

C.U.SHAH UNIVERSITY

Summer Examination-2018

Subject Name : Advanced Process Control

Subject Code : 4TE07APC1

Branch : B.Tech (IC)

Semester : 7

Date : 26/03/2018

Time : 10:30 To 01:30

Marks : 70

Instructions:

- (1) Use of Programmable calculator & any other electronic instrument is prohibited.
 - (2) Instructions written on main answer book are strictly to be obeyed.
 - (3) Draw neat diagrams and figures (if necessary) at right places.
 - (4) Assume suitable data if needed.
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- Q-1 Attempt the following questions: (14)**
- a) Control systems based on these linear methods are generally successful in the process industries because _____. 01
- (a) The control system maintains the process in a small range of operating variables
(b) Many processes are not highly nonlinear
(c) Most control algorithms and designs are not sensitive to reasonable ($\pm 20\%$) model errors due to nonlinearities
(d) All the above
- b) Adjusting of controller gain to achieve the desired control performance is known as _____. 01
- (a) Feedforward (b) Gain scheduling (c) Ratio (d) None of them
- c) Simple integrating system has _____ order and _____ type. 01
- (a) 2 & 0 (b) 1 & 0 (c) 0 & 1 (d) 1 & 1
- d) Implementation issue of a cascade control is/are _____. 01
- (a) Windup in loop (b) Bumpless transfer
(c) Cost is more (d) All of the above
- e) Inner loop of cascade control is also known as _____. 01
- (a) Master (b) Slave (c) Primary (d) Controller
- f) The type 0 system has _____ at the origin. 01
- (a) No pole (b) One pole (c) Simple pole (d) None of the above
- g) Feed forward controller play's an important role in stability of system 01
- (a) True (b) false
- h) Feed forward controller is a _____. 01
- (a) Lead lag compensator (b) An integrator
(c) An differentiator (d) None of the above
- i) In ratio control the stem whose flow is not control is called as 01
- (a) Wild (b) Manipulated (c) Controlled (d) None of these
- j) Cascade control in loop is implemented because _____. 01
- (a) Single-loop control does not provide satisfactory control performance.
(b) A measured secondary variable is available.



- (c) Both a and b
 (d) None of above
 Characteristic such that a given percentage change in stem position produces an 01
- k) equivalent change in flow at constant pressure drop is known as
 (a) Linear (b) Quick opening (c) Equal percentage (d) None of them
- l) Feed forward control cannot eliminate _____. 01
 (a) Disturbance (b) Noise (c) Offset (d) None of them
- m) In non-linear system transfer function _____ with input and time 01
 (a) Constant (b) Vary (c) Can't say (d) None of the above
- n) Impulse response of system is called as _____ of a system. 01
 (a) Transfer function (b) Frequency response
 (c) Delay (d) None of these

Attempt any four questions from Q-2 to Q-8

- Q-2 Attempt all questions (14)**
 a) Explain step analysis method for finding three parameter model (gain, time constant and dead time) with suitable diagram. 10
 b) Give the difference between feedback and feed forward control system. 04
- Q-3 Attempt all questions (14)**
 a) Explain PID controller and explain the procedure of its tuning 07
 b) With the help of diagram explain ratio control and its configuration. 07
- Q-4 Attempt all questions (14)**
 a) Derive mathematical model of first order of system and plot the graph for the same. 07
 b) Explain MPC with the help of diagram. 07
- Q-5 Attempt all questions (14)**
 a) With the help of diagram explain split range control.. 07
 b) Explain in detail the implementation issue, advantages & disadvantages of cascade controller 07
- Q-6 Attempt all questions (14)**
 a) Explain deterministic loop calculation for improving the performance of non linear process. 07
 b) Write a short note on Feedforward control. 07
- Q-7 Attempt all questions (14)**
 a) Give control analysis of a non-linear process with linear feedback control. 07
 b) Explain the control objective for controlling a system. 07
- Q-8 Attempt all questions (14)**
 a) Write a short note on cascade control. 07
 b) Explain improving nonlinear process performance through final element selection. 07

