Paper / Subject Code: 51503 / Transducer-I

S.E. (Instru) sem III choice based 4/12/18 (12)

Q.P. Code: 27379

Time : 3 hours Marks: 80

N.B.:(1) Question No. 1 is compulsory.
(2) Attempt any 3 out of remaining
(3) Figures indicate to the full marks.
(4) Assume suitable data if necessary.

Q.1 Answer the following. 20

a. Classify transducers with suitable example.

b. Define a) Accuracy b) Sensitivity

c. Explain working principle of-

i) Piezo electric transducers
Ii) Piezo resistive transducers

d. Find seebeck voltage for a thermocouple with proportionality constant of 40μV/°C

If the junction temperature are 40°C and 80°C.

e. Explain level measurement by using float.

Q.2

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

b) i) A voltmeter with internal resistance of 200 KΩ is connected across an unknown resistance. It reads 250 V and a milliammeter (with very small internal resistance) connected in series with same resistance reads 10 mA. Determine Apparent resistance, actual resistance & loading error due to loading effect of the voltmeter.

ii) If the same voltmeter & milliammeter when connected in another resistance read 100 V & 2 A respectively, determine the loading error in this case. 10

Q.3

a) Explain any five static characteristics of transducer with suitable examples. 10

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

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Q.4

a) 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

b) Draw set up and explain working of air purge method of level measurement. 10

Q.5

a) Explain in detail radioactive type level detector. 10

b) A capacitive transducer uses two quartz diaphragm of area 750 $m\,n^2$ separated by a distance of 3.5 mm. A pressure of 900 KN/m^2 when applied to top diapnragm 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

Q.6 Write short notes 20

a) Optical pyrometer

b) Rotary encoder

c) Types of error

d) Calibration & need of calibration

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