

2005 JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY

III B.TECH I SEMESTER SUPPLEMENTARY EXAMINATIONS
PROCESS CONTROL INSTRUMENTATION
 (ELECTRONICS & INSTRUMENTATION ENGINEERING)

NOVEMBER 2005

TIME - 3 HOUR
 MARK - 80

Answer any FIVE Questions
 All Questions carry equal marks

1. (a) What is called a "Dead End System"? Explain one such system with neat diagram.
 (b) Write the differential equation of this system and get the transfer function. [10+6]
2. (a) Is the Thermometer Bulb and well arrangement a non-interacting system? Justify your answer.
 (b) Write the differential equations and determine the transfer function for Thermometer bulb and well arrangement. [6+10]
3. (a) what is meant by differential gap and how it is related to the performance of the final control element?
 (b) Define proportional band. Explain the relation between proportional gain, proportional band and offset error.
 (c) With a neat sketch explain the integral controller mode action. Summarize the characteristics. [4+4+8]
4. (a) Briefly explain the principle of operation of a displacement type pneumatic PD controller. How the derivative time can be adjusted in this controller.
 (b) Outline the design steps involved in developing an electronic PI controller. [8+8]
5. (a) A proportional - integral controller is used on a pure time - delay process. Calculate the response to a step change in load if the controller gain is half the maximum value and the reset time is half the time delay. Calculate the integral of the absolute error.
 (b) Suggest and explain the control schemes for better control of process with dead time. [8+8]
6. (a) What is the importance of ac motor and briefly explain its principle.
 (b) Differentiate between ac motor and dc motor.
 (c) A stepper motor has 7.50 per step. Find the rpm produced by a pulse rate of 2000 pps on the input. [4+4+8]
7. Write about the rotating shaft valves? [16]
8. (a) What control strategy is needed for improved performance when input and output of a process affected by significant disturbance?
 (b) What is compensation in a closed operation? Explain with neat diagram. [8+8]