Code :R7321001 1

III B.Tech II Semester(R07) Regular & Supplementary Examinations, April/May 2011
AUTOMATION OF INDUSTRIAL PROCESSES
(Electronics & Instrumentation Engineering)

Time: 3 hours **Max Marks: 80**

Answer any FIVE questions
All questions carry equal marks

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1. (a) Distinguish between distributed and Hierarchical control systems.
   (b) Explain the feed forward control algorithm with an example.
2. (a) What are the process control requirements of computers. Explain them.
   (b) What are the main advantages and disadvantages of cascade control system? Explain.
3. (a) Write short notes on relative gain frequency.
   (b) Discuss about the selection of controlled variable and the selection of manipulated variable.
4. What are the limitations of Z-transforms? Define modified Z-transform and obtain the modified Z-transform for $G(s) = \frac{1}{(s+2)}$
5. Design a dead beat feed forward control system algorithm with $Gp(Z^{-1}) = \frac{(0.3-Z^{-1})}{(3-Z^{-1})(6-z^{-1})}$ and $Gv(Z^{-1}) = \frac{(Z^{-1})}{(3-Z^{-1})(0.6-z^{-1})}$
6. (a) Explain the difference between model based and multivariable predictive control systems.
   (b) Write the advantages of smart sensors.
7. (a) Determine the relationship necessary for a good inferential control systems.
   (b) Write short notes on intelligent control process.
8. (a) Explain the basic distributed control system with a neat block diagram.
   (b) Write short notes on distributed digital control system software configuration.

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Code :R7321001 **2**

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(Electronics & Instrumentation Engineering)

Time: 3 hours **Max Marks: 80**

Answer any FIVE questions
All questions carry equal marks

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1. (a) Distinguish between batch process and continuous process.
   (b) What are the tasks carried out by each level in the automation hierarchy? Explain briefly.
2. (a) Discuss the principle of "smart transmitter and discuss some aspects of its development in recent years.
   (b) Draw the block diagram and explain how sensors interact with the automated manufacturing process with an example.
3. Draw the schematic diagram of PID controller and explain the tuning of PID controller with a flow chart. Discuss about the noise and differential gain while tuning controllers.
4. (a) Write short notes on zero-order hold(20H) device. Derive its transfer function.
   (b) Discuss briefly about the desirable characteristics of a digital control algorithm.
5. Design a dead beat feed forward control algorithm for the system with $Gp(Z^{-1}) = \frac{(0.9-Z^{-1})}{(4-Z^{-1})(2-z^{-1})}$ and $Gv = \frac{(0.1-Z^{-1})}{(3-Z^{-1})(0.2-z^{-1})}$
6. (a) Distinguish between predictive control and adaptive control.
   (b) Explain the dynamic response of cascades control system with an example.
7. (a) Write short notes on Analytical predictor control.
   (b) Compare AP and SP algorithms with an example.
8. (a) Explain the fundamental requirements of distributed digital control process system.
   (b) What are the features of DCS and explain the advantages of DCS.

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Code :R7321001 **3**

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Time: 3 hours **Max Marks: 80**

Answer any FIVE questions
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1. (a) Explain the features on which MMI depends.
   (b) Give a example of Architecture centralized computer controlled process and explain its advantages a other processes.
2. (a) Draw the block diagram of field bus and explain.
   (b) Discuss how the configuration of distributed control system is performed.
3. Compare and explain the various computer aided control system design methods.
4. (a) Explain the procedure of continuous - time controller to discrete time domain conversion With flow chart.
   (b) Design a Dahlin control process with open loop transfer function Gp(s) = $\frac{(e^{-0.6s})}{(0.2s+1)}$ (Assume T=0.4 seconds).
5. (a) What is dead beat algorithm ? Explain dead beat algorithm for first order system considering dead time.
   (b) Design a dead beat controller for a process whose open loop transfer function is $Gp(s) = \frac{1}{(0.4s+1)}$ (Assume T=0.2 seconds)
6. (a) Discuss about the different communication protocols associated with smart seasons.
   (b) Write about the advantages of smart sensors.
7. (a) Give an example process for dead-time smith predictor and develop a algorithm for the process.
   (b) What are the advantages and disadvantages of dead - time smith predictor.
8. (a) Give as example of distributed digital control system block diagram and explain.
   (b) Distinguish between distributed versus centralized computer control concepts.

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Code :R7321001 4

III B.Tech II Semester(R07) Regular & Supplementary Examinations, April/May 2011
AUTOMATION OF INDUSTRIAL PROCESSES
(Electronics & Instrumentation Engineering)

Time: 3 hours **Max Marks: 80**

Answer any FIVE questions
All questions carry equal marks

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1. (a) Draw the block diagram of a sequential control process and explain with an example.
   (b) Write short notes a MMI Devices.
2. (a) What are the different types of communication protocols associated with smart sensor systems Explain them.
   (b) Give the advantages of smart sensor systems.
3. (a) Explain how the control parameters are set in Ziegler Nicholas controller training method.
   (b) Discuss the basic elements of a computer aided control system design.
4. What is zero- order hold equivalence ? Derive the expression for zero - order hold equivalence.
5. (a) Which feed forward algorithm is used in industrial automation process and justify the reasons.
   (b) What are the various types of feed forward algorithm? Explain the static algorithm with an example.
6. Discuss about the implementation of a cascade control system with an example.
7. (a) What is meant by optimum controller settings? Describe the procedure to controller settings that give minimum ISF.
   (b) Distinguish between inferential control and Intelligent control.
8. (a) Write short notes on DCS software configuration.
   (b) Discuss about any two topologies of most widely used communication network in DCS.

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