

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.

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|------------|---|-----------|
| Q.1 | (a) What is electrical transducer? Explain its advantages. | 03 |
| | (b) Differentiate between the following with suitable examples of each:
(i) Active and Passive Transducer. (ii) Primary and Secondary Transducer | 04 |
| | (c) Explain the following characteristics of a Transducer.
(i) Precision (ii) Resolution (iii) Sensitivity (iv) Threshold
(v) Repeatability (vi) Accuracy (vii) Hysteresis. | 07 |
| 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 |



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 |

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