

22384

22232

3 Hours / 70 Marks

Seat No.

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- 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 :

5 × 2 = 10

- (a) State needs of industrial automation systems (any 4 points).
- (b) List any four default data files present in the PLC memory.
- (c) Give classification of Input module of PLC.
- (d) Define Automation.
- (e) List any four parameters considered while installing the PLC.
- (f) List any four specialty I/O modules used with PLC.
- (g) Write any four comparison instructions.

2. Attempt any THREE of the following :

3 × 4 = 12

- (a) Compare fixed and flexible automation types (any 4 points).
- (b) Classify modular PLC and explain its types.



- (c) Explain the sinking & sourcing concept in PLC input output module with neat sketches.
- (d) Explain power supply block diagram of PLC with a neat sketch .

3. Attempt any THREE of the following :

3 × 4 = 12

- (a) Write functions of following w.r.t. PLC :
 - (i) Power supply, (ii) CPU
- (b) List arithmetic instructions along with their symbols used in ladder programming.
- (c) Describe the working of the UP counter with a neat diagram and waveform.
- (d) The industrial process is controlled by the PLC system and if the PLC system fails, then, is there any option available to take over the control of the process without any break ? If yes, then explain that system.

4. Attempt any THREE of the following :

3 × 4 = 12

- (a) Explain the scanning cycle in PLC.
- (b) Draw PLC ladder diagram for :
 - (i) $Y = (A + B) (C + DE)$
 - (ii) $Y = AB + C (D + E) + CD$
- (c) Draw a neat wiring diagram (interfacing diagram) of following I/O devices with appropriate PLC module :
 - (i) Motor – 24 VDC
 - (ii) Limit switch
- (d) Choose the appropriate timer which holds on the accumulated time even if the prior condition goes false and continue timing after condition resumes. Show with example and waveform.
- (e) Compare Mitsubishi and Siemens micro-PLCs on the basis of any four points.

5. Attempt any TWO of the following :**2 × 6 = 12**

- (a) Draw a ladder diagram for Stepper motor control in clockwise direction.
- (b) Draw a ladder diagram for
 - (i) 3 input AND gate
 - (ii) 2 input EX-OR gate
- (c) Draw a neat block diagram of Discrete input module & describe the functions of each block.

6. Attempt any TWO of the following :**2 × 6 = 12**

- (a) Draw and explain Analog scaling instruction used in PLC.
 - (b) Write a PLC program for a 24-hour time clock.
 - (c) Draw PLC ladder diagram for 1:4 demultiplexer.
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