22534

12223

3 Hours / 70 Marks Seat No. | | | | | | | | |

Instructions : (1) All Questions are *compulsory.*

(2) Answer each next main Question on a new page.

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

(4) Figures to the right indicate full marks.

(5) Assume suitable data, if necessary.

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

Marks

1. Attempt any FIVE of the following : **10**

(a) State the need of automation.

(b) List the different types of PLC.

(c) State the redundancy in PLC.

(d) Write any four name of PLC programming languages.

(e) State PLC I/o addressing.

(f) State the characteristics of electric drives.

(g) State the benefits of SCADA.

2. Attempt any THREE of the following : **12**

(a) Explain various types of automation system.

(b) Explain with a neat block diagram the working principle of PLC.

(c) Explain memory organization of PLC with diagram.

(d) Explain Time on delay instruction with symbol & waveform.

3. Attempt any THREE of the following : **12**

(a) Give the names of any four analog input and analog output devices.

(b) Explain with neat block diagram, the function of each block of electrical drives.

(c) State different tools of automation system. Explain any one in brief.

(d) Explain any two data handling instruction with symbol.

4. Attempt any THREE of the following : **12**

(a) Explain with neat block diagram of SCADA.

(b) Explain significance of OPC in SCADA based application.

(c) Explain any four special I/o modules of PLC.

(d) Compare AC and DC drives on any four points.

(e) Compare PLC and SCADA system. (four point)

5. Attempt any TWO of the following : **12**

(a) Describe the speed control of AC motor using VFD (Variable Frequency Drive)

(b) Develop ladder program for following :

(i) $Q = A + \bar{B} + C\bar{D}$

(ii) Ex-NOR logic gate

(iii) NOT logic gate

(c) Sketch the interfacing diagram (wiring diagram) for following I/o devices with appropriate PLC module :

(i) Proximity sensor – 24 V DC

(ii) Limit switch

(iii) Level switch

(iv) Lamp – 24 V DC

(v) Fan – 230 V AC

(vi) Heater – 230 V AC

6. **Attempt any TWO of the following :** **12**

(a) Describe the steps to develop SCADA application for traffic light control.

(b) Develop ladder program for following conveyor system :

(i) When start push button is pressed, the conveyor A and B carrying objects starts after 10 seconds.

(ii) Conveyor A and B stops when total object count equals to 50 number.

(iii) Use suitable sensors to detect object over conveyor A and B.

(c) Develop ladder program for following Boolean expression :

$AB + \bar{C}D + E = Y_1$

$FGH + I\bar{J} = Y_2$

$Y_1 + Y_2 = Q$
