

(3 Hours)

[Total Marks : 100]

- N.B. :** (1) Question No. 1 is **compulsory**.
 (2) Attempt any **four** questions from the remaining **six** questions.
 (3) **Figures** to the **right** indicate **full** marks.

1. (a) Explain the principle and working of an electromagnetic blood flow meter. 10
 (b) Explain with neat diagrams the laws governing thermocouples. 10
2. (a) Differentiate between first order system and second order system giving suitable examples. 8
 (b) Explain with suitable diagram the construction and working of LVDT. Give an application of it. 12
- 10
 10
 3. (a) Explain with a block diagram the various factors considered for selecting a transducer for Biomedical application. 10
 (b) Define pH. Describe the transducer system used to measure pH of blood. 10
4. (a) Define and derive the gauge factor for strain gauges. Explain the construction and working of an unbonded strain gauge. 16
 (b) What is a thermistor? How are they classified? 4
5. (a) What is Fick's Principle? Explain how rapid injection dilution method is used for measuring cardiac output. 12
 (b) Draw the equivalent circuit model for electrode-skin interface. 8
6. (a) What is Doppler shift? With the help of a block diagram, explain how ultrasonic transducers are used to measure blood flow. 12
 (b) Discuss the principle and working of pulse transit time flowmeter. 8
7. Write short notes on any **four** :- 20
 (a) Primary and secondary transducers
 (b) Radiation thermopiles
 (c) Enzyme electrode
 (d) RTD
 (e) PCO₂ Electrode
 (f) Fibre optic pressure transducer.
