

**GUJARAT TECHNOLOGICAL UNIVERSITY**  
**BE - SEMESTER-VII • EXAMINATION – WINTER • 2014**

**Subject Code: 170904****Date: 27-11-2014****Subject Name: Industrial Instrumentation****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) State and explain advantages of electrical transducers. **07**  
(b) What is Piezo-resistive effect? Explain the term Gauge Factor with respect to resistance strain gauge and obtain its expression in terms of poisson's ratio. **07**
- Q.2** (a) Explain construction and working of Semiconductor strain gauge. Also state its advantages **07**  
(b) Why temperature compensation is required for strain gauge? Explain any one method in detailed for temperature compensation. **07**
- OR**
- (b) Explain different configuration of strain gauge in bridge circuit. Also derive equation for voltage sensitivity. **07**
- Q.3** (a) Explain the construction and working of LVDT used for measurement of Linear displacement. **07**  
(b) Explain the construction and working of Piezoelectric transducer. Also derive output equation **07**
- OR**
- Q.3** (a) Explain how capacitive transducer used for Linear and Angular displacement. **07**  
(b) Explain working principle of Hall effect transducer. Also state its application **07**
- Q.4** (a) State different methods used for Torque measurement. Explain any one in detail **07**  
(b) State different methods used for Flow measurement. Explain how Venturi tube used for flow measurement Also state its advantages and disadvantages. **07**
- OR**
- Q.4** (a) State different type of Load cell used for force measurement. Explain any one in detail. **07**  
(b) Explain measurement of Liquid level using capacitive transducer. **07**
- Q.5** (a) Explain working principle of Thermocouple for temperature measurement. **07**  
(b) Explain working of XY recorder. **07**
- OR**
- Q.5** (a) State different types of transducers used for pressure measurement. How LVDT used for pressure measurement. **07**  
(b) 1) Write short note on Thermopile. **03**  
2) Application of Thermister. **04**

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