22348

21222

3 Hours / 70 Marks Seat No. | | | | | | | | |

15 minutes extra for each hour

Instructions : (1) All Questions are *compulsory.*

(2) Answer each next main Question on a new page.

(3) Illustrate your answers with neat sketches wherever necessary.

(4) Figures to the right indicate full marks.

(5) Assume suitable data, if necessary.

(6) Use of Non-programmable Electronic Pocket Calculator is permissible.

Marks

1. Attempt any FIVE : **10**

(a) List various transducers used in medical electronics.

(b) State chemical equation for PCO_2 electrode.

(c) Define motion artifacts.

(d) List various types of Boundon tubes.

(e) State material used for making of thermistor.

(f) State clinical use of pH meter.

(g) Sketch of Micro-Pipette. Draw neat electrode.

2. Attempt any THREE of the following : **12**

(a) List the medical instruments in which potentiometer is used as sensor.

(b) Explain advantages of optical fibre sensors.

(c) Explain with neat sketch the flow measurement by thermal convection method.

(d) Explain radiation thermometry.

3. Attempt any THREE of the following : **12**

(a) Explain meaning of plethysmograph. Draw any instrument used to measure blood volume in human body.

(b) Compare RTD and thermistor (Any four points).

(c) Explain with sketch working of capacitive transducers.

(d) Compare active & passive transducers (Any four points).

4. Attempt any THREE of the following : **12**

(a) Compare primary transducers and secondary transducers (Any two points).

(b) Describe operating principle of blood glucose sensor.

(c) Explain with sketch piezoelectric transducer.

(d) Explain with sketch flow measurement by Electromagnetic transducer.

(e) Explain wireless biosensor.

5. Attempt any TWO of the following : **12**

(a) Identify different sources of biomedical signals with respect to heart, brain, muscle and describe it.

(b) With help of neat diagram, explain photomultiplier tube.

(c) Explain operation of

(i) PO_2 electrode

(ii) PCO_2 electrode

6. Attempt any TWO of the following : **12**

(a) Explain term BioMEMS. List applications of it.

(b) Explain principle of optical temperature sensor based on variation of refractive index.

(c) Explain concept of

(i) Electrode electrolyte interface

(ii) Electrodes for EEG & EMG.