22526

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.

(8) Use of steam tables, logarithmic, Mollier's chart is permitted.

Marks

SECTION-I

1. Attempt any FIVE : **5 × 2 = 10**

(a) State the need of automation.

(b) Draw only block diagram of PLC.

(c) Draw a ladder diagram to ON a lamp if either switch A or switch B is actuated.

(d) Give list of any four relay type instructions with their symbols.

(e) State the three traffic control signals with their use.

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

(g) List the functions of Data acquisition in SCADA system.

2. Attempt any THREE : **3 × 4 = 12**

(a) Draw ladder diagram for stepper motor in clockwise direction.

(b) Describe the working of Proportional-Integral Derivatives (PID) controller.

(c) Describe the operation of solid state relay with neat diagram.

(d) Draw ladder diagram for OR & AND gate.

3. Attempt any THREE : **3 × 4 = 12**

(a) List any two advantages & any two disadvantages of PLC.

(b) Explain block diagram of SCADA. Identify different components of it.

(c) Write the ladder program for 24 hour clock.

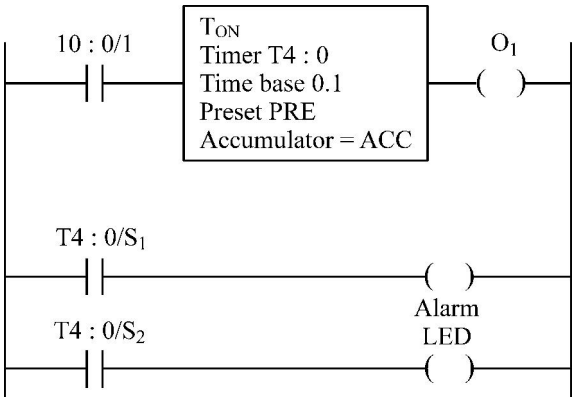
(d) Explain with block diagram, the working of soft starter.

SECTION-II

4. Attempt any THREE : **3 × 4 = 12**

(a) Develop power & control circuit diagram to control forward & reverse motion of 3ϕ Induction motor.

(b) In the given ladder diagram, the alarm is ON for 10 sec. After 10 sec. the LED is ON. What will be the value of PRE & what are S_1, S_2 & O_1 bits ?



(c) State the functions of PLC memory w.r.t. types, speed of execution.

(d) Develop ladder diagram for following sequences :

(i) When NO START PB is pressed Motor M_1 starts & after 10 seconds Motor M_2 starts.

(ii) When NC STOP, PB is pressed both motor M_1, M_2 stops immediately.

(e) List the different applications of DCS (Distributed Control System) system.

5. Attempt any TWO : **2 × 6 = 12**

(a) Explain the working of PLC based bottle filling system with the help of ladder diagram.

(b) Develop control & power circuit diagram of hoist control & mill.

(c) Draw block diagram of analog input module of PLC. State function of each block.

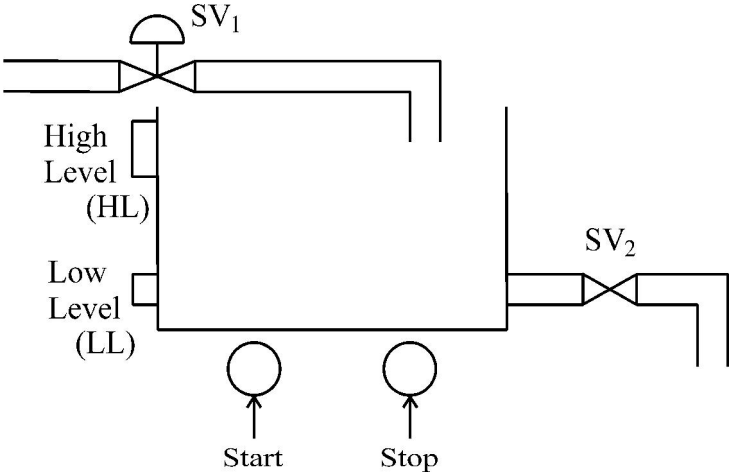
6. Attempt any TWO : **2 × 6 = 12**

(a) Describe the PLC based water level controller.

(i) When start button is pressed process starts, when stop button is pressed process stops ?

(ii) If level is low, SV_1 is open & SV_2 is closed.

(iii) When level is high, SV_1 is closed & SV_2 is open.



(b) Explain the instruction T_{ON} & T_{OFF} with timing diagram.

(c) Discuss proximity sensor with its four applications.
