22585

12425

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

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

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

(3) Illustrate your answer 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 any two advantages of Automation.

b) List the types of Comparison instructions used in PLC.

c) State the use of HMI.

d) Draw the symbol of the following:

i) Push button

ii) Limit switch

iii) Proximity switch

iv) Pressure switch.

e) Explain following terms with respect to PLC:

i) Scan time

ii) Speed of execution.

f) Draw block diagram of PLC.

g) State the functions of seal in circuit w.r.t. PLC.

Marks

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

a) State selection criteria of PLC.

b) Explain type of digital control used in automation with suitable example.

c) Draw a symbol of ON delay timer instruction. State the function of the following:

i) Enable bit

ii) Done bit

iii) Timer timing bit.

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

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

a) Explain redundancy in PLC with suitable diagram.

b) Draw and explain Master terminal unit (MTU) in SCADA system.

c) Explain PLC programming scan cycle.

d) Describe automation hierarchy in detail.

e) Draw ladder diagram of ON/OFF temperature control.

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

a) Differentiate Fixed and Programmable automation with respect to:

i) Initial investment

ii) Production rate

iii) Flexibility

iv) Example.

b) Explain any four data handling instruction used in PLC.

c) Draw block diagram of DC discrete input module. State function of threshold detector and optical isolator.

Marks

d) Explain concept of sinking and sourcing in PLC.

e) Design a ladder diagram for following conditions: (V3 is a manual valves) –

i) Valve V1 and V2 are ON together for 10s when START push button is pressed

ii) Then motor M1 will start for 10s.

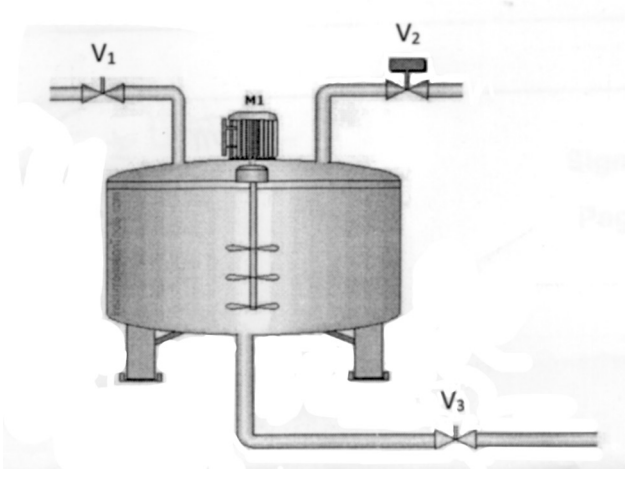

Fig. No. 1

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

a) Explain count up (CTU) instruction with timing diagram.

b) Describe the steps involved in interfacing of PLC based application to a SCADA System.

c) Write a ladder diagram program of water bottle filling plant for following conditions:

i) ON button starts motor M1 of conveyer belt having empty bottles.

ii) Sensor S1 detects bottle and stops conveyer for 10s for filling of bottle through valve V1.

iii) Sensor S2 detects filled bottle, stops conveyer, starts motor M2 for 5s to seal the bottle.

iv) STOP button is Emergency stop button.

Marks

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

a) State the types of programming languages and explain any two.

b) Develop a ladder diagram program for moving the stepper motor in forward and reverse direction.

c) Discriminate following components as input and output devices of PLC

i) Limit switch

ii) Push button

iii) Siren

iv) Proximity sensor

v) Contractor

vi) Solenoid valve.