**DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING**

**MEDICAL ELECTRONICS**

**UNIT -I**

**ELECTRO PHYSIOLOGY AND BIO-POTENTIAL RECORDING**

**PART –A (2Marks)**

1. What is the nature of cancer cells?

2. Define ICF and ECF.

3. Define resting and action potential.

4. What are the characteristics of resting potential?

5. Define sodium pump.

6. Define systolic pressure and diastolic pressure

7. What are the different valves present in heart?

8. Define heart beat.

9. Mention various bioelectric potentials.

10. Define electrodes and mention its types.

11. Define All or Nothing Law.

12. What is electrode potential or half cell potential?

13. Define polarized and non- polarisable electrodes.

14. What is plethysmograph?

15. What are the characteristics of op-amp?

16. What is pre – amplifier?

17. Define CMRR.

18. What are the functions of chopper amplifier?

19. What is the need of bio–amplifier?

20. Mention the basic requirements for bio – amplifiers.

21. What are the types of bio – amplifiers?

22. What are the microphones used in PCG?

**PART- B**

1. Draw the waveform of the Action Potential and explain (16)

(i) Action potential (ii) Resting Potential

(iii) Absolute Refractory Period (iv ) Relative Refractory Period

(v) Conduction velocity (vi) All or Nothing Law.

2. Explain the various classifications of Biopotential Electrodes. (16)

3. Explain the types of Biological Amplifier. (16)

4. Explain the Working Principles of an EEG Recorder? (16)

5. a. Write down the Nernst Equation and Goldman Equation and about the

contents used. (8)

b. Write Short notes on PCG (8)

6. Draw the block diagram of ECG machine and give justification for the

inclusion of each circuit block of the machine. (16)

7. a. Explain about EMG. (8)

b.Draw the bipolar limb lead system of an ECG. (8)

**UNIT – II**

**BIO-CHEMICAL AND NON ELECTRICAL PARAMETER MEASUREMENT**

**PART –A (2Marks)**

1. What are the two types of BP measurement*?*

2. What is Korotkoff sound?

3. What is cardiac output?

4. What are the various methods to measure cardiac output?

5. What are the types of heart sound?

6. Write the equation to find pH value?

7. Expand the terms BSR and GSR.

8. What is the use of plethysmograph?

9. What are the various methods of blood flow measurement?

10. What are two methods of pulse measurement?

**PART-B**

1 .Explain how the PH&po2 of blood is measured. (16)

2. Explain how the PCO2& PHCO3of blood is measured. (16)

3. a. Write down the application of Electrophoresis and explain the basic

principles involved. (8)

b.Explain the working principle of an Electromagnetic blood flow meter. (8)

4. Describe the operation of the blood cell counter. (16)

5. a. Define the term residual volume, tital volume, vital capacity and total lung

capacity (8)

b. Discuss the Fick’s method for determining cardiac output. (8)

6. a. Describe the working principle of a flame photometer. (8)

b.Explain about blood pressure measurement. (8)

7. a. Explain about ultrasonic blood flow meter (Doppler type). (8)

b. Explain about Respiratory measurement Technique. (8)

8. Explain the following. (16)

(i) Temperature

(ii) Pulse.

**UNIT- III**

**` ASSIST DEVICES AND BIO TELEMETRY**

**PART –A (2Marks)**

1. What is pacemaker?

2. What are the types of pacemaker?

3. Write the classification of pacemaker based on the mode of operation.

4. What is demand pacemaker?

5. What is fibrillation? What are the types of fibrillation?

6. What is counter shock?

7. What is stimulator?

8. Define biotelemetry.

9. What are the types of biotelemetry?

10. What are the advantages of biotelemetry?

**PART-B**

1. What is fibrillation? Discuss in detail direct current defibrillator. (16)

2. Explain in detail the components of a biotelemetry. (16)

3. a. Explain about single channel telemetry system. (8)

b. Explain about multi channel telemetry. (8)

4. What is pacemaker? Discuss in detail. (16)

**UNIT- IV**

**RADIOLOGICAL EQUIPEMENTS**

**PART –A (2Marks)**

1. How are X- rays produced?

2. What are the applications of X-ray?

3. Write short notes on Angiography.

4. Compare radiography and fluoroscopy.

5. Properties of x-rays.

**PART-B**

1. Explain the principle involved in the production of x-rays. (16)

2. a. Draw and explain the block diagram of an Image Intensifier unit. (8)

b. Write short notes on Scintillation Detectors. (8)

3. a. Explain principle of angiography. (8)

b.Compare Radiography and Fluoroscopy. (8)

4. a. Write short notes on ionization chamber. (10)

b. (i) Properties of x-rays. (6)

**UNIT V**

**RECENT TRENDS IN MEDICAL INSTRUMENTATION**

**PART –A (2Marks)**

1. What is thermography?

2. What are the medical applications of thermography?

3. What is endoscope? List its types.

4. Name the types of lasers used in medicine.

5. What are the advantages of laser?

6. What are the applications of laser?

7. What is diathermy?

8. What are the advantages of diathermy?

9. What are the types of diathermy?

10. Define macro shock.

11. Define micro shock

12. What are the devices used to protect against electrical hazards?

13. Define let go current.

14. Define leakage current.

**PART-B**

1. a. Explain the basic principle of operation of an ultrasonic Diathermy unit. (8)

b. Explain the Working principle of an Infrared Thermography unit with a neat

block diagram. (8)

2. a. List out the Physiological effect of electric current on Humans. (8)

b. Explain about Thermography. (8)

3. a. What is an Endoscope? Discuss the Working of an Endoscopic unit. (8)

b. Write Short Notes on Ground Fault Circuit Interrupter. (8)

4. Explain about micro shock and macro shock. (16)