

Total No. of Questions : 10]

SEAT No. :

P3922

[4958]-1080

[Total No. of Pages : 3

T.E.(Instrumentation)
PROCESS LOOP COMPONENTS
(2012 Pattern)(Semester-II)

Time :2½Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) *Attmept Q 1 or Q 2, Q 3 or Q 4, Q 5 or Q 6, Q 7 or Q 8, Q 9 or Q 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 Level control loop using standard symbols and explain its components in brief. **[8]**
- b) State the features of conventional transmitter. **[2]**

OR

- Q2) a)** Draw P & ID symbols for the following components & also explain the use of each components **[6]**
- i) Air to Close Control valve,
 - ii) High Alarm signal
 - iii) Pressure Indicator and Controller
 - iv) Temperature Transmitter
 - v) Pnenmatic signal line
 - vi) Hydraulic Signal line
- b) Compare transmitters and convertor.(Min 3 comparison points). Give one example for each. **[4]**

- Q3) a)** Explain the following terms related to controller **[8]**
- i) Offset
 - ii) Dead Zone,
 - iii) Rate Action,
 - iv) Proportional Band
- b) Give the limitations of Integral Controller. **[2]**

OR

P.T.O.

Q4) a) Draw and explain the response of Proportional, Integral and Derivative controller for step change in error. [8]

b) Explain tuning of controller? [2]

Q5) a) Explain with following w.r.t. PLC [10]

i) Ladder diagram,

ii) timer,

iii) Scan time,

iv) Rung

v) Watch dog timer

b) Develop physical ladder diagram for a motor with following: [8]

NO start P.B., NC stop PB., thermal over load limit switch opens on high temperature, green light when running and red light for thermal overload. Assume suitable data if required.

OR

Q6) a) Explain block diagram of PLC. Give one example of Analog Input and Digital Output (min 2 each). [10]

b) Compare Relay logic and PLC logic(min 6 comparison points). [8]

Q7) a) List various types of control valve. Draw and explain any one type in detail. [8]

b) Explain w.r.t control valve [8]

i) Yoke

ii) Rangeability

iii) Plug

iv) Travel indicator

OR

Q8) a) Draw and explain fail safe action in level control application-{Air to Open(ATO) and Air to closed(ATC) valve applications}. [8]

b) What do you mean by “Installed characteristics of control valve”? Why they are different than inherent characteristics. [8]

- Q9) a)** Find (a) the valve coefficient (C_v) for a control valve that must allow 150gal. of ethyl alcohol per minute with a specific gravity of 0.8 at maximum pressure of 50 psi and (b) the required valve size in inches. **[8]**

Use following data.

C_v	0.3	3	14	35	55	108	174	400	725
Valve size in inches	0.25	0.5	1	1.5	2	3	4	6	8

- b) Explain high temperature service valves and needle valve. **[8]**

OR

- Q10)a)** Draw and explain Cavitation and Flashing. Draw pressure profile diagram. Also list techniques to reduce it. **[10]**

- b) Explain use of Positioner in control valve and list different selection criteria for control valve. **[6]**

