Paper Code : EIC-502

(Following Paper ID and Roll No. to be filled in your Answer Book)	
Paper ID :	**Roll No.**

B. Tech.

(Odd Sem.) Theory Examination, 2016-17

Industrial Instrumentation

Time : 3 : 00 Hr.] **[Maximum Marks : 100**

Note : Attempt all Sections. If require any missing data; then choose suitably.

Section-A

1. Attempt any five parts from the following : 5×4=20

   (a) Explain the function of a bimetallic strip?

   (b) Describe how a capacitive transducer is used for water level measurement.

   (c) What is the effect of resistivity of liquid on operation of magnetic flow meter?

   (d) Explain any one method of viscosity measurement in brief.

   (e) Explain the advantages of electrical method of moisture content measurement over chemical methods?

   (f) How moisture content is related to electrical resistance of material explain.

   (g) Name the device used for low pressure measurement explain working on any one.

Section-B

2. Attempt any five parts form this section : 10×5=50

(a) Derive the Expression for the output voltage of a Piezoelectric transducer. A Piezoelectric Crystal having dimensions of 5mm×5mm×1.5mm and voltge sensitivity of 55×10^{-3} Vm/N is used for force measurement. Calculate the force if the voltage developed is 50 V.

(b) Explain working principle of rotameter. In a rotameter for metering gasoline of specific gravity 0.8, what should be the density of float material is density compensation is desired?

(c) Explain construction and working of Resistance temperature detector.

(d) Explain McLeod gauge for pressure measurement also derive its expression for unknown Pressure.

(e) Draw schematic of bourdon tube. Show how bourdon tube can be used as secondary transducer for force measurement.

(f) Derive the formula for the Gauge factor of a Strain Gauge. A semiconductor Strain Gauge having a resistance of 1000 Ω and a gauge factor of 133 is subjected to a compressive strain of 500 micro strains. Calculate new value of resistance of gauge.

(g) Explain construction and working principle of LVDT. Also discuss its applications.

Section - C

Attempt all questions. 10×3=30

3. Attempt any two parts : 5×2=10

(a) What is capacitive transducer? Derive the expression for its sensitivity.

(b) Explain principle and construction of Pirani guage.

4. Attempt any one part : 10×1=10

(a) Explain chemical reaction method for moisture measurement.

(b) Name some of the piezoelectric crystals. Discuss about the piezoelectric transducer for weight measurement.

5. Attempt any two parts : 5×2=20

(a) Explain the different laws of thermocouple.

(b) Explain optical method of temperature detection.

(c) Explain construction and working of thermocouple.