Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VI • EXAMINATION – WINTER 2013

Subject Code: 162401 Date: 27-11-2013

Subject Name: Industrial Instrumentation

Time: 02:30 pm to 05:00 pm Total Marks: 70

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**
4. **Abbreviations/ symbols used have usual meanings.**

Q.1 **(a)** Explain the following terms: **10**

1. Primary sensor	2. MDS
3. Thermopile	4. Sensitivity
5. Accuracy	6. Specificity
7. Precision	8. Nonlinearity
9. Resolution	10. Isolation

(b) For the following enlist the corresponding measurends: **04**

(i) Mechanical Energy (ii) Radiant energy.

Q.2 **(a)** Define strain gauge. Describe working of un-bounded resistance type strain gauge. How strain gauge sensitivity is calculated? **07**

(b) Explain LVDT transducer and its usage in practice. **07**

OR

(b) Enlist capacitive transducers; and explain any one in detail. **07**

Q.3 **(a)** Enlist advantages of thermistor. For a thermistor β = 3100 K and its resistance at 20° C is known to be 1050 Ω. Thermistor is used for temperature measurement and the resistance measured is 2300 Ω. Calculate the measured temperature. **07**

(b) Describe noise thermometry in detail. **07**

OR

Q.3 **(a)** How is quartz crystal resonators used as temperature sensors? Draw the schematic diagram and explain crystal resonator thermometer used in practice. **07**

(b) Describe heat flux sensor and briefly state how it operate. Where are such sensors used in practice? **07**

Q.4 **(a)** What are the different types of magnetic sensors? On what principle do they work? **07**

(b) Enlist applications of optical fiber. Also, explain any one of them in detail. **07**

OR

Q.4 **(a)** Explain ΔY-effect. How it is used for magnetic field sensing? **07**

Q.4 **(b)** Draw the schematic diagram of Geiger- Muller counter and explain its usage. **07**

Q.5 **(a)** What is compensation? List various sensor defects and explain any three of them in brief. **07**

(b) Describe the concept of industrial automation. **07**

OR

Q.5 **(a)** Write a short note on: Nano sensor. **07**

(b) How velocity can be measured using sensor(s)? **07**

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