[78] SEAT No._____ No. of Printed Pages : 2

SARDAR PATEL UNIVERSITY

T.Y.B.Sc. Examination, SIXTH Semester

Friday, 29TH March 2019

Time : 10.00 am To 1.00 pm

Instrumentation Course Code : US06CINS03

Course Title : Advanced Process Control

Total Marks : 70

Q-1 Write answers to the following multiple choice questions in your answer book by selecting the proper option. [10]

(1) Transfer function of a feedforward controller is a relationship between manipulated and _____ variables.
(a) static (b) dynamic (c) controlled (d) disturbance

(2) When the channels are polled in some particular order, a channel scan ____ is maintained in the memory
(a) log (b) array (c) series (d) list

(3) In predictive control the predicted process dynamic output is ____ the desired dynamic output.
(a) greater than (b) less than (c) equal to (d) less or equal to

(4) In old days (1960s) people were using _____ control for the plant processes.
(a) centralized (b) distributed (c) cascaded (d) optimized

(5) In mathematical modelling the system with distributed parameters are described by ____ differential equations.
(a) non-linear (b) linear (c) quadratic (d) partial

(6) The modern industry makes use of ____ control for the processes.
(a) centralized (b) distributed (c) cascaded (d) optimized

(7) The feedforward control offers large improvements over feedback control for processes that have _____ time constant.
(a) large (b) small (c) zero (d) infinite

(8) In cascade control, the inner loop is also called ____ loop.
(a) secondary (b) primary (c) lower (d) higher

(9) Cascade control is particularly useful when final control element shows ___ behavior.
(a) linear (b) non-linear (c) exponential (d) polynomial

(10) Which one of the following is not an advantage of the Distributed system?
(a) cost effectiveness (b) incremental system growth
(c) lower cost of up gradation (d) higher cost of up gradation

Q-2 Answer the following questions in brief. (Answer any Ten Questions) [20]

(1) What are the requirements of channel scanning and reading of data?
(2) Enlist the basic functions of SCADA systems.
(3) What are the requirements of ideal control methodology?
(4) Provide a list of any four requirements of maintenance engineer.

(PTO)

(5) Draw the block diagram showing decentralized computer control concept.
(6) Write a short note on Model predictive control.
(7) Enlist any four advantages of advanced control.
(8) Write a short note on interrupt scanning.
(9) Enlist the types of communication module.
(10) Enlist the different types of advanced control strategies.
(11) Enlist any four requirements of design engineer.
(12) Draw the block diagram of a basic SCADA system.

Q-3 What is cascade control? Discuss the method for water temperature control in a tank. [10]

OR

Q-3 (a) Discuss the model based control concept in detail. [5]
(b) What is predictive control? Discuss the model based control in detail. [5]

Q-4 (a) Write a note on data processing. [5]
(b) Write a detailed note on channel polling. [5]

OR

Q-4 (a) What is remote terminal unit? Discuss the various modules used in remote terminal unit. [5]
(b) Give an introduction to SCADA. [5]

Q-5 (a) Discuss the concept of distributed and centralized control in detail. [5]
(b) Write a detailed note on advantages of distributed control systems. [5]

OR

Q-5 (a) Write a note on functional requirements of distributed process control system. [5]
(b) Write a note on plant operator's requirements. [5]

Q-6 (a) Define the terms modelling and simulations in detail with the help of necessary equations and diagrams. [5]
(b) Write a note on system modelling. [5]

OR

Q-6 (a) Discuss the uses of system simulations with the help of an example. [5]
(b) Explain how the mathematical model of a plant can be build. [5]

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