

313327

24225

3 Hours / 70 Marks

Seat No. 

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- Instructions* – (1) All Questions are *Compulsory*.  
(2) Answer each next main Question on a new page.  
(3) Illustrate your answer with neat sketches wherever necessary.  
(4) Figures to the right indicate full marks.  
(5) Assume suitable data, if necessary.  
(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) Define primary and secondary transducers.
  - b) List biomedical signals. (Any four)
  - c) Enlist any two temperature and any two pressure transducers.
  - d) State any two signal conditioning elements.
  - e) State type of materials used for RTD, and J type thermocouple.
  - f) State any two flow measurement technique.
  - g) State the names of any two biochemical sensors.

P.T.O.

- 2. Attempt any THREE of the following:** **12**
- a) Compare Active and Passive transducer. (Any four points)
  - b) State the applications of –
    - i) Metal plate electrode
    - ii) Disposable electrode
    - iii) Needle electrode
    - iv) Glass electrodes.
  - c) Explain construction and working of micropipette electrode.
  - d) Describe PO<sub>2</sub> electrode with neat diagram.
- 3. Attempt any THREE of the following:** **12**
- a) Suggest the temperature transducer for body temperature measurement and justify.
  - b) With the help of neat diagram give working of ultrasonic flow transducer.
  - c) State and explain the function of impedance matching circuits in detail.
  - d) Draw the general block diagram of signal conditioning circuit. State the functions of preamplifiers.
- 4. Attempt any THREE of the following:** **12**
- a) Define motion artifact. And suggest the remedies to overcome motion artifact.
  - b) Explain piezoelectric transducer with neat diagram.
  - c) Suggest the flow transducer to measure blood flow and justify.
  - d) Explain with neat diagram blood glucose sensor.
  - e) State and explain the need of filters in signal conditioning circuit. Give example.

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

- a) i) Compare Polarisable and non polarisable Electrodes.  
ii) Compare Action potential and resting potential.
- b) Suggest the pressure transducer for blood pressure measurement and justify.
- c) Explain the working principle of measuring electrode and reference electrode for pH measurement with the help of neat diagram.

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

- a) Draw neat block diagram of Man Instrumentation System (MIS) and describe function of each block.
  - b) Suggest the electrodes to sense and record activities of
    - i) Muscles
    - ii) Cardiac
    - iii) Brain.Justify your answer.
  - c) Draw and explain construction and working of LVDT. State any two applications of LVDT.
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