

17664

16172

3 Hours / 100 Marks

Seat No.

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- Instructions :**
- (1) All Questions are *compulsory*.
 - (2) Illustrate your answers with neat sketches wherever necessary.
 - (3) Figures to the right indicate full marks.
 - (4) Assume suitable data, if necessary.
 - (5) Use of Non-programmable Electronic Pocket Calculator is permissible.
 - (6) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

1. (A) Attempt any THREE : **12**

- (a) State any three different tools used for automation.
- (b) Draw labelled diagram of AC input module.
- (c) Differentiate Relay based system & PLC control system. (any four points)
- (d) Draw the functional block diagram of PLC.

(B) Attempt any ONE : **6**

- (a) Classify PLC types. Explain each type in brief.
- (b) Explain output device addressing in PLC with example.

2. Attempt any TWO :**16**

- (a) Draw ladder diagram 1 : 4 for demultiplexer.
- (b) Draw the electrical and ladder diagram for following logic gates :
 - (i) NOR gate
 - (ii) NAND gate
 - (iii) EX-OR gate
 - (iv) OR gate
- (c) List any four logical instructions of PLC. Write ladder diagram for $y = \sqrt{(A \cdot B) + C}$.

3. Attempt any FOUR :**16**

- (a) Draw the sinking type and sourcing type DC input module.
- (b) State the following with respect to P.L.C. installation :
 - (i) Noise Suppression techniques
 - (ii) Grounding requirement
- (c) What are the addressing modes used in PLC programming ? Illustrate with example.
- (d) Explain criterion for I/O module selection.
- (e) Draw block diagram of DC O/P module.

4. (A) Attempt any THREE :**12**

- (a) What are the different redundancy modules used in P.L.C ?
- (b) Draw the ladder diagram for 4 : 1 line multiplexer.
- (c) Draw the timing diagram of TON timer showing status of DN bit, TT bit, & EN bit.
- (d) Explain need of Automation.

(B) Attempt any ONE :**6**

- (a) Classify the following instructions into input and output instructions with respect to PLC :

(1) CTU

(2) CTD

(3) —| |—

(4) —()—

(5) —(L)—

(6) —(GET)—

(7) —(PUT)—

- (b) Draw analog output module. State function of each block.

5. Attempt any TWO :**16**

- (a) State different P.L.C. programming languages used. Illustrate with one example.
- (b) Draw block diagram of analog input module. Explain each block in detail.
- (c) Draw ladder diagram for stepper motor control in clockwise direction.

P.T.O.

6. Attempt any FOUR :**16**

- (a) Draw the block diagram of thermocouple module.
 - (b) Draw block diagram of AC O/P module. Explain it.
 - (c) Explain any four maintenance guidelines for PLC.
 - (d) List arithmetic instruction of PLC. Explain any one instruction with example.
 - (e) Illustrate fault detection techniques for LED status of input and output module.
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