Total No. of Questions : 12]

SEAT No. :

P1761

[Total No. of Pages : 3

[4859]-123
B.E. (Electronics)
PROCESS AUTOMATION
(2008 Pattern) (Semester - II)

Time : 3 Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) ***Answer Any three questions from each section.***
2) ***Answers to the two sections should be written in separate answer books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Assume suitable data, if necessary.***

SECTION - I

Q1) a) Explain the following control system evaluation criteria. **[6]**

i) Minimum area

ii) Quarter amplitude

b) Explain process control principles with: **[10]**

i) A self regulating Process.

ii) Human Aided control

iii) Automatic Control

OR

Q2) a) Explain with suitable example following process characteristics: **[8]**

i) Process Equation

ii) Process Load

iii) Process lag

iv) Self Regulation

b) What are the different categories of signal? Which signal is widely Used in process Industry? Write standard ranges of signals. **[8]**

P.T.O.

Q3) a) Draw schematics diagram of a PI and PD controller using OPAMPs and explain. **[8]**

b) For a proportional controller the controlled variable is a process temperature with a range of 50ºC to 130ºC and a set point of 73.5ºC. Under nominal condition the set point is maintained with an output of 50%. Find the proportional offset that results from a load change which requires a 55% output if the proportional gain is: **[10]**

i) 0.1

ii) 0.7

iii) 2.0

iv) 5.0

OR

Q4) a) Write down the comparisons of electronic, pneumatic and hydraulic control systems. **[8]**

b) Explain the following discontinuous controller modes: **[10]**

i) Two Position

ii) Three Position.

iii) Single speed floating control

iv) Multiple speed floating control

Q5) What is control valve noise? How it affects performance of control valve? **[16]**

a) Write sources of valve noise

b) Write a note on valve positioner.

OR

Q6) Explain in details following (any three): **[16]**

a) Cavitation and flashing

b) Pneumatic controller

c) Hydraulic controller

d) Valve Sizing

SECTION - II

Q7) a) Explain feed forward control system with suitable example. **[8]**

b) Explain the concept of Model Predictive Control [MPC]. **[8]**

OR

Q8) a) What is ratio control system? Explain direct approach to ratio control with block diagram. **[8]**

b) Why adaptive controllers are needed? Explain programmed adaptive control. **[8]**

Q9) a) Why robotics is need in process industry explain with example? **[8]**

b) Explain the instrumentation scheme for air compressor. **[10]**

OR

Q10)a) Explain feed forward control for the composition of overhead and bottoms product in a distillation column. **[10]**

b) Explain the classification of industrial robots. List various applications of robots. **[8]**

Q11)a) Explain different recorders used in process instrumentation. **[8]**

b) Draw the block diagram of a SCADA and explain the function of each blocks. **[8]**

OR

Q12)a) Write a short notes on: **[10]**

i) Direct Digital Control System.

ii) Supervisory Control System.

b) Explain the role of Control Panels in Process automation. **[6]**