

Seat No.: _____

Enrolment No. _____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE- VIIth SEMESTER-EXAMINATION – MAY/JUNE- 2012

Subject code: 170904

Date: 28/05/2012

Subject Name: Industrial Instrumentation

Time: 02:30 pm – 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.

Q.1 (a) Define static and dynamic characteristic of Instrumentation system. Enumerate the dynamic characteristic of measuring system. Explain any two. **07**

(b) What is Electrical transducers? Give its advantages. What are the basic requirements of a transducer? **07**

Q.2 (a) Name some resistance materials for wire gauge. **07**

A resistance strain gauge with a gauge factor of 2 is fastened to a steel rod, subjected to a stress of 500 Kg/cm^2 . If the modulus of elasticity of the steel is $2 \times 10^6 \text{ Kg/cm}^2$, calculate the change in resistance of the strain gauge element due to the applied stress.

(b) Define Gauge factor with respect to resistance strain gauge. Obtain an expression for the gauge factor in terms of poisson's ratio. **07**

OR

(b) Explain how temperature compensation is achieved in strain measuring system. **07**

Q.3 (a) Explain the construction and working of LVDT used for measurement of displacement. **07**

(b) What is synchros? Explain in short control type synchro system. **07**

OR

Q.3 (a) Describe the working principle of thermocouple. Explain the laws governing the thermocouple. **07**

(b) How we can measure temperature above 1400°C . Explain any one method of measurement. **07**

Q.4 (a) What is Hall effect? Describe the working principle, construction and application of Hall effect transducer. **07**

(b) Name different types of electrical force transducer. Explain any one. **07**

OR

Q.4 (a) Explain giving neat sketch, how LVDT can be used to measure pressure. **07**

(b) Describe the construction, working, advantages and limitation of any method for flow measurement. **07**

Q.5 (a) What is sample and hold circuit? why it is needed? Explain with circuit diagram. **07**

(b) Explain the various elements of analog data acquisition system. **07**

OR

Q.5 (a) Define (1) absolute humidity (2) Relative humidity (3) dew point. (4) See back effect (5) moisture (6) Load cell (7) piezoelectric effect. **07**

(b) Explain strip chart recorder. **07**
