

III B.Tech I Semester Regular Examinations, November/December 2005
INSTRUMENTATION AND CONTROL SYSTEMS
(Common to Mechanical Engineering and Production Engineering)
Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

1. (a) Describe about the step response of second order system.
- (b) A response test on a thermometer was thrust into temperature controlled bath of water maintained at 100°C and the time was observed as the indicated temperature reached preselected values giving the following readings.

Times(sec)	0.0	1.2	3.0	5.6	8.0	11.0	15.0	18.0
Temp(deg c)	20	40	60	80	90	95	98	99

Draw the response curve on a graph paper and show that it follows closely the form of a simple lag with a time constant of 4 secs. [8+8]

2. Describe the method of measuring speed using
 - (a) Capacitor type Impulse Tachometer. [16]
 - (b) Tachometers.
3. Explain the following with neat sketches.
 - (a) Optical pyrometer.
 - (b) Thermopile
 - (c) Liquid filled pressure thermometer. [6+5+5]
4. (a) What way strain gauge be used to measure pressure, explain.
- (b) Explain the construction and working of hydraulic load cell. [6+10]
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. [16]
6. (a) Explain the principle of a hydrometer.
- (b) What is a vibrometer? Explain any one of them. [16]
7. (a) What is the need for temperature compensation in a strain gauge? How it is done.
- (b) Derive an equation for gauge factor for a metallic strain gauge. [8+8]

8. (a) Draw the schematic block diagram for an automatic washing machine and identify the input and output of the system.
- (b) Draw the block diagram of a biological control system when a human hand approaches to an object to grip it. Discuss the functions of various elements of the system. [11+5]

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