MUTHAYAMMAL ENGINEERING COLLEGE

(An Autonomous Institution)

(Approved by AICTE, New Delhi, Accredited by NAAC & Affiliated to Anna University)
Rasipuram - 637 408, Namakkal Dist., Tamil Nadu.

Department of Biomedical Engineering
Question Bank - Academic Year (2020-21)

Course Code & Course Name : 19BMD03&Biomedical Instrumentation and Measurements

Year/Sem/Sec : III/V

Unit-I: ELECTROPHYSIOLOGY AND BIOPOTENTIAL ELECTRODES

Part-A (2 Marks)

1. Define Resting Potential and Action potential
2. Define depolarization and repolarisation.
3. What is electrode? List out the types and explain
4. What are the classfication of non polarizable electrode?
5. List out some example of internal and external electrode and their uses.
6. Define half cell potential.
7. State the uses of electrode paste.
8. List the different types of Micro electrodes.
9. List the different types of internal electrodes.
10. What is meant by sodium pump?

Part-B (16 Marks)

1. Explain generation of Action potential and its propagation
2. Explain Electrode –Skin Interface with its equivalent circuit diagram
3. Explain in detail about various types of electrodes used for the measurement of biopotential signals.
4. What are body surface electrodes? Discuss in detail with various examples.
5. Describe the generation and features of action potential and also explain the refractory period of a cell

Unit-II : BIO-POTENTIAL MEASUREMENTS OF PARAMETERS

Part-A (2 Marks)

1. Define ECG
2. What are the different artefacts encountered while recording ECG?
3. What are the important bands of frequencies in EEG and state their importance.
4. Define EEG

5. What are the different artefacts encountered while recording EEG?
6. What is montage system?
7. What is evoked potential?
8. Define – Conduction Velocity
9. Draw the typical ECG waveform.
10. What are the different types of ECG lead configuration?

Part-B (16 Marks)

1. What is evoked potential? Explain EEG recording with suitable block diagram
2. Draw the ECG waveform indicating typical time intervals and amplitude of tbe waves?Explain how these waves are physiologically correlated with heart's activity
3. Explain EEG measurement with 10-20 Electrode system
4. Discuss the different components of EEG measurement.Discuss the desired features of electromyography.
5. Describe in detail about the principle used for electrodes in the measurement of ECG,EEG,EMG?

Unit-III : BIO AMPLIFIER WITH SIGNAL CONDITIONING CIRCUITS

Part-A (2 Marks)

1. Write the effect of power line interference in bio signal recording?
2. What is the need for band pass filters in biological pre-amplifiers?
3. Write any two conditions of biological preamplifiers.
4. What is powerline interference?
5. Differentiate single ended and differential ended mode of a biological amplifier.
6. Why do we require isolation amplifiers in a biomedical instrument?
7. Mention the different types of filters used in biosignal measurement.
8. What are the characteristics of a DC amplifier?
9. What are the types of chopper amplifier?
10. Mention the characteristics of instrumentation amplifier

Part-B (16 Marks)

1. Explain in neat sketch about the right leg driven ECG amplifier?
2. What is an isolation amplifier?What is its significance? Illustrate any one type.
3. Distinguish biological amplifier from a conventional amplifier with suitable equations and circuits
4. Sketch a neat circuit diagram of a medical preamplifier and deduce an expression for its net gain.
5. Draw the buffer amplifier circuit and explain its working.

Unit-IV : MEASUREMENT OF NON-ELECTRICAL PARAMETERS

Part-A (2 Marks)

1. Explain the principle of electromagnetic blood flow measurement.
2. What is thermal dilution in cardiac output measurement?
3. What is cardiac output and stroke volume?
4. What is korotkoft sound?
5. What are the methods used to measure blood pressure is directly?
6. What is meant by Doppler Effect?
7. Give the methods for measuring blood flow.
8. What are the methods involved in direct blood pressure measurement?
9. Give the principle of transduction of heart sounds.
10. Give the principle of transduction of heart sounds.

Part-B (16 Marks)

1. Explain the rheographic method of blood pressure measurement? Describe in detail about the auscultatory method of blood pressure measurement
2. Describe the working principle of ultrasonic blood pressure measurement.Compare direct and indirect blood pressure measurement
3. What is cardiac output? Explain its measurements with suitable diagram.
4. Write short notes on Indicator dilution technique for cardiac output measurement
5. What are the methods for measuring blood pressure? Sketch a typical setup and explain

Unit-V : BIO-CHEMICAL MEASUREMENT

Part-A (2 Marks)

1. What are the prinicipal components of auto analyser?
2. What is the principle of colorimeter?
3. What is an autoanalyser and what are it’s advantages and disadvantages?
4. What are the differences between spectrophotometer and colorimeter?
5. Mention the clinical significance of PO2 and PCO2 in blood.
6. What is Fick’s technique?
7. What is the principle of blood glucose sensor?
8. What are the methods of blood cells counting?
9. What are photometers?
10. Define IMFET.

Part-B (16 Marks)

1. Explain in detail about blood gas analyzer with neat block diagram.
2. Explain the working principle of spectrophotometer. Discuss its applications in clinical laboratory
3. Explain with block diagram about the working of colorimeter

4. Explain in detail about PCo2,Po2 and Ph sensor.
5. Explain in detail about ISFET and IMFET.

Course Faculty **HoD**

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Department of Medical Electronics
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