

Total No. of Questions : 12]

SEAT No. :

P1168

[4659] - 312

[Total No. of Pages : 3

B.E. (Chemical Engineering)

F : COMPUTERAIDED PROCESS CONTROL (Elective - IV)

(2008 Pattern) (Semester - II)

Time : 3 Hours]

[Max. Marks : 100

Instructions to the candidates:

- 1) *Answer three questions from Section - I and three questions from Section - II .*
- 2) *Answers to the two sections should be written in separate answer books.*
- 3) *Neat diagrams must be drawn wherever necessary.*
- 4) *Figures to the right indicate full marks.*
- 5) *Use of logarithmic tables, slide rule, Mollier Charts, electronic pocket calculator and steam table is allowed.*
- 6) *Assume suitable data, if necessary.*

SECTION - I

- Q1)** a) Explain role of digital computer in process control. [6]
- b) With suitable block diagram explain basic components of computer control system. [6]
- c) Write short note on MMI [6]

OR

- Q2)** Explain the following process control architectures - centralized, distributed, heirarchical. [18]

- Q3)** a) Define controllability and observability of MIMO system. State mathematical conditions for the same. [8]
- b) Define RGA for 3×3 system and state its properties. [8]

OR

P.T.O.

Q4) a) How will you design non-interacting control tools for a 2×2 MIMO process? [8]

b) Explain interaction analysis and 100p pairing for a 3×3 system based on RGA analysis. [8]

Q5) a) Explain discretization of continuous time signals with relevant equations. [8]

b) How will you reconstruct original continuous - time signal from its discrete - time version using hold elements (ZOH and FOH) [8]

OR

Q6) a) Derive digital approximations of classical P, PI and PID controllers. [8]

b) Explain Z - domain stability criteria for discrete - time system. [8]

SECTION - II

Q7) a) Explain PC-based data acquisition system. [8]

b) Explain organization of general purpose computer used for process control. [8]

OR

Q8) a) Explain data transfer techniques between computers. [8]

b) Write short note on process control softwares. [8]

Q9) a) Write short note on distributed control system (DCS) [8]

b) Explain basic structure of PLC. [8]

OR

- Q10)** a) Explain integration of DCS With PLC and Computers. [8]
b) Explain communication and networking in DCS. [8]

Q11) Write short notes on the following. [18]

- a) Supervisory control.
b) Distillation column control system.
c) Process decomposition for control purpose.

OR

Q12) Write short notes on the following. [18]

- a) Ladder logic of PLC.
b) Heat exchanger control system.
c) Temporal heirarchy of plantwide control system.

