

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-VII • EXAMINATION – SUMMER • 2014****Subject Code: 170904****Date: 29-05-2014****Subject Name: Industrial Instrumentation****Time: 02:30 pm - 05:00 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)** Explain the following characteristics of a Transducer. 7
(i) Linearity (ii) Resolution (iii) Sensitivity (iv) Threshold
(v) Repeatability (vi) Calibration (vii) Hysteresis.
- (b)** Differentiate between the following with suitable examples of each: 7
(i) Active and Passive Transducer. (ii) Primary and Secondary Transducer
(iii) Analog and Digital Transducer
- Q.2 (a)** Explain temperature compensation in Strain gauges using Dummy gauge. 7
- (b)** What is Piezo-resistive effect? Explain the term Gauge Factor with respect to 7
resistance strain gauge and obtain its expression in terms of poisson's ratio.
- OR**
- (b)** What is load cell? Explain Proving ring and Hydraulic load cell. 7
- Q.3 (a)** List different types of thermocouples used for temperature measurement. Explain 7
thermoelectric laws and the method for cold junction compensation in thermocouple
- (b)** Give the merits, demerits and applications of (i) Platinum resistance thermometer 7
(ii) Thermistor (iii) Thermocouple for measurement of temperature.
- OR**
- Q.3 (a)** What is synchros? Explain in short control type synchro system. 7
- (b)** Draw the schematic of X-Y recorder and describe its working. 7
- Q.4 (a)** State and explain various principles of operation of Capacitive Transducers for level 7
measurements.
- (b)** What is Torque? State different types of torque measurement techniques and explain 7
any one in brief.
- OR**
- Q.4 (a)** Explain Black Body concepts for very high temperature measurements. Describe with 7
neat diagram how disappearing filament type optical pyrometer can measure very high
temperature. Mention its merit and demerits.
- (b)** Describe basic difference between a variable area type flow meter and differential 7
pressure type flow meter. With necessary formula describe how Rotameter is used to
measure the flow of given liquid.
- Q.5 (a)** Describe with neat diagram how strain gauge is used for torque and pressure 7
measurement
- (b)** Describe the application of LVDT for pressure measurement. 7
- OR**
- Q.5 (a)** Describe the schematic of strip chart recorder and describe its working and construction 7
of each component. Compare with circular chart recorder
- (b)** Describe the construction and working principle of Electro-magnetic type flow meter, 7
with its merit and demerits.