Roll No. ..... Total Pages : 3

BT-8/D-17 **38018**

TRANSDUCER AND THEIR APPLICATIONS

Paper : ECE-430E

Time : Three Hours] [Maximum Marks : 100

Note : Attempt *five* questions in all, selecting atleast *one* question from each section.

SECTION–I

1. (a) What is the difference between accuracy and precision ? 5

(b) What is the 5% settling time in the step response of a first-order instrument with a time-constant of 12 sec. ? 5

(c) Explain Hall effect in detail and also give different application of Hall effect transducer. 10

2. (a) A capacitive transducer uses two quartz diaphragm of area 750 mm^2 separated by a distance of 3.5 mm. A pressure of 900 kN/m^2 when applied to top diaphragm produces a deflection of 0.6 mm. The capacitance is 370 pF when no pressure is applied to the diaphragm. Find the value of capacitance after the application of pressure 900 kN/m^2. 10

(b) Draw and explain working of LVDT. What causes residual voltage to occur ? 10

SECTION–II

3. (a) Explain in detail about the functioning of different force summing devices. 10

(b) Find seeback voltage for a thermocouple with proportionality constant of 40 μV/°C if the junction temperatures are 40°C and 80°C. 10

4. (a) What is the need of lead wire compensation? How is it to be done in RTD? What is self heating effect in RTD? 10

(b) For a certain thermistor β = 3140 K and at 27°C is known to be 1050 Ω. The thermistor is used for temperature measurement and the resistance measured is as 2330 Ω. Find the measured temperature. 10

SECTION–III

5. (a) Explain with a sketch the principle of operation of a variable reluctance accelerometer. 10

(b) Explain in detail the working of toothed rotor tachometer generator. 10

6. (a) The output of LVDT is connected to a 5 V Voltmeter through an amplifier whose amplification factor is 250. An output of 2 mV appears across the terminals of LVDT when the core moves through a distance of 0.5 mm. Calculate the sensitivity of LVDT. 10

(b) Explain different non-electrical methods for measurement of temperature. 10

SECTION–IV

7. (a) Define torque. Explain in detail absorption type dynamometers. 10

   (b) Explain different methods used to measure velocity. 10

8. Explain the following :

   (a) Load Cells.

   (b) Photoelectric Tachometer.

   (c) Piezoelectric Transducer.

   (d) Metallic Resistance Thermometers. (5×4=20)
