

**GUJARAT TECHNOLOGICAL UNIVERSITY**  
**BE - SEMESTER-VI • EXAMINATION – SUMMER • 2014**

**Subject Code: 162401****Date: 19-05-2014****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)** Define following. **07**  
 1. Resolution      2. Precision      3. Accuracy      4. Threshold  
 5. Linearity      6. Hysteresis      7. Repeatability
- (b)** Explain the construction, working and characteristics of LVDT. List the advantages of LVDT. **07**
- Q.2 (a)** Explain the theory of operation of resistance strain gauge and derive the equation for the gauge factor. Draw the flat grid type strain gauge. **07**
- (b)** Explain the piezoelectric sensors with necessary diagram. List the materials used for piezoelectric sensors. List the properties of natural quartz. **07**
- OR**
- (b)** Explain the electrical characterization of the sensors. **07**
- Q.3 (a)** Explain the construction and working of platinum resistance thermometer. **07**
- (b)** Explain the hall effect principle with neat diagram. Explain the hall effect angular displacement transducer. **07**
- OR**
- Q.3 (a)** Explain the Seebeck effect. List the factors affecting the choice of materials for thermoemf sensors. Explain the construction of the thermocouple. **07**
- (b)** Explain the construction and working of ultrasonic flow meter. **07**
- Q.4 (a)** Explain the construction and working of electromagnetic flow meter. **07**
- (b)** Define photoconductivity. Explain the construction and working of photoconductive cell. **07**
- OR**
- Q.4 (a)** Explain in brief the temperature measurement and liquid level detector using optical fibre. **07**
- (b)** Write a technical note on “Standard Hydrogen Electrode”. **07**
- Q.5 (a)** Explain the pH measurement in detail. **07**
- (b)** List the properties of intelligent field device. Draw the block diagram of the typical intelligent sensor and explain in brief. **07**
- OR**
- Q.5 (a)** Write a technical note on “ChemFET”. **07**
- (b)** Explain the data communication in smart transmitters. **07**

\*\*\*\*\*