24/05/2017

S.E. SEM - III / INST / CBGS / MAY 2017

Q.P. Code : 550800

(3 Hours )  [ Total Marks : 80

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

1.    Answer the following.  20
   a) Classify transducers with suitable example.
   b) Draw and explain Flapper-Nozzle system.
   c) What is the principle of working of capacitive transducers? How can we use them for level measurement?
   d) Find seebeck voltage for a thermocouple with proportionality constant of $40 \mu V/^{\circ}C$ If the junction temperature are $40^{\circ}C$ and $80^{\circ}C$.
   e) A thermistor has a resistance temperature coefficient of -5% over a temperature range of $25^{\circ}C$ to $50^{\circ}C$. If the resistance of the thermistor is 100 ohms at $25^{\circ}C$, what is the resistance at $35^{\circ}C$?

2.  a) Draw and explain working of LVDT. What causes residual voltage to occur?  10
    b) A linear resistance potentiometer is 50mm long and is uniformly wound  10 with a wire having resistance of 10,000 $\Omega$ under normal condition. The slider is at the center of the pot. Find the linear displacement when the resistance of pot is measured by Wheatstone's bridge for two cases (i) 3850 $\Omega$ (ii) 7560 $\Omega$. Are the two displacements in the same direction?

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?  10 What is self heating effect in RTD?

4.  a) For a certain thermistor $\beta$ = 3140 K and at $27^{\circ}C$ is known to be 1050 $\Omega$.  10 The thermistor is used for temperature measurement and the resistance measured is as 2330 $\Omega$. Find the measured temperature.
    b) Draw set up and explain working of air purge method of level measurement.  10

5.  a) Explain in detail radioactive type level detector.  10

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b) A capacitive transducer uses two quartz diaphragm of area 750 mm² **10** separated by a distance of 3.5 mm. A pressure of 900 KN/m² when applied to top diaphragm produces a deflection of 0.6 mm. The capacitance is 370pF when no pressure is applied to the diaphragm. Find the value of capacitance after the application of pressure 900 KN/m².

6.    Write short notes **(any two)** :-
      **20**
   a) Optical pyrometer
   b) Rotary encoder
   c) Metrology & need of inspection

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