

Register Number:

9344

Name of the Candidate:

**M.E. DEGREE EXAMINATION, 2012**

**(PROCESS CONTROL OF PROCESSES)**

**(SECOND SEMESTER)**

**PCIE-205. COMPUTER CONTROL OF PROCESSES**

May)

(Time: 3 Hours

Maximum: 75 Marks

(Maximum: 60 marks for those who joined before 2011-12)

Answer any FIVE questions (5×15=75)

1. a) With an industrial case study, explain how to implement computer control with a neat block diagram.

- b) Find the inverse z transform of

$$F(z) = \frac{z^2(z^2 + z + 1)}{(z - 0.5)(z - 1)(z^2 - z + 0.8)}$$

2. a) Derive the transfer function of zero order hold element.

- b) Derive the sampling theorem and discuss about aliasing.

3. a) Determine the closed loop response of a sampled data control system having transfer function.

$$G_p(n) = \frac{e^{-0.8S}}{0.4S + 1} \text{ using Dahlin's controller with } T=0.2\text{sec.}$$

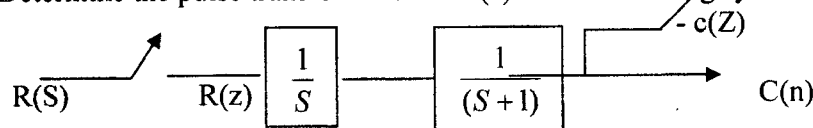
- b) Explain about discrete regulatory control.

4. a) Derive the transfer function of digital PID control.

- b) Explain in detail about antireset windup.

5. a) Imagine a chemical process control problem with dead time. Design a controller which can compensate the dead time.

- b) Determine the pulse transfer function  $G(z)$  of the following system.



6. a) A process fan is to run only when all the following conditions are met

- i) Input 1 is off.
- ii) Input 2 is ON or input 3 is ON or both 2 and 3 are ON.
- iii) Inputs 5 and 6 are both ON.
- iv) One or more of inputs 7,8 or 9 is ON. Realize a ladder logic.

- b) Discuss in detail in what ways relay operation is different from PLC operation.
7. a) Explain in detail about  
i) timers in PLC  
ii) counters in PLC.
- b) Discuss how a PID controller can be realized in PLC.
8. a) Discuss about interlock design principles with relevant examples from industrial problems.
- b) Discuss the various stages involved in the design of computer control of process for a heat exchange system.

\*\*\*\*\*