Seat No.: _____

GUJARAT TECHNOLOGICAL UNIVERSITY ME SEMESTER – I EXAMINATION – SUMMER 2017

Subject Code: 2714703 Subject Name: Sensor Technology Time:02:30 p.m. to 05:00 p.m **Instructions:**

- 1. Attempt all questions.
- 2. Make suitable assumptions wherever necessary and clearly mention the same.
- 3. Figures to the right indicate full marks.
- 4. Draw neat diagrams. Diagrams with inferior quality may not be awarded any credit.
- Q.1 (a) Explain uni-dimensional transfer function and two-dimensional transfer 07 function of sensor with suitable examples.
 - (b) What is called as a calibration of a sensor? Describe two-point calibration and 07 one-point calibration method with the help of mathematical representation.
- Q.2 **(a)** Describe the use of capacitive sensor to measure the level of liquid in a tank. 07 Support your answer with the help of suitable diagram showing the complete set up and a note about the sensitivity of level measuring system.
 - (b) Name the sensor which can be used for moisture measurement. Briefly discuss 07 the working principle of this sensor for moisture measurement.

OR

- (b) Discuss and describe various ways to specify a nonlinearity of a given sensor 07 with graphical representation.
- 0.3 (a) Explain with the help of neat schematic diagrams the piezoelectric effect with 07 the example of SiO₂ crystal.
 - (b) With the help of neat schematic diagram explain the working principle of Hall 07 effect sensor.

OR

- (a) Briefly explain seebeck and peltier effect. Give example of sensors based on Q.3 07 these effects and their working.
 - (b) Bring out the procedure to be followed for manufacturing of ceramic PZT 07 sensors.
- (a) Explain the principle of thermal expansion used in bi-metallic laminated plates 07 **Q.4** for temperature measurement.
 - (b) Draw and describe the circuit diagram to control rotary position of antenna with 07 the help of potentiometer as a sensing device.

Date:10/05/2017

Total Marks: 70

Enrolment No.

- Q.4 (a) What is the function performed by electrolytic tilt sensor? Describe the working 07 of this sensor as analogue measuring device.
 - (b) Evaluate the statement: "Rotational velocity can be measured by linear variable 07 differential transformer (LVDT)."
- Q.5 (a) Explain with suitable example the application of polarized light in proximity 07 detection of metallic objects.
 - (b) Differentiate between absolute encoders and incremental encoders for position 07 measuring system. Compare their merits and demerits.

OR

- Q.5 (a) Evaluate the statement: "Fibre-optic sensors can be used as liquid level 07 indicator in hazardous situation".
 - (b) With the help of suitable examples differentiate between binary tactile sensors 07 and analogue tactile sensors in robotic touch sensing system.
