOGY

EIE133: Biomedical Instrumentation

Time: Three Hours

Maximum Marks: 100

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

1. _____ is a natural pacemaker
 - a) S A Node
 - b) A V Node
 - c) Cathode
 - d) Anode
2. The upper limit of blood pressure is known as _____
 - a) Systolic
 - b) Diastolic
 - c) Arterial pressure
 - d) MAP
3. Muscle in the food canal is an example of _____
 - a) Voluntary muscles
 - b) Involuntary muscles
 - c) Cardiac muscle
 - d) Skeletal muscle
4. Floating electrode is a type of _____
 - a) Surface electrode
 - b) Micro electrode
 - c) Internal electrode
 - d) Intracellular electrode
5. Normal pH of blood varies between
 - a) 7.05 – 7.15
 - b) 7.15 – 7.25
 - c) 7.35 - 7.45
 - d) 7.55 – 7.65
6. GSR measurement is used to find
 - a) Cardiac activity of heart
 - b) Functional activity of muscles
 - c) Dermal activity of sweat gland
 - d) Electrical activity of a cell
7. Mode of sonography where pulses are emitted in quick succession each time
 - a) A mode
 - b) B mode
 - c) M mode
 - d) C mode
8. What is the typical current used in routine abdomen CT studies on an average sized patient
 - a) 400-500 mA
 - b) 25-100 mA
 - c) 200- 300 mA
 - d) 100 – 150 mA

9. A procedure that can be used to cure arthritis
- a) pacemaking
 - b) defibrillation
 - c) diathermy
 - d) dialysis
10. The contractions of the heart can be stopped by using
- a) Potassium nitrite
 - b) Sodium chloride
 - c) Potassium iodide
 - d) Potassium citrate

PART B (10 x 2 = 20 Marks)

11. Define absolute refractory period and relative refractory period.
12. What is the significance of a sodium pump?
13. What are microelectrodes? Enumerate the different types of microelectrodes.
14. Name a few biomedical signals and their frequency range and amplitude.
15. Define aging in PO₂ electrodes.
16. State Beer's law.
17. Give the applications of infrared thermography.
18. Differentiate between radiography and fluoroscopy.
19. What is a biphasic defibrillator? State its advantages.
20. Give the principle of working of an audiometer.

PART C (5 x 14 = 70 Marks)

21. a) With neat sketches explain the function of the cardiovascular system.
- (OR)**
- b) (i) Draw the structure of a living cell of the human body and explain its constituents. (7)
- (ii) Explain working of ultrasonic transducers and discuss its applications. (7)
22. a) With the required block diagram explain the working of an ECG machine and its lead system.
- (OR)**
- b) (i) Describe the recording setup of EEG waves. (7)
- (ii) Explain the measurement of heart sound with suitable diagrams. (7)
23. a) Explain the measurements of blood pO₂ and pCO₂.
- (OR)**

b) Give the principle of operation of blood cell counter and blood gas analyzer and explain its working.

24. a) Explain the various parts of an MRI scanning machine with the required block diagram. State its advantages over a CT scan.

(OR)

b) Draw and explain the working of a multi channel bio telemetry system.

25. a) With a neat detailed diagram show the significance of a CardioPulmonaryBypass machine during surgery.

(OR)

b) Describe in detail the different types of pacemakers with a suitable block diagram. Mention a few complications that can rise due to a pacemaker.
