

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-V • EXAMINATION – SUMMER 2013****Subject Code: 150302****Date: 16-05-2013****Subject Name: Biomedical Transducer****Time: 10.30 am - 01.00 pm****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

Q.1 (a) Draw & explain generalized block-diagram of medical instrumentation system. **07**

(b) Explain electro-magnetic blood flow transducer with its working. **07**

Q.2 (a) Give classification of transducers with their transduction principles & related examples. **07**

(b) Explain piezoelectric transducer with its modes of operation. Enlist its merits & demerits. **07**

OR

(b) Explain polarographic clark & transcutaneous pO₂ sensor with its constructional diagram. **07**

Q.3 (a) Explain construction of LVDT with its merits and demerits. **07**

(b) Explain ultrasonic blood flow transducer & derive equation for blood velocity measurement. **07**

OR

Q.3 (a) Explain different types of microbial biosensors. **07**

(b) Explain the working principle of enzyme based glucose sensor. Draw neat diagram of polarographic glucose biosensor electrode and explain it in detail. **07**

Q.4 (a) Explain the thermocouple temperature transducer in detail with its merits and demerits. **07**

(b) 1) Explain different techniques used for temperature compensation in strain gauge. **04**

2) Find the change in resistance produced by a strain of 160µm/m in (A) metal wire strain gauge, GF=-3.1 (B) Semiconductor strain gauge, GF= -170. Nominal strain gauge resistance of both is 350 ohm. **03**

OR

Q.4 (a) Explain general methods for use of electrodes. **07**

Q.4 (b) Explain non-contact type infrared thermometry. **07**

Q.5 (a) Explain any two transducers used for measurement of nuclear radiation. **07**

(b) Define following terms: **07**

- 1) Precision 2) Threshold 3) Drift 4) Hysteresis 5) In vivo measurement 6) Transducer 7) Half cell potential

OR

Q.5 (a) Explain electrode-electrolyte interface & electrode- skin interface. **07**

(b) Give the classification of electrodes & explain in detail with their application. **07**
