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SEAT No. \_\_\_\_\_

SARDAR PATEL UNIVERSITY

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

Saturday, 31<sup>st</sup> March 2018

Time : 10.00 am To 01.00 pm

Instrumentation Course Code : US06CINS03

Course Title : Advanced Control System

No. of Printed Pages : 2

Total Marks : 70

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

- (1) In cascade control, the inner loop is also called \_\_\_\_ loop.  
(a) secondary (b) primary (c) lower (d) higher
- (2) Cascade control is particularly useful when final control element shows \_\_\_\_ behavior.  
(a) linear (b) non-linear (c) exponential (d) polynomial
- (3) The performance of the predictive control system significantly depends on the \_\_\_\_ of the prediction.  
(a) precision (b) accuracy (c) deviation (d) dynamics
- (4) In interrupt scanning, primary facility is provided to check for the \_\_\_\_ of limits in the data scanned.  
(a) variations (b) violations (c) validation (d) visualization
- (5) The data read from the ADC output for various channels is processed by the \_\_\_\_ to carry out limit checking and performance analysis.  
(a) multiplexer (b) microprocessor (c) RTU (d) transmitter
- (6) The modern industry makes use of \_\_\_\_ control for the processes.  
(a) centralized (b) distributed (c) cascaded (d) optimized
- (7) Which one of the following is most suitable as the requirement for a maintenance engineer?  
(a) modular design (b) self-diagnostic facility (c) both (a)&(b) (d) none of these
- (8) Which one of the following is most suitable as the requirement for a manager?  
(a) process dynamics (b) availability of logs (c) both (a)&(b) (d) none of these
- (9) In mathematical modelling non-linear systems are described by non-linear \_\_\_\_ equations.  
(a) differential (b) binomial (c) quadratic (d) partial
- (10) In mathematical modelling the system with distributed parameters are described by \_\_\_\_ differential equations.  
(a) non-linear (b) linear (c) quadratic (d) partial

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

[20]

- (1) Enlist any four advantages of advanced control.
- (2) What are the requirements of ideal control methodology?
- (3) Enlist the different types of advanced control strategies.
- (4) Draw the flowchart for one cycle scan in polling.
- (5) Enlist the basic functions of SCADA systems.
- (6) Draw the block diagram of a basic SCADA system.
- (7) Enlist any four functional requirements of a distributed process control system.
- (8) Provide a list of any four requirements of maintenance engineer.
- (9) Enlist any four requirements of design engineer.
- (10) Enlist the different control strategies used in modern control theory.

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- (11) Enlist any four statistical methods of parameter estimation in a mathematical modelling.
- (12) Enlist any four analytical methods of parameter estimation in a mathematical modelling.

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

OR

- Q-3 (a) Discuss the model based control concept in detail. [5]  
(b) Describe the adaptive control in detail. [5]

- Q-4 (a) What is remote terminal unit? Discuss the various modules used in remote terminal unit. [5]  
(b) Explain how the data read from the output of ADC is converted to equivalent engineering units? [5]

OR

- Q-4 (a) Write a detailed note on channel polling. [5]  
(b) Write a note on special software facilities. [5]

- Q-5 (a) Write a detailed note on advantages of distributed control systems. [5]  
(b) Write a note on maintenance engineer's requirements. [5]

OR

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

- Q-6 (a) Explain how the mathematical model of a plant can be build. [5]  
(b) Define the terms modelling and simulations in detail with the help of necessary equations and diagrams. [5]

OR

- Q-6 (a) Discuss the uses of system simulations with the help of an example. [5]  
(b) Write a note on model evaluation and improvement. [5]



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