

# 315355

**12526**

**3 Hours / 70 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) 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 the need of automation.
  - b) List the types of automation system.
  - c) Define scan time of PLC.
  - d) Draw the block diagram of PLC.
  - e) List any two PLC Relay based instruction.
  - f) List any two data handling instructions of PLC.
  - g) Define SCADA.

P.T.O.

2. Attempt any THREE of the following : 12
- Draw automation hierarchy and explain each level in brief.
  - Give four examples of typical discrete output devices.
  - State the rules for ladder logic programming
  - List comparison instructions of PLC. Explain any one instruction with example.
3. Attempt any THREE of the following : 12
- Compare conventional relay based control with PLC control.
  - Draw ladder diagram for NOR and NAND operations.
  - Explain ON delay timer with timing diagram.
  - Draw generalized block diagram of DCS. Explain data highway.
4. Attempt any THREE of the following : 12
- Define hybrid control system. Explain in brief.
  - Draw the block diagram of AC input module.
  - Explain PLC I/O Addressing format.
  - Develop a ladder logic program for the following Boolean expression  
$$Y = (A+B) (C+D)$$
  - Draw a neat wiring diagram of following I/O devices with appropriate PLC module:
    - Push button – 24 VDC
    - Solenoid valve – 230 VAC
    - Motor – 230 VAC
    - Level switch – 24 VDC

315355

[ 3 ]

**Marks**

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

- a) Develop a ladder logic diagram for a bottle filling system. Assume suitable system design for the same.
- b) Draw the block diagram of SCADA system and explain the function of each block in brief.
- c) State different communication protocols used in Industrial Automation. Explain any one.

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

- a) Explain with diagram, sourcing and sinking connections.
  - b) List different PLC programming Languages. Explain with one suitable example each.
  - c) Explain counter instructions used in PLC programming with symbol.
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