



(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/m². Calculate the voltage output if the permittivity of quartz is 40.6×10^{-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 : $4 \times 3 = 12$

- (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 ± 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 : $2 \times 6 = 12$

- (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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