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Total Number of Pages: 2

B.Tech
CPBM8401

Seventh Semester Examination – 2010

BIOMEDICAL ELECTRONICS AND INSTRUMENTATION

Time: 3 Hours

Max. Marks: 70

Answer Question No.1 which is compulsory and any five from the rest.

The figures in the right - hand margin indicate marks

1. Answer the following questions (2×10=20)
 - a) Explain Polarization, Depolarization and Repolarization of cell.
 - b) What is half-cell potential?
 - c) Distinguish between active and passive transducers.
 - d) Why the amplitude (not the frequency) of ECG signal and frequency (not the amplitude) of the EEG signal are important?
 - e) Why and under which mode the instrumentation amplifiers are been designed for measurement of bio electric potential?
 - f) Show the placement and colour code used to identify each electrode to record an electrocardiogram.
 - g) What is the role of signal delay and trigger unit in EMG?
 - h) In NMR blood flow meter why and which magnet is of lower magnetic field?
 - i) What are different types of cells present in blood?
 - j) What is micro and macro shock?
2.
 - (a) What are the problems encountered while designing biomedical instruments? (5)
 - (b) What is skin contact impedance? How is it affected by motion artifact? (5)
3.
 - (a) List various electrodes used for measurement of ECG, EEG, and EMG. Briefly explain them with neat diagram. (5)
 - (b) Explain physiological importance of action potential, resting potential and sodium pump. (5)
4.
 - (a) How a thermistor can be linearized over a limited temperature range? (5)
 - (b) What is reference junction compensation? How is it implemented? (5)

5. (a) Explain with the help of functional block diagram, the operation of an ECG recorder. (5)
- (b) Compare between direct and indirect methods of blood pressure measurement. Briefly discuss different automated indirect methods used for measurement of blood pressure. (5)
6. (a) Discuss the origin of heart sounds. Describe types of microphones used for recording phonocardiogram. (5)
- (b) What is difference between phonocardiogram and phonocardiograph? Discuss measurement of heart sound by stethoscope and draw its frequency spectrum. (5)
7. (a) Explain the principle of operation and derive an expression for the velocity of blood in ultrasonic Doppler shift blood flow meter. How it is different from range gated pulse Doppler flow meter? (5)
- (b) What are different methods for counting blood cell? Briefly explain each of them. (5)
8. Write short notes on any **TWO** (5×2=10)
- (a) Apnoea detector
- (b) What is evoked potential and how is it measured?
- (c) Coulter counter
- (d) Respiratory sensor
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