

Total No. of printed pages = 4

19/4th Sem/UIE 402

2022

## SENSORS AND TRANSDUCERS

Full Marks – 100

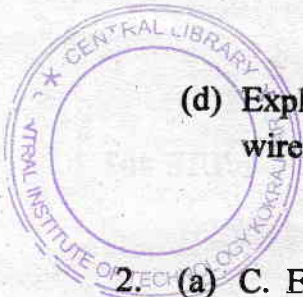
Time – Three hours

The figures in the margin indicate full marks  
for the questions.

Answer any *five* questions.

1. (a) Write the equation of gauge factor and explain. 4
- (b) A Hg manometer has one arm in the shape of a well and the other as a tube inclined at an angle  $20^\circ$  with the horizontal. The well is 4 cm in diameter and the tube is 3 mm in diameter. Find the percentage of error if no area correction factor is used. 6
- (c) If Pt 1000 is used for measurement of temperature then at what temperature its resistance is 1100 ohm.  $\alpha = .0039 \text{ ohm/ohm/C}$ ? 4

[Turn over



(d) Explain temperature measurement using 4 wires RTD using Wheatstone bridge circuit.

6

2. (a) C, E, N, J, K types of thermocouples with their compositions and temperature range.

4

(b) A strain gauge has a gauge factor of 2.5. If it stretches from 20 cm to 20.3 cm, what is the % change in resistance?

6

(c) What is cold junction compensation? What are the types?

4

(d) How pressure gauge calibrated using Dead weight tester?

6

3. (a) Draw complete LVDT circuit with phase sensitive demodulation.

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(b) Derive the formula of incline (with well) type manometers.

6

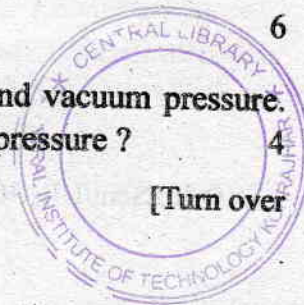
(c) What are the different types of manometers? Which type of manometer is used for better sensitivity? Describe it.

4

(d) Write short notes on Revolution counter.

6

4. (a) Write a short note on IC temperature sensor. 4
- (b) Explain the working principles of Ionization gauge. 6
- (c) How Piezoelectric accelerometer works ? 4
- (d) Draw the essential parts of a Bourdon tube pressure gauge and describe the purpose of each part. 6
5. (a) How an A. C. tacho generators works ? 4
- (b) Write a short note on Stroboscope. 6
- (c) How a Bimetallic thermometer works ? 4
- (d) Write short note on Optical Radiation Pyrometer. 6
6. (a) Define working principles of thermocouple. It is based on which law ? 4
- (b) Explain the operating principles of Mcleod gauge with a schematic diagram. What is the measuring range and accuracy of Mcleod gauge ? 6
- (c) Define gauge pressure and vacuum pressure. What are the units of pressure ? 4



(d) Explain the working principles of Pirani gauge. 6

7. (a) Write the features of AD590 IC temperature sensor. 4

(b) Write a note on Elastic type pressure sensor. 6

(c) How drag cup tacho generators work? 4

(d) Draw the setup of Total radiation pyrometer. 6

