

B.E. DEGREE EXAMINATIONS: APRIL/MAY 2012

Eighth Semester

ELECTRICAL AND ELECTRONICS ENGINEERING

U07EEE05: Biomedical Instrumentation

Time: Three Hours

Maximum Marks: 100

Answer All Questions:-

PART A (10 x 1 = 10 Marks)

1. _____ Organelles are called power houses of the cell.
a) Ribosomes b) lysosomes c) mitochondria d) nucleolus
2. An example of inverse transducer
a) Piezo electric b) Piezo resistive c) Potentiometer d) LVDT
3. The bio-electric generator of heart is situated at
a) Aortic Valve b) SA Node c) AV Node d) Tricuspid valve
4. The use of notch filter in signal conditioning system is
a) to filter R.F noise b) to filter 50 HZ noise from mains
c) to filter the signal from various noises d) to attenuate the evoked response potentials.
5. "Heart lung machine" can be used for a longer time for a patient, Justify
a) Yes
b) No
c) it depends upon the condition of the patient
d) when there is no power failure, the statement is true.
6. Blood plasma is obtained by _____ blood that has been prevented from coagulating.
a) Centrifuging b) heating c) mixing water with d) cooling
7. Ground fault oriented electric shocks can be avoided by
a) Using uninterrupted power supplies b) using isolated power supplies
c) Using DC current from batteries d) using AC with proper circuit breakers
8. The time taken by ultrasonic waves to travel through a soft tissue of thickness 7cm and back when they are moving through it with a velocity 1540m/s is
a) 45.45 μ s b) 90.91 μ s c) 215.6 s d) 4.55ms
9. The dialysing time of hemodialysis is about
a) 3 to 6 Hrs b) 6 to 9 hrs c) 9 to 12 hrs d) 5 to 8 hrs
10. The process of destroying the unwanted tissue like tumour using diathermy is
a) Desiccation b) electrotomy c) Coagulation d) fulguration

PART B (10 x 2=20 Marks)

11. Define Resting and action potential.
12. Draw the block diagram of biomedical instrumentation system.
13. List down the basic requirements of bio-medical pre amplifier.
14. Differentiate – polarisable and non polarisable electrode.
15. What is tidal volume?
16. Mention the normal values of pH, pCO₂, pO₂ in human blood.
17. Define let-go current of a human body.
18. List the mode of operation of ultrasonic imaging.
19. What are the basic requirements of oxygenators?
20. Write short notes on disorders of hearing.

PART C (5 x 14=70 Marks)

- 21.a) (i) Discuss in detail about the factors to be considered while selecting a transducer?(6)
- (ii) What is meant by Central Nervous System? Explain the different parts of it and their activity. (8)

(OR)

- b) (i) Describe the characteristics of resting potential and what you have inferred from the relationship between action potential and muscle contraction. (8)
- (ii) Explain the principle of operation of photo electric transducer. (6)
22. a) (i) Classify the different types of electrodes used in Medical instrumentation and develop an equivalent circuit for metal electrode. (7)
- (ii) Mention the types of chopper amplifier and with a neat sketch, discuss the functioning of non mechanical chopper amplifier. (7)

(OR)

- b) Draw the block diagram of an EEG unit and explain the different parts in it.
- 23.a) (i) Suggest and describe a suitable method for measuring the TLC of a human body.(8)
- (ii) Discuss how the cardiac output can be measured using Fick's method. (6)

(OR)

- b) Explain the three different types of invasive blood pressure measuring techniques.

24. a) (i) Explain how the electrical hazards protection can be provided in the biomedical instrumentation system.

(OR)

b) (i) Draw a block diagram of MRI system and explain them in detail. (9)

(ii) Examine the application of computer tomography for diagnostic function of CNS. (5)

25. a) Explain the need for nerve and muscle stimulators also discuss the different types of waveforms used for stimulation.

(OR)

b) (i) Discuss the operation of DC Defibrillator and how it effectively eliminates the disadvantages of AC defibrillators. (7)

(ii) Explain the functioning of peritoneal dialysis and distinguish it with the hamodialysis method. (7)
