

Con. 2791-08.

(REVISED COURSE)  
 (3 Hours)



CO-2908

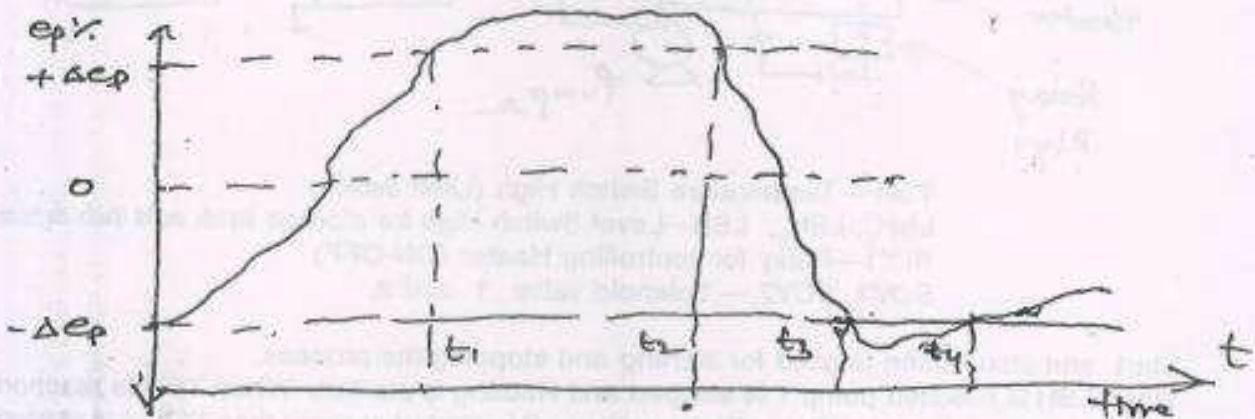
[Total Marks : 100]

- N.B. (1) Question No. 1 is compulsory.  
 (2) Attempt any four questions from remaining six questions.  
 (3) Assume suitable data wherever necessary.

1. Attempt any five. Each Question carries equal marks.

20

- Why Tuning is required in PID controllers ?
- Why PID controllers are not used in feed-forward controllers ?
- Define degrees of freedom. Find Degrees of freedom for Stirred Tank Heater System.
- Why systems with dead time are difficult to control ?
- Develop a feedback control system for STH system.
- For a following graph find the output of Single speed Floating control mode action.



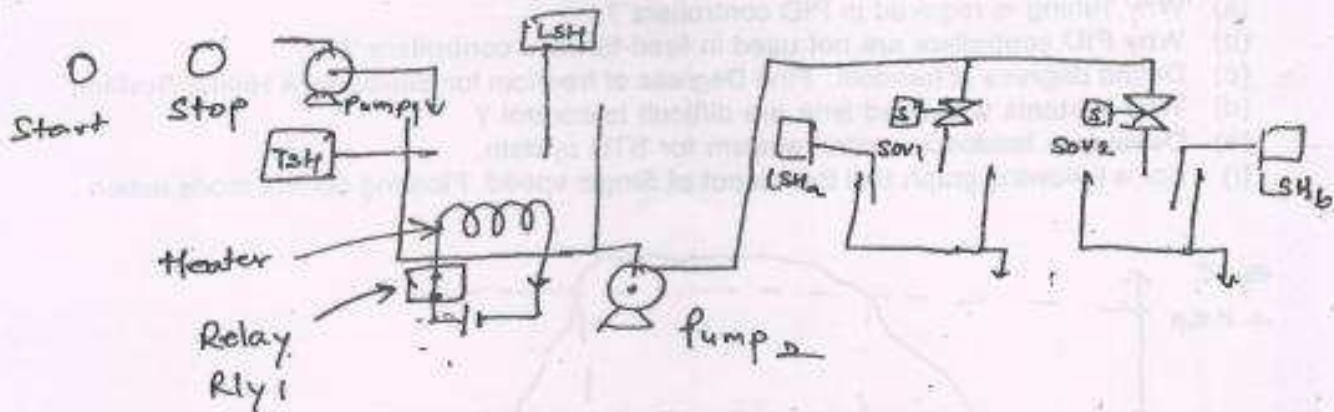
- What are the steps involved in Designing/Selecting Estimator in inferential control ? Why inferential control is used. 19
  - What is Gain Margin and Phase Margin ? Explain Ziegler Nichols method in detail. 10
- A PI controller indicates an o/p of 12 mA when the error is zero. The setpoints is suddenly increased to 14 mA. and controller o/p is recorded and is given below : 10

Time t, sec	0	10	20	30
o/p mA	14	16	18	20

- Prove that proportional controller Introduces offset in the first order process. Consider measurement gain and final control element Gain equal to unity. 10
- Develop a mathematical model for two Tank interacting capacities. 10
    - Develop a Electronic PID controller. 10
  - Explain Inverse Response concept with an example. 10
    - Give an example of Batch process. Explain— 10
      - Recipe
      - Grade
      - Unit.

[ TURN OVER ]

6. (a) Explain Internal Architecture of PLC. Why PC Interface and Real time Clock Circuit is required in PLC ? 10  
 (b) What is the objective of Adaptive Control System ? Explain MRAC system (Model Referenced Adaptive Control) 10
7. (a) Develop a ladder logic program for a following system. 10



TSH— Temperature Switch High (Limit switch)  
 LSH<sub>a</sub>, LSH<sub>b</sub>, LSH—Level Switch High for storage tank and two tanks  
 RLY1—Relay for controlling Heater (ON-OFF)  
 SOV1, SOV2,— Solenoid valve 1 and 2.

Start and stop button is used for starting and stopping the process.

When LSH is reached pump 1 is stopped and Heating is started. When TSH is reached heating is stopped through Relay Rly1 and Pump 2 is started at same time SOV 1 is started when LSH<sub>a</sub> is reached SOV1 is stopped and SOV2 is started when LSH<sub>b</sub> is reached SOV2 and Pump 2 are stopped.

- (b) Explain why cascade control is preferred in CSTR over f/b control system. Draw any two other examples of CSTR. 10

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