

**[5254]-86**  
**B.E. (Electronics)**  
**BIOMEDICAL INSTRUMENTATION**  
**(2008 Pattern)**

*Time : 3 Hours]*

*[Max. Marks : 100*

*Instructions to the candidates:*

- 1) Answer any three questions from section I and section II.*
- 2) Neat diagrams must be drawn wherever necessary.*
- 3) Figures to the right side indicate full marks.*
- 4) Use of Calculator is allowed.*
- 5) Assume suitable data if necessary.*

**SECTION - I**

**Q1) a)** Discuss ten most important factors to be considered in the design of medical instruments. **[10]**

b) With the help of two electrode equivalent circuit explain measurement of bio potential & half potential. **[8]**

OR

**Q2) a)** Discuss chemical sensor for measurement of PH, PO<sub>2</sub>, Glucose & O<sub>2</sub>. **[10]**

b) Describe temperature sensor used in medical application. **[8]**

**Q3) a)** Draw and explain 10-20 electrode system for EEG recording. **[8]**

b) What are the different components of central nervous system? Explain in detail. **[8]**

OR

**Q4) a)** Name the different type of EMG. Explain the procedure to perform EMG with the help of neat block diagram. **[8]**

b) Explain various types of EEG electrodes. **[8]**

**Q5) a)** Amplitude of R wave in lead I = 12mm, Lead III = 6mm, Sensitivity = 10mm/mV. What is value of Lead II, a VR, a VL & a VF. [8]

b) Explain the Cardio Vascular system with neat sketch. [8]

OR

**Q6) a)** Draw ECG amplifier to measure output at Lead II configuration & noise effect by using right leg drive. [8]

b) Write short note on electro conduction system of heart. [8]

### **SECTION - II**

**Q7) a)** Write short note on power sources for implantable pacemakers. [8]

b) Explain techniques used in sphygmometric blood pressure measurement. Distinguish between direct & indirect B.P. measurement. [8]

OR

**Q8) a)** What are the objectives of patient monitoring system? With block diagram explain bed side monitoring system. [8]

b) What is systolic & diastolic pressure? Explain non invasive blood pressure measurement system. [8]

**Q9) a)** Explain the automatic optical method for measurement of RBC & WBC. [8]

b) Describe the working of Flame photometer. [8]

OR

**Q10)**a) Explain the Doppler shift blood flow velocity meter. [8]

b) Explain Electronic stethoscope with advantages & disadvantages. [8]

**Q11)**a) Explain the working principle of MRI. Draw the block diagram of MRI machine & explain it in detail. [10]

b) Write short note on Amalgamator. [8]

OR

**Q12)**a) Name the detector used in CT scanner. Explain each of them with their feature. [10]

b) Explain how LASER are used in vision correction. [8]

