

Seat No.: \_\_\_\_\_

Enrolment No. \_\_\_\_\_

**GUJARAT TECHNOLOGICAL UNIVERSITY**  
**BE - SEMESTER-VII(OLD) • EXAMINATION – WINTER 2016**

**Subject Code: 170904**

**Date: 25/11/2016**

**Subject Name: Industrial Instrumentation**

**Time: 10:30 AM to 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) What is Electrical transducers? Give its advantages. What are the basic requirements of a transducer? **07**
- (b) Explain the following characteristics of a Transducer. **07**  
(i) Linearity (ii) Resolution (iii) Sensitivity (iv) Threshold  
(v) Repeatability (vi) Calibration (vii) Hysteresis.
- Q.2** (a) Explain semiconductor strain gauge. Also state its advantages and applications. **07**
- (b) Differentiate unbonded and bonded type strain gauge. How is the temperature compensation carried out using strain gauge in a bridge circuit? **07**
- OR**
- (b) Write short note on Hall effect transducer. **07**
- Q.3** (a) List different types of thermocouples used for temperature measurement. Explain thermoelectric laws and the method for cold junction compensation in thermocouple **07**
- (b) List different types of thermocouples used for temperature measurement. Explain thermoelectric laws and the method for cold junction compensation in thermocouple **07**
- OR**
- Q.3** (a) What is synchros? Explain in short control type synchro system. **07**
- (b) Explain the construction and working of LVDT used for measurement of displacement. **07**
- Q.4** (a) Name different types of electrical force transducer. Explain any one. **07**

- (b) Define the following (i) Absolute Pressure (ii) Gauge Pressure (iii) Differential Pressure. Explain how this pressure can be measured by an Inductive transducer? **07**

**OR**

- Q.4** (a) Explain Black Body concepts for very high temperature measurements. Describe with neat diagram how disappearing filament type optical pyrometer can measure very high temperature. Mention its merit and demerits. **07**
- (b) Describe with neat diagram how strain gauge is used for torque and pressure measurement. **07**

- Q.5** (a) Describe the schematic of strip chart recorder and describe its working and construction of each components. Compare with circular chart recorder. **07**
- (b) Define : (1) absolute humidity (2) Relative humidity (3) Dew point (4) See back effect (5) Moisture (6) Load cell (7) piezoelectric effect. **07**

**OR**

- Q.5** (a) Explain the various elements of analog data acquisition system. **07**
- (b) What is sample and hold circuit? Why it is needed? Explain with circuit diagram. **07**

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