

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER-VII (NEW) EXAMINATION – WINTER 2017

Subject Code: 2170913

Date: 02/11/2017

Subject Name: Industrial Instrumentation (Departmental Elective - II)

Time: 10:30 AM TO 01:00 PM

Total Marks: 70

Instructions:

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
1. Figures to the right indicate full marks.

- Q.1** (a) What is electrical transducer? Explain its advantages. **03**
(b) Differentiate between the following with suitable examples of each: **04**
(i) Active and Passive Transducer. (ii) Primary and Secondary Transducer
(c) Explain the following characteristics of a Transducer. **07**
(i) Precision (ii) Resolution (iii) Sensitivity (iv) Threshold
(v) Repeatability (vi) Accuracy (vii) Hysteresis.
- Q.2** (a) How is the temperature compensation carried out using strain gauge in a bridge circuit? **03**
(b) Describe the construction, working principle of Hall effect transducers. **04**
(c) What is Gauge factor? Derive the expression for Gauge factor in terms of Poisson's ratio. **07**
- OR**
- (c) Explain the construction and working of Piezoelectric transducer. Also derive output equation. **07**
- Q.3** (a) Define Force and Name different types of electrical force sensors. **03**
(b) Explain Proximity Torque sensor. **04**
(c) Explain construction and working principle of L.V.D.T. with its characteristics. **07**
- OR**
- Q.3** (a) Explain Construction and Working of Bourdon Tube. **03**
(b) Explain Variable Dielectric Constant method for measurement of Liquid level using capacitive transducer. **04**
(c) Explain proving ring type load cell with its Advantages. **07**
- Q.4** (a) Define the following (i) Absolute Pressure (ii) Gauge Pressure (iii) Differential Pressure. **03**
(b) Explain Capacitive Pressure Transducer. **04**
(c) With a neat sketch explain the construction and working of Rotameter. **07**
- OR**
- Q.4** (a) Describe working principle of Electro-magnetic type flow meter, with its merit and demerits. **03**
(b) Explain flow measurement technique using Hot Wire Anemometer. **04**
(c) Explain with neat sketch, how McLeod pressure gauge measure vacuum pressure. **07**
- Q.5** (a) State Advantages and Disadvantages of Optical Pyrometer. **03**
(b) Explain the operation of Sample and Hold circuit in brief. **04**
(c) Explain RTD with diagram, construction, principle, working, merits, **07**

demerits and application.

OR

- Q.5**
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|------------|--|-----------|
| (a) | Explain Advantages and Disadvantages of Thermistor. | 03 |
| (b) | Explain the different components of an Analog Data Acquisition System. | 04 |
| (c) | Describe the construction, theory and working principle of thermocouples. Describe different types of compensations used . | 07 |
