Total No. of Questions : 10]

SEAT No. :

P3626

[Total No. of Pages : 3

[4959] - 1113
B.E. (Electronics)
PROCESS AUTOMATION
(2012 Course) (Semester - II)

Time :2½ Hours] *[Max. Marks :70*

Instructions to the candidates:-

1) ***Answer Q. No. 1 or Q. No. 2, Q. No. 3 or Q. No. 4, Q. No. 5 or Q. No.6, Q. No. 7 or Q. No. 8, and Q. No. 9 or Q. No. 10.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right side indicate full marks.***
4) ***Use of Calculator is allowed.***
5) ***Assume suitable data if necessary.***

Q1) a) Draw the following P&ID symbols. **[5]**

i) Stand alone Instrument

ii) Shared Display or control

iii) Computer Function

iv) Programmable Logic Controller(PLC)

v) Orifice Plate

b) Explain Ziegler Nichol's tuning procedure. State the formulae for three mode Ziegler Nichol's settings. **[5]**

OR

Q2) a) State the equation for a Proportional Derivative (P+D) controller. Draw a circuit diagram for a Proportional Derivative (P+D) mode controller. **[5]**

b) Draw a neat sketch of control valve characteristics and explain the following terms. **[5]**

i) Quick Opening

ii) Linear

iii) Equal Percentage

P.T.O.

Q3) a) Explain the following measures of control system quality. **[4]**

i) Quarter Amplitude Criterion

ii) Minimum Area Criterion.

b) A temperature control system inputs the controlled variable as a range from 0 to 4V.The output is a heater requiring 0 to 8V. A PID controller is to be used with Kp = 2.4 % / %, Ki = 9%/(%-min) , Kd = 0.7 % / (%/min).The period of the fastest expected change is estimated to be 8 seconds. Develop the PID circuit. **[6]**

OR

Q4) a) Explain the following process characteristics. **[4]**

i) Process Equation

ii) Process Load.

b) A proportional derivative controller has a 0.4 to 2.0 V input measurement range, a 0 to 5V output, Kp = 5%/% and Kd = 0.08 % per (%/min).The period of the fastest expected signal change is 1.5 sec. Implement this controller with an op-amp circuit. **[6]**

Q5) a) Explain with neat diagram architecture of a PLC? Give important specifications of a PLC. **[9]**

b) Develop the physical ladder diagram for a motor with the following. NO START button, NC STOP button, thermal overload limit switch opens on high temperature, green light when running, red light for thermal overload. **[8]**

OR

Q6) a) Explain the PLC operation with respect to **[9]**

i) I/O scan mode

ii) Execution mode

iii) Scan time

b) Develop physical ladder diagram for the tank system to satisfy following automation sequence. **[8]**

i) Fill the tank

ii) Heat and stir the liquid for 30 minutes.

iii) Empty the tank

iv) Repeat from step

Q7) a) Explain with neat P&I diagram inferential control scheme for a distillation column. **[9]**

b) Explain with block diagram the concept of Adaptive Control. **[8]**

OR

Q8) a) Write a short note on Fuzzy Logic Control. **[9]**

b) Explain with block diagram the concept of Model Predictive Control. **[8]**

Q9) Write Short notes on

a) Strip Chart recorder **[8]**

b) Direct Digital Control **[8]**

OR

Q10) a) Explain with suitable block diagram architecture of a typical Distributed Control System (DCS) **[8]**

b) State applications of SCADA. Explain the functions of RTU and MTU. **[8]**

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