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**4th Sem. / ECE / ME / PE / Mechatronics**

**Subject : Instrumentation / Instrument Process Control**

Time : 3 Hrs.

M.M. : 100

### **SECTION-A**

**Note:** Very Short Answer type questions. Attempt any 15 parts. (15x2=30)

- Q.1
- a) Name any two display devices.
  - b) Define signal conditioning.
  - c) What is primary sensing element.
  - d) Define passive transducer.
  - e) Strain gauge is \_\_\_\_\_ transducer. (Active/Passive).
  - f) Define piezo resistive effect.
  - g) Define self inductance.
  - h) Name any two piezo electric materials.
  - i) Expand LVDT.

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- j) Name material used for making element in strain gauge.
- k) Torque = \_\_\_\_\_.
- l) Name any one transducer to measure speed.
- m) What is unit of force.
- n) Define humidity.
- o) pH of pure water is \_\_\_\_\_.
- p) Pyrometers are used for \_\_\_\_\_.
- q) Which flow meter is independent of liquid density.
- r) Expand RTD.

### **SECTION-B**

**Note:** Short answer type questions. Attempt any ten parts 10x4=40

- Q.2
- i) What is importance of measurement.
  - ii) What are main parts of a basic measuring system.
  - iii) Write advantages of electric transducers.

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- iv) Explain basic principle of potentiometers.
- v) Differentiate between primary and secondary transducers.
- vi) What is significance of gauge factor in strain gauges.
- vii) Write a short note on "Load cell".
- viii) What is foil type strain gauge.
- ix) What is use of pressure cells.
- x) How we measure torque by dynamometer method.
- xi) What is basic principle of electromagnetic flow meter.
- xii) Show how bimetallic thermometer works.
- xiii) Name anyone method of measurement of level. Explain in brief its working.
- xiv) What are different types of thermistors.
- xv) How speed is measured by using tachometer.

## SECTION-C

**Note:** Long answer type questions. Attempt any three questions. 3x10=30

- Q.3 With the help of a neat sketch explain construction & working of L.V.D.T.
- Q.4 What are Bourdon tubes show how these are used for measurement of pressure.
- Q.5 Explain in detail working of ultrasonic flow meter.
- Q.6 What are thermocouples, explain construction working principle of them.
- Q.7 Write short notes on following.
  - i) Hygrometer.
  - ii) Strain gauge load cell.

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