ST) TE / Sem - VI - CBSGS / NOV - 2018.

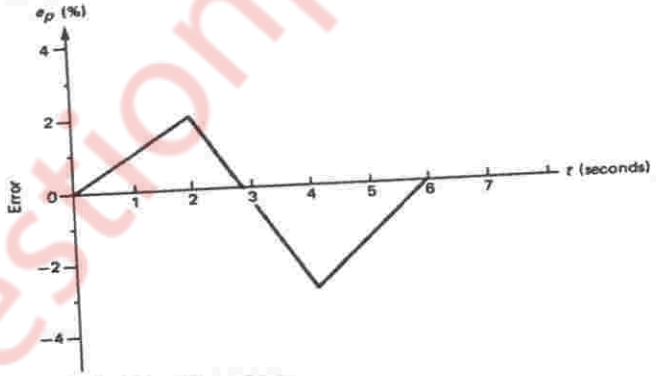
(3 Hours) **[Total Marks: 80]**

N.B: (1) Question No.1 is **compulsory.**
(2) Answer any **three** questions from Question Nos. 2 to 6.
(3) Assume suitable data if necessary.

1 Answer any FIVE of the following questions:- 20
(a) Discuss the process characteristics. 4
(b) In the temperature measurement system, suppose the temperature range 20^0 *to* 120^0C is linearly converted to the standard current range of 4 to 20 mA. What current will result from 60^0C? What temperature does 6.5 mA represent? 4
(c) Discuss the need of controller tuning and explain any one method. 4
(d) Draw and explain of cascade controller for CSTR. 4
(e) Explain the use of RGA in multivariable control. 4
(f) Discuss discrete state process control.

2 (a) Discuss dynamic behavior of first and second order systems. 10
(b) For the error curve shown below, plot a graph of a PID controller output as a function of time. 10

$K_p = 2.0, \quad K_I = 2.2\ s^{-1}, K_D = 2\ s, and \quad p_I(0) = 40\%$



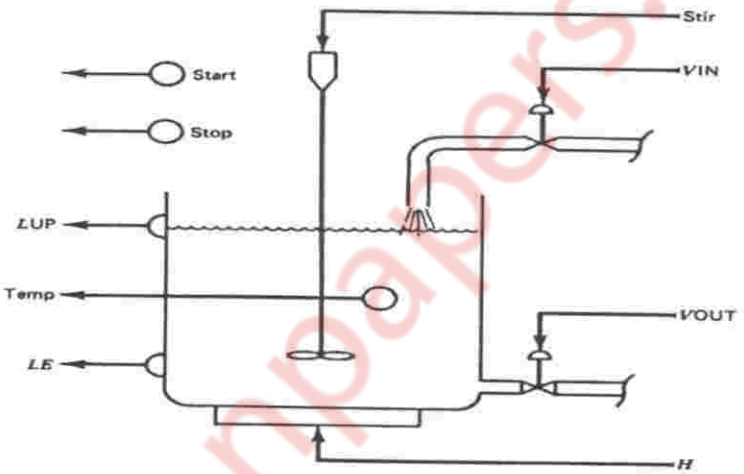
3 (a) Differentiate electronic and pneumatic controller. 10
(b) With example explain selective control scheme. 10

4 (a) Explain the advantages and disadvantages of F/B and F/F controller. 10

(b) Discuss the need of adaptive controller and explain any one type adaptive controller. 10

5 (a) For the control problem shown in figure below, write the physical and programmed ladder diagram. The global objective is to heat a liquid to a specified temperature and keep it there with stirring for 30 min. The hardware has the following characteristics: 10

1. START push button is NO, STOP is NC.
2. NO and NC are available for the limit switches.



The event sequence is

1. Fill the tank.
2. Heat and stir the liquid for 30 min.
3. Empty the tank.
4. Repeat from step 1.

(b) Discuss with example the batch and continues process control. 10

6 Write short note on (any TWO):- 20

(a) MRAC.
(b) Elements of Process control.
(c) Z-N method of PID tuning.
(d) Ratio controller.

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