22534

24225

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

(7) 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) Draw neat diagram of automation triangle.

(b) List different types of PLC.

(c) State the I/O module selection criteria with respect to PLC.

(d) Write any four PLC programming languages.

(e) State PLC I/O addressing.

(f) Give features of electric drive.

(g) List any four applications of SCADA.

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

(a) Compare fixed and flexible automation on any four points.

(b) Draw & explain block diagram of PLC.

(c) Describe power supply of PLC with neat labelled diagram.

(d) Draw symbol of OFF delay timer instruction & state the function of

(i) Enable bit

(ii) Done bit

(iii) Timer timing bit

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

(a) Draw neat wiring diagram of following I/O devices with appropriate PLC module :

(i) Limit switch – 24 V DC

(ii) Motor – 230 V AC

(iii) Inductive Proximity Sensor – 24 V DC

(iv) Fan – 230 V AC

(b) Compare AC and DC drive.

(c) Develop Ladder diagram for blinking LED with 2 sec ON & 3 sec OFF time.

(d) Draw block diagram of SCADA system and explain its parts.

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

(a) Compare PLC and SCADA. (Any four points)

(b) Describe different systems for Industrial Automation.

(c) Draw and describe any four arithmetic instructions used in PLC.

(d) Describe discrete I/P module with neat block diagram.

(e) Explain V/F control method of AC drive.

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

(a) Draw general block diagram of electric drives & explain its working.

(b) Sort following Input and Output devices into discrete I/P, discrete O/P, analog I/P and analog O/P.

(i) Motor

(ii) Sensor (Magnetic)

(iii) Relay

(iv) Thermocouple

(v) Neon Bulb

(vi) Solenoid valve

(vii) Temp. sensor

(viii) Alarm

(ix) Push Button

(x) Microphone

(xi) Fan

(xii) LCD

(c) Develop Ladder diagram for

(i) EX-OR gate

(ii) $y = \sqrt{AB + C + \overline{D}}$

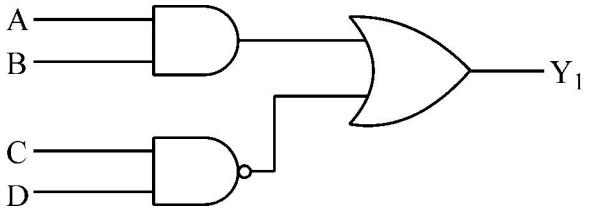
(iii) Half Adder

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

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

(b) Develop Ladder diagram for following :

(i)



(ii)

A	**B**	**C**	**Y_2**
1	0	1	1
1	1	0	1
0	1	1	1

(iii) $Q = \overline{y_1 + y_2}$

(c) Explain four quadrant operation of an electric drive used for driving a hoist load.
