



Reg. No. :

Name :

Sixth Semester B.Tech. Degree Examination, May 2012
(2008 Scheme)
Branch : Electrical and Electronics
08.606 (B) : Elective – II : BIOMEDICAL INSTRUMENTATION (E)

Time : 3 Hours

Max. Marks : 100

PART – A

Answer **all** questions. **Each** question carries **four** marks.

1. Explain the all-or-nothing law governing the excitable cells.
2. Draw the electrical equivalent circuit of a skin-electrode interface and explain its components.
3. List the types of transducers used for temperature measurement. Compare them and state which of them are suitable for biomedical applications.
4. Draw a typical ECG wave and mark its relevant timings and amplitude with respect to a cardiac cycle.
5. What are the problems associated with invasive blood pressure measurement ?
6. Explain the significance of position of EEG electrodes.
7. What is the principle of operation of heart rate monitor ?
8. What are the advantages and disadvantages of X-ray imaging ?
9. What is a pacemaker ? Differentiate between fixed rate pacemakers and demand pacemakers.
10. Define Let-go-current. What are the typical values of safe let-go-current in men and women ?

PART – B

Answer **any one** full question from **each** Module.

MODULE – I

11. a) Explain the cause of production of polarisation potentials in excitable cells. What are the major factors which contribute to these potentials ?
- b) What are the different types of electrodes used for recovery of EMG signals ? Give a detailed account of them. Differentiate between a needle electrode and a glass micropipette electrode.





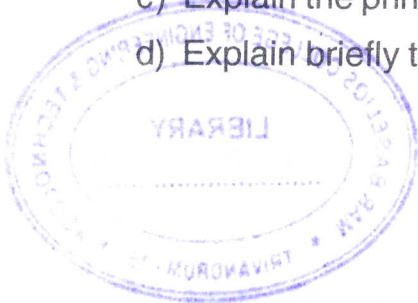
12. a) Describe, with neat diagrams, any one method for the measurement of respiration rate.
- b) What are the direct and indirect methods of blood pressure measurements? Explain the ultrasonic method of BP measurement in detail.

MODULE – II

13. a) Draw the block diagram of an ECG machine and explain the function of each block. What are the requirements of an ECG amplifier?
- b) Explain the 10-20 lead system for EEG recording. How do the recordings made from unipolar and bipolar leads differ in amplitude?
14. a) Draw the block diagram of an EMG machine and describe the various blocks.
- b) Explain with necessary diagrams the central and peripheral nervous systems and reflex arc.
- c) Explain the lead systems used in ECG recording.

MODULE – III

15. a) What is the basic principle of ultrasound imaging? Discuss the areas of ultrasonic imaging in medicine. Differentiate between A-scan and B-scan.
- b) What are defibrillators? Explain any two types of defibrillators with neat diagrams.
16. a) Explain the principle of magnetic resonance imaging.
- b) Compare MRI and Ultrasonography.
- c) Explain the principle of shortwave diathermy.
- d) Explain briefly the physiological effects of electric current.



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