# 17694

**11819**

**3 Hours / 100 Marks** Seat No. | | | | | | | | |

*Instructions* – (1) All Questions are *Compulsory.*

(2) Illustrate your answers with neat sketches wherever necessary.

(3) Figures to the right indicate full marks.

(4) Assume suitable data, if necessary.

(5) Use of Non-programmable Electronic Pocket Calculator is permissible.

(6) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

**Marks**

**1. Attempt any TEN of the following:** **20**

a) List different controller modes.

b) List two examples of PI controller.

c) State two advantages of PID controller.

d) State applications of PLC. (any two)

e) List any two analog inputs of PLC.

f) State the need of HMI in SCADA.

g) List any two digital outputs of PLC.

h) Explain proportional control mode.

i) List standard electrical signals used for analog input.

j) List different types of memories used in PLC.

k) State two disadvantages of PLC.

**Marks**

l) List two applications of ON-OFF controller.

m) Give any one function of

(i) Push button

(ii) Selector switch

n) List two limitations of PI controller.

**2. Attempt any FOUR of the following:** **16**

a) Explain the working of proximity switch.

b) Define relay? State working principle of electromagnetic relay.

c) Explain in brief the concept of ON-OFF controller.

d) State the difference between ROM and RAM.

e) Explain in brief the on delay timer of PLC.

f) Draw schematic of solenoid valves and explain its working.

**3. Attempt any FOUR of the following:** **16**

a) Draw neat block diagram of the PLC. Describe the function of each block.

b) Develop a ladder diagram for single lamp controlled by two switches.

c) Draw the block diagram of PLC power supplies and explain function of each block.

d) Explain the timer module of PLC.

e) Draw the ladder diagram for following Boolean expression.

$$Y = (A + B) \bullet (C + D)$$

f) Give the functions of below mentioned memory units in PLC.

(i) PROM

(ii) EPROM

(iii) EEPROM

(iv) RAM

**Marks**

**4. Attempt any FOUR of the following:** **16**

a) Draw the ladder diagram for the following table:

Inputs : I1, I2 and outputs : Q1, Q2.

| I1 | I2 | Q1 | Q2 |
|---|---|---|---|
| 0 | 0 | 1 | 0 |
| 0 | 1 | 0 | 1 |
| 1 | 0 | 0 | 1 |
| 1 | 1 | 1 | 0 |

b) Draw and explain standard start - stop - seal circuit.

c) Explain the selection criteria for PLC I/o modules.

d) List the functions of I/o modules.

e) Draw the ladder diagram for the following:

(i) When START button is pressed system starts and when STOP button is pressed system stops.

(ii) Motor M1 start when system starts and stops after 10 sec.

(iii) Motor M2 starts when M1 is OFF and stops after 20 sec.

f) Draw ladder diagram for simple logic operation.

$Y = (A \cdot \overline{B} + \overline{A} \cdot B)$

**5. Attempt any FOUR of the following:** **16**

a) Draw the block diagram of SCADA hardware and explain function of each components.

b) Explain use of SCADA in Rail monitoring and control.

c) Define Topology. Explain any two network topologies protocols.

d) Compare RS 232 and RS 485 (four points)

e) Define SCADA? State its two applications.

f) Explain concept of broadcast network.

**Marks**

**6. Attempt any FOUR of the following:** **16**

a) Explain 7 layers of OSI model and their functions.

b) Compare client / server network and point to point network (any four points)

c) Explain advantages and disadvantages of SCADA system.

d) Explain PI control action. State its equation.

e) State the difference between standards and protocols.

f) Draw the ladder diagram to control the temperature of oven. (Assume suitable data)

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