

Sem - IV Transducers in Biomedical Inst

Con. 3007-11.

(REVISED COURSE) Biom 28/5/11 RK-1899

(3 Hours)

[Total Marks : 100

AE

N.B (1) Question No. 1 is **Compulsory**.

(2) Attempt any **four** questions out of remaining **six**.

(3) Figures on the right indicate full marks.

(4) Assume data wherever necessary.

(5) Draw diagrams / sketches wherever necessary.

(6) Use legible handwriting. Use blue / black ink only.

1. (a) Draw and explain Electrode – skin interface. [05]
(b) Explain with a neat diagram bonded strain gauges. [05]
(c) What is meant by thermistor? Differentiate between NTC and PTC Thermistor. [05]
(d) Which are the different reference electrodes? Explain any one with a neat labelled diagram. [05]
2. (a) Explain the working of fibre optics along with its application for the measurement of any medical parameter. [12]
(b) Draw and explain different types of pressure sensing element. [08]
3. (a) Explain the term biosensors and immunosensors. Explain with a neat diagram working of any one immunosensor. [10]
(b) Explain the principle of working of enzyme sensor and hence explain glucose sensor. [10]
4. (a) Which are the different laws that govern the working of a thermocouple. [08]
(b) Which are the different methods of thermistor linearization? Explain with circuit diagram and necessary equation. [08]
(c) Differentiate between amperometric and potentiometric sensors. [04]
5. (a) Explain with suitable diagram the construction and working of L.V.D.T. Making use of relevant input and output waveforms explain the need of phase sensitive detector in measurement with L.V.D.T. [12]
(b) Prove that "for metals gauge factor is always more than 1.6". [08]
6. (a) Describe with suitable example following : [12]
 1. Zero order system
 2. 1st order system
 3. 2nd order system
(b) Explain with example any four static characteristics. [08]
7. Write short notes on: [20]
 - (a) Capacitive transducer.
 - (b) ISFET
 - (c) Photoconductive cell.
 - (d) Piezoelectric transducer.

(b) For a three pole amplifier neatly draw magnitude and phase plot. Explain concept of Miller Compensation.

3. (a) Design a class A transformer coupled power amplifier for the following 12 requirements

output power = 5 W $V_{cc} = 12 V$

Load resistance = 2Ω $S_i \leq 8$

Calculate overall efficiency at full load.