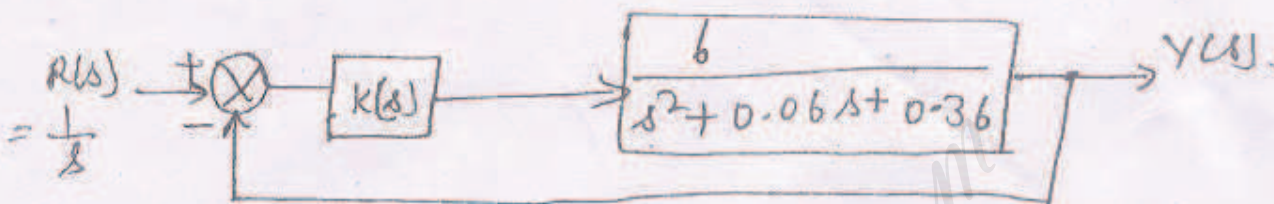


M. S. P. M.

- N.B. (1) Question No. 1 is compulsory.
 (2) Attempt any four questions from the rest.
 (3) Make any suitable assumptions if required.

SEE VIT for Industrial Controllers 14/12/19

1. (a) Explain various type of controlling mode. 10
 (b) Explain proportion band, proportion gain and reset time. 10
2. (a) For a system shown, apply a PD controller to move the poles to the position $S_{1,2} = -1.414 \pm j$. 10



- (b) In a chemical work unit, a process unit gave 5°C offset to a 10% actuator input change, and the open loop time constant was found to be 10 min. It is desired to find a three term controller to ensure no steady state offset to step reference signals, to achieve 5% settling time of less than 20 minute at most and to have only a little overshoot. 10
3. (a) Explain the intergral wind-up and unwinding effect of I controller. Draw the antiwindup circuit and explain it. 10
 (b) Write short note on the issues in implementing PID controller and its solution. 10
4. (a) Explain relay experiment method of PID tuning. Discuss its advantages and disadvantages as compared to sustained oscillation method. 10
 (b) Write short notes on various input and output devices used in PLC. 10
5. (a) Draw a motor control and starter circuit and explain it. 10
 (b) Explain various timer instructions in PLC. 10
6. (a) Write a ladder program for a temp. alarm system— 8
 If the temp. lowers to 32 degrees an alarm sounds and stays on, even if the temp. rises above freezing. The alarm system notifies the green house operator if any freezing condition occurred, required less of the amount of time if lasted. The alarm in turned off only when a push button is pressed.
- (b) An up counter is used in a factory that manufactures inductor coils. The counter controls the number of windings of wire wound around a core. When a 5 millihenry inductor is produced, a lathe makes 400 revolutions to wind the coil. If the machine makes a 10 MH coils the lathe must make 800 turns before stopping. Write and explain a relay ladder program. 12
7. (a) Write short notes on any two :- 10
 (i) Sequencer
 (ii) Shift register
 (iii) Trouble shooting PLC.
- (b) Write short note on special purpose module. 10
8. (a) Explain the addressing technique used in PLC. 10
 (b) Explain various programming languages of PLC with example. 10