

**III B.Tech II Semester Regular Examinations, April/May 2005**  
**INSTRUMENTATION AND CONTROL SYSTEMS**  
( Common to Mechanical Engineering, Mechatronics and Production Engineering)

**Time: 3 hours****Max Marks: 80**

**Answer any FIVE Questions**  
**All Questions carry equal marks**

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1. (a) What are the different standard inputs for studying the dynamic response of a system. Define and sketch them.  
(b) A thermometer has a time constant of 3.44. It is quickly taken from a temperature  $0^{\circ}\text{C}$  to a water bath having a temperature  $100^{\circ}\text{C}$ . what temperature will be indicated after 1.55?
2. (a) Describe the methods of measurement of speed using
  - i. Resonance tachometer
  - ii. Centrifugal force tachometers.(b) Explain working of magnetic pick-up.
3. (a) List all industrial thermocouples giving their elements and temperature ranges.  
(b) Why cold junction compensation is required? Explain an automatic cold junction compensation method.
4. (a) Draw a neat sketch of an ionization gauge; explain the working principle of the gauge  
(b) List merits and limitations of ionization gauges.
5. (a) List out the advantages and limitations of direct method of level measurement.  
(b) Describe with neat sketch the functioning of any two types of displacer type liquid level measuring instruments.
6. (a) What are the advantages of piezoelectric type accelerometer?  
(b) Name the different vibration sensing systems used in practice. Explain any one such system for the measurement of vibration.
7. (a) Explain the factors affecting the strain measurement.  
(b) Explain the working of servo accelerometer with neat sketch.
8. (a) An automobile driver uses a control system to maintain the speed of the car at a prescribed level. Sketch a block diagram to illustrate this feedback system. Explain various functional elements of this system.  
(b) The student-teacher learning process is inherently a feedback process intended to reduce the system error to a minimum. Construct a feedback model of the learning process and identify each block of the system.

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