Enrolment No.

GUJARAT TECHNOLOGICAL UNIVERSITY

B. E. - SEMESTER - VI • EXAMINATION - WINTER 2012

Subject code: 161702 Date: 03/01/2013

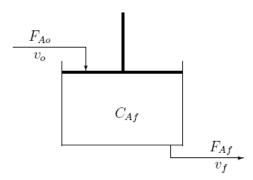
Subject Name: Process Control

Time: 02.30 pm - 05.00 pm Total Marks: 70

Instructions:

1. Attempt any five questions.

- 2. Make suitable assumptions wherever necessary.
- 3. Figures to the right indicate full marks.
- Q.1 (a) Obtain control model for Room Air conditioning system 07 defining all system variables. Is the system is Self regulating?
 - **(b)** An electronic flow sensor converts flow information in linearly so that the flow from 0 to 300 m³/h becomes a current from 0 to 50 mA. Calculate the current for a flow of 225 m³/h.
- Q.2 (a) Draw block diagram for thermometer bulb control system. 07
 Obtain its closed loop response by applying step input.
 - (b) Determine the dynamic response of a CSTR to a step input 07 the inlet concentration.



OR

- (b) What are the steps to make linear model for non linear **07** physical system? Explain it in details.
- Q.3 (a) How will you evaluate self regulation and process load in 07 the process? Explain it.
 - (b) What is a controller mode? List it and describe its function 07 and characteristic in the process.

OF

- Q.3 (a) Implement the two position control using electrical heater 07 on closed process vessel.
 - (b) Define following terminology of the controller.(i) Proportional band (ii) Anti reset action (iii) Rate gain
- Q.4 (a) Prepare a feedback control algorithm using plain 07 proportional control on level system.
 - b) What is controller tuning? Calculate the PI tuning 07 constants by obtaining the process curve from following

table. The manipulating variable was changed in a step at time = 0 by +8%

Sr	Output	Time
1	0.00	00
2	0.00	10
3	0.38	20
4	0.54	30
5	0.68	40
6	0.74	50
7	0.97	60
8	1.10	70
9	1.05	80
10	0.98	90
11	1.00	100

OR

- Q.4 (a) What is a master-slave control? Explain how outlet 07 temperature of the heat exchanger is controlled using this kinds of control.
- **Q.4 (b)** What is the effect of controller modes on Stability? Explain **07** it with proper justification.
- Q.5 (a) How and where feed forward control is implemented? 07 Describe with logical explaination.
 - (b) Draw and describe fuel to air ratio control system. 07

OR

- Q.5 (a) Explain the roll and benefits of split range control in 07 process control system.
 - (b) Differentiate selective versus override control. 07
