

Printed Pages : 3



NEE403

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

**PAPER ID : 121411**

Roll No.

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**B. Tech.**

(SEM. IV) THEORY EXAMINATION, 2014-15  
**INSTRUMENTATION & PROCESS CONTROL**

Time : 2 Hours]

[Total Marks : 50

**Note :** Attempt all questions.1 Attempt any four questions : 4×3=12

- (a) Define an instrumentation system with suitable block diagrams.
- (b) What is the load cell, what for it used ?
- (c) What is primary sensing element and why is it important ?
- (d) Describe a method for the measurement of flow.
- (e) A quartz piezoelectric crystal having a thickness of 2mm and voltage sensitivity of 0.055 Vm/N is subjected to a pressure of 1.5 M N/m<sup>2</sup>. Calculate the voltage output if the permittivity of quartz is  $40.6 \times 10^{-12}$  F/m, calculate its charges sensitivity.
- (f) Explain digital transducer. Why are these preferred over analog transducer.

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**2** Attempt any four questions : **4×3=12**

- (a) What is the piezo-resistive gauges and derive the expression for gauges factor.
- (b) Explain the Piezo-electric transducers and derive the expression for output voltage.
- (c) Describe the working of resistance Thermometer.
- (d) Explain the measurement of low pressure using diaphragm with the help of diagram.
- (e) The LVDT with secondary voltage 5 Volt has a range of  $\pm 100$  mm, Find
  - (i) Output voltage when core is  $-7.5$  mm from centre.
  - (ii) Plot the o/p voltage core position for core movement from  $+7.5$  mm to  $-40$  mm.
- (f) Describe various electrical methods used for measurement of liquid level.

**3** Attempt any two questions : **2×6=12**

- (a) Define telemetry. Explain need of data transmission and telemetry.
- (b) What is data acquisition system ? With suitable diagram explain digital data acquisition system.
- (c) Define time division multiplexing and frequency division multiplexing as applied to telemetry.

**4** Attempt any two questions : **2×7=14**

- (a) Describe the basic components of magnetic tape recorder and application using direct techniques.
  - (b) Explain x-y recorder and strip chart recorder.
  - (c) What is process control ? Explain with a suitable example. Also explain the three term control action (PID).
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