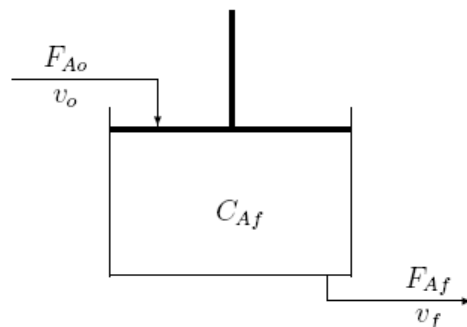


**GUJARAT TECHNOLOGICAL UNIVERSITY**  
**B. E. - SEMESTER – VI • EXAMINATION – WINTER 2012**

**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 defining all system variables. Is the system is Self regulating? **07**
- (b) An electronic flow sensor converts flow information in linearly so that the flow from 0 to 300 m<sup>3</sup>/h becomes a current from 0 to 50 mA. Calculate the current for a flow of 225 m<sup>3</sup>/h. **07**
- Q.2** (a) Draw block diagram for thermometer bulb control system. Obtain its closed loop response by applying step input. **07**
- (b) Determine the dynamic response of a CSTR to a step input the inlet concentration. **07**

**OR**

- (b) What are the steps to make linear model for non linear physical system? Explain it in details. **07**
- Q.3** (a) How will you evaluate self regulation and process load in the process? Explain it. **07**
- (b) What is a controller mode? List it and describe its function and characteristic in the process. **07**
- OR**
- Q.3** (a) Implement the two position control using electrical heater on closed process vessel. **07**
- (b) Define following terminology of the controller. **07**
- (i) Proportional band (ii) Anti reset action (iii) Rate gain
- Q.4** (a) Prepare a feedback control algorithm using plain proportional control on level system. **07**
- (b) What is controller tuning? Calculate the PI tuning constants by obtaining the process curve from following **07**

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 temperature of the heat exchanger is controlled using this kinds of control. **07**

**Q.4 (b)** What is the effect of controller modes on Stability? Explain it with proper justification. **07**

**Q.5 (a)** How and where feed forward control is implemented? Describe with logical explanation. **07**

**(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 process control system. **07**

**(b)** Differentiate selective versus override control. **07**

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