

**III B.Tech I Semester Supplementary Examinations, November 2006**  
**PROCESS CONTROL**

(Electronics & Control Engineering)

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions  
 All Questions carry equal marks

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1. (a) Write differential equation for the following single capacitance process, as shown in the below figure 1a

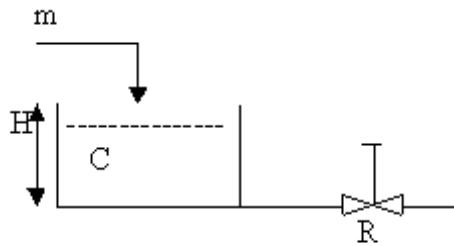


Figure 1a

- (b) The above single capacitance level process has a normal operating head of 1.2 m and a normal valve of outflow of 3375 cubic cms /sec. The cross section area of the vessel is  $0.54 \text{ m}^2$ . If the resistance to the flow is parabolic, determine the time constant of the system.
- (c) Show that the time constant of the above process is proportional to the time required to change the fluid in the vessel. [8+4+4]
2. (a) Discuss relative advantages and disadvantages of the P,I and D control actions.
- (b) A proportional controller has a gain of 3. Plot the controller o/p for the error given below of  $P_0 = 50\%$  ( $P_0$  – controller o/p with no error) as shown in the below figure 2b [8+8]

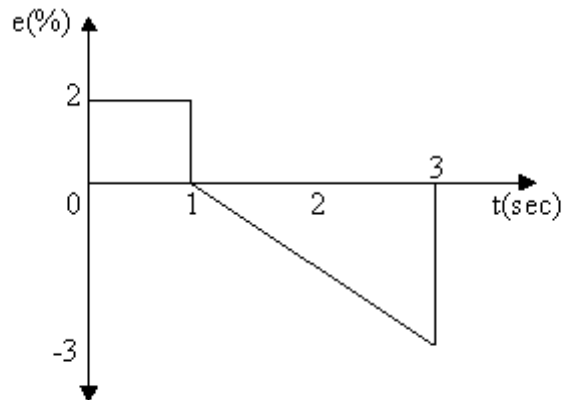


Figure 2b

3. (a) Explain the operation of any one method of electrical transmission with closed loop. What are the advantages of electrical transmission?

- (b) Write short notes on Electromagnetic flow meter. [8+8]
4. (a) Discuss about electronic controller for realizing PID action and derive relation between its output and input.
- (b) Discuss the relative advantages and disadvantages of electric and pneumatic controllers. [8+8]
5. Explain the different types of rotating shaft valves. [16]
6. Write briefly about boiler steam pressure ,drum level control Systems and super heat steam temperature control. [16]
7. (a) What is reaction rate? Write about chemical equilibrium.
- (b) What are the different methods to improve forward reaction rate and to reduce reverse reaction rate? [8+8]
8. Explain the relative gain analysis with one example. [16]

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