

Code No: 126EU

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**B.Tech III Year II Semester Examinations, May - 2016****PROCESS CONTROL INSTRUMENTATION****(Electronics and Instrumentation Engineering)****Time: 3 hours****Max. Marks: 75****Note:** This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A. Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART - A (25 Marks)

- 1.a) What is Regulatory problem? Give example [2]
- b) Write the difference between interacting and non-interacting systems. [3]
- c) Write the transfer function of a PID controller. [2]
- d) Write the advantages and disadvantages of a PI controller. [3]
- e) What is IAE? [2]
- f) What is process reaction curve? [3]
- g) Write the uses of ball valves? [2]
- h) What is a valve positioner? [3]
- i) What is cascade control? [2]
- j) Write the difference between globe valve and gate valve. [3]

PART - B (50 Marks)

2. Discuss the dynamics of simple liquid level system and derive the transfer function $H(s)/Q(s)$ [10]
- OR**
3. Derive the transfer function of a non- interacting system, $H_2(s)/Q(s)$. [10]
4. Derive the transfer functions of different types of controllers. [10]
- OR**
- 5.a) Write short notes on hydraulic controllers.
- b) A unit step change is given to a PI controller. If the gain $K_c = 5$, integral time constant (τ_i) = 2, obtain the response of the PI controller. [5+5]
- 6.a) What is the criterion for good control? Explain.
- b) Explain about IAE, ISE, and ITAE. [5+5]
- OR**
7. Discuss about Ziegler-Nichols controller settings. [10]
8. What is control valve? Explain the characteristics of control valves. [10]
- OR**
9. Explain in brief about Valve sizing. [10]
10. Describe about "split range control" with an example. [10]
- OR**
11. Describe about "ratio control" with an example. [10]