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TIC-013

(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 0318Roll No. **B. Tech.****(SEM. VII) EXAMINATION, 2007-08
COMPUTERISED PROCESS CONTROL***Time : 3 Hours]**[Total Marks : 100*

- Note :
- (1) Attempt **all** questions.
 - (2) All questions carry **equal** marks.
 - (3) Be precise in your answer.
 - (4) No second answer book will be provided.

- 1 Attempt any **four** parts of the following :
 - (a) Discuss the main advantages of distributed control system over centralised control system.
 - (b) List the advantages and disadvantages of using computers in a process control.
 - (c) Discuss any one type of very popular distributed control system.
 - (d) Discuss the nature of common applications of computers in the process industries.
 - (e) Explain with the help of block diagram the Computer Supervisory Control.
 - (f) Define a data acquisition system. How is data acquisition performed, explain.

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- 2 Attempt any **four** parts of the following :
- (a) Discuss any practical real-time operating system.
 - (b) What is HART protocol? Explain the functions of the various layers.
 - (c) What is TCP/IP reference model? Elaborate.
 - (d) Discuss Data transfer techniques, comparing one another.
 - (e) What is fully Integrated Control system software? – Explain.
 - (f) Describe functionally PC and XT Bus signals.

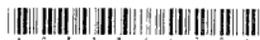
- 3 Attempt any **two** parts of the following :
- (a) A system is described by the following set of state equations :

$$\frac{dx_1}{dt} = f_1 (m_1, m_2, d_1, d_2) \text{ and}$$

$$\frac{dx_2}{dt} = f_2 (m_1, m_2, d_1)$$

Find the degrees of freedom for the system at its dynamic state and steady state. Are they equal? If not, why?

- (b) What are the principal control considerations that affect the scope of mathematical model of a chemical process?
 - (c) What is model validation? Write the most standard method for validation of model.
- 4 Attempt any **two** parts of the following :
- (a) What is Cascade control? How it is different than feedback control?
Give the design criteria for Cascade Control.



- (b) Write all the steps empirically and analytically required to design an inferential controller?
- (c) What do you understand by 'Intelligent Control'? Give an example where either Fuzzy or Neural Network Controller is controlling the plant.
- 5 Attempt any **four** parts of the following :
- (a) What are major input and control variables in thickness and flatness control system for metal rolling?
- (b) Draw and explain the block diagram of temperature control of an electric oven.
- (c) Write about the Instrumentation involved in closed loop control of power generation plant.
- (d) Discuss the implementation issues in control of reheat furnace temperature control system.
- (e) How computer is used in closed loop control of flow in a water tank? Explain by drawing block diagram.
- (f) What on-line functions need to be performed by the software in an automatic thermal power plant?

