

GUJARAT TECHNOLOGICAL UNIVERSITY
BE – SEMESTER – VI EXAMINATION – WINTER 2015

Subject Code:161702**Date:17/12/ 2015****Subject Name: Process Control****Time:2:30pm to 5:00pm****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

- Q.1** (a) Define controlled variable and Manipulated variable. How to select controlled and manipulated variable for any process loop with a suitable process loop example. **07**
- (b) Explain P+I+D controller algorithm. Explain the importance of each mode in PID controller. **07**

- Q.2** (a) Discuss Ziegler Nichols closed loop method for controller tuning **07**
- (b) What are the different elements of Process Dynamics? Explain any two with example **07**

OR

- (b) Derive the transfer function of two non interacting series tanks. And Draw the system response to a unit step input. **07**

- Q.3** (a) Write seven control objectives of process control , explain any two in detail. **07**
- (b) Explain Cascade controller in detail with actual process examples. **07**

OR

- Q.3** (a) Explain ON-OFF controller with proper application of it. **07**
- (b) Discuss the ratio control in detail with Process example. **07**

- Q.4** (a) What is Proportional Band, Reset wind up and derivativ kick? How one can modify the algorithm to remove disadvantage of an individual mode in PID. **07**
- (b) Draw and Explain the Parallel system structure. Derive its Transfer function. Draw the response of a sample parallel system to a unit step input. **07**

- Q.4** (a) Consider a transfer function , Derive an approximate first-order-plus-time-delay model, using taylor series expansion **07**

$$G(s) = \frac{K(-0.1s+1)}{(5s+1)(3s+1)(0.5s+1)}$$

- (b) Give desired features of feedback control algorithms **07**

- Q.5** (a) Explain the term direct and reverse action of a controller with suitable example of a common process loop. **07**
- (b) Differentiate between override and Selective control **07**

OR

- Q.5** (a) Explain Feedforward controller with suitable example. **07**
- (b) What are the steps to make linear model for non linear physical system? Explain it in details. **07**
