

Sample Question Paper-I

Course Name : Diploma In Medical Electronics

9076

Semester : Fourth

Course Code : MU

Subject : Biosensors

Marks : 80

Time: 3 Hours.

Instructions:

1. All questions are compulsory.
2. Illustrate your answers with neat sketches wherever necessary.
3. Figures to the right indicate full marks.
4. Assume suitable data if necessary.
5. Preferably, write the answers in sequential orders.

Q.1. Attempt any four.

08 Marks

- a) Write Definition of "Biometrics".
- b) State the use of transducer with respect to man-Instrument system.
- c) List the materials used for construction of thermistors.
- d) State working principle of RTD.
- e) List the different Biochemical transducers.

B) Attempt any two.

08 Marks

- a) What is strain gage? Give its different types.
- b) Explain with neat diagram how optical transducers are used for measurement in Biomedical.
- c) Draw block diagram of ultrasonic blood flow meter and explain its working?

Q.2. Attempt any three.

12 Marks

- a) Explain how partial anygen in the blood is measured by using po_2 electrode with neat diagram.
- b) Describe the phenomenon of Electrolyte-Skin interface with neat sketch.
- c) Explain how instrumentation amplifier satisfies all the requirements of Bio amplifier.
- d) Draw labelled sketch of microelectrode.

Q.3. Attempt any two.

12 Marks

- a) State the working principle of Thermocouple with diagram. How Thomson effect and peltier effect adds to its utility.
- b) Draw neat diagram and give construction of one example each for – i) ECG, ii) EEG iii) EMG Measurement
- c) Give the names for different pressure transducers. And explain working of piezoelectric transducer with diagram.

- Q.4. Attempt any four. 16 Marks**
- List at least Eight Specifications of Medical Instrumentation system.
 - Show with neat diagram how LVDT is used for pressure measurement
 - Draw diagram give construction details and state use of Glass electrode for pH measurement.
 - On which factors electrodes are classified as Polarizable & non-Polarizable electrode. State their use.
 - Define pH? Draw a labelled diagram of Combinations pH electrodes.
 - Draw labelled sketch of phase sensitive detector for i) Positive half cycle ii) Negative half cycle.
- Q.5. Attempt any three. 12 Marks**
- Show with circuit diagram how change in resistance in RTD is converted into equivalent voltage signal.
 - Describe how capacitive method is used for pressure measurement.
 - State different methods of thermal convection used for blood flow measurement.
 - State and explain the principle of variable inductance displacement transducer.
- Q.6. Attempt any three. 12 Marks**
- State and explain the principle of electromagnetic Blood flow meter with diagram.
 - Describe working of needle electrode and wire electrode with neat diagram.
 - Draw a circuit diagram of bridge amplifier and explain its operation.
 - Explain how inaccessibility of variables create problem in measuring a living system.

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