313327

12425

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

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

(6) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

1. Attempt any FIVE of the following : **10**

a) State the concept of action potential.

b) Define term pH. State the range of pH value for normal arterial blood.

c) Identify the electrode used to measure dissolved oxygen in biological sample.

d) Give the significance of signal conditioning circuit in biomedical field.

e) Define motion artifact.

f) State the seebeck effect.

g) State the chemical equation for PO_2 electrode.

Marks

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

a) Explain the working principle of piezoelectric transducer with neat sketch.

b) Describe the concept of plethysmography.

c) Suggest the electrode used to record the electrical signal from muscle fibers and explain it.

d) Describe the general constraints in design of Man - instrumentation system.

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

a) Draw the circuit diagram of DC wheatstone bridge.

b) Explain the electrode electrolyte interference.

c) List any two transducer used for temperature measurement and draw it's sketch.

d) Suggest the sensor used for measurement of blood glucose level and describe it with neat sketch.

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

a) State the need of biosignal preamplifier.

b) Explain the working of linear variable differential transformer (LVDT) with neat sketch.

c) Explain the concept of impedance matching circuit.

d) Draw the block diagram of man-Instrumentation system and give the significance of transducer in this system.

e) Explain the concept of ionselective field effect transistor.

Marks

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

a) Describe the construction details of RTD.

b) Draw a labeled diagram of PCO_2 electrode and describe it's working.

c) Draw the diagram of following electrode –

i) Suctioncup electrode

ii) Floating electrode

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

a) Suggest the biosignals related to heart, brain and muscle. Also describe it.

b) Give the significance of following pressure transducer.

i) Diaphragm

ii) Bellows

iii) C-type bourdon tube

c) Explain working principle of measuring electrode and reference electrode for pH measurement with the help of neat diagram.
