



[3764] – 252

B.E. (Electronics) Examination, 2010
BIOMEDICAL ELECTRONICS
(2003 Course)

Time : 3 Hours

Max. Marks : 100

- Instructions :**
- 1) Answers to the **two** Sections should be written in **separate** books.
 - 2) Neat diagrams must be drawn **wherever** necessary.
 - 3) Black figures to the **right** indicate **full** marks.

SECTION – I

1. a) Explain the meaning of action potential, resting potential, depolarization and repolarization of a cell with necessary diagram. 9
- b) Explain the application of microelectrode, skin surface electrode and needle electrode. 9

OR

2. a) Give the classification of transducers with examples. Explain the strain gauge pressure sensor in detail. 9
- b) State and explain the sensor performance characteristics in detail. 9
3. a) Draw and explain the cardiovascular circulation in detail. 8
- b) Describe the Einthoren's triangle and its use in interpreting ECG waveforms. 8

OR

4. a) Draw the schematic design of the main stages of a bio-potential amplifier and explain the functioning of a preamplifier and filter. 8
- b) What is the input guarding used in instrumentation amplifier ? Explain the instrumentation amplifier providing input guarding. 8
5. a) Explain the concept of phonocardiography with the help of basic heart sounds and primary signal characteristic. 8
- b) State any six points which are available from Echo-cardiogram analysis. Comment on the resolution obtained due to Echo-cardiogram. 8

OR

6. a) Describe the intensive care unit monitoring architecture with the help of neat diagram. 8
- b) What are the basic requirements of implantable pacemaker ? With the help of block diagram, explain the operation of ventricular synchronous demand pacemaker. 8

P.T.O.



SECTION – II

7. a) Show the different arrangements for a basic colorimeter analysis and a schematic for measuring the concentration of a substance in a solution. Explain the basic colorimeter analysis. 9
- b) Explain the basic working principle of spectrophotometry with the help of neat diagram. 9
- OR
8. a) Draw and explain the working of flame photometer. Also show the essential parts of flame photometer in schematic form. 9
- b) What are the problems in the measurement of PO_2 . Explain the principle of operation with the help of a diagram of PO_2 electrode with platinum cathode. 9
9. a) Draw and explain the working of electroencephalograph machine with necessary waveform. 8
- b) With the help of neat sketch, explain the 10-20 system of electrode placement. 8
- OR
10. a) State the four major types of continuous rhythmic sinusoidal EEG activity. Explain any one in detail. 8
- b) Explain the anatomy of the central nervous system with necessary diagram. 8
11. a) State the three processes to form laser beam. Explain any one in detail with the help of neat diagram. 8
- b) Give the comparison between Ruby laser and He-Ne laser. 8
- OR
12. a) Explain the basic working principle of Magnetic Resonance Imaging System. 8
- b) What is a CT scanner ? Explain the technique of producing CT images. 8