

22534

23242

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.

Marks

1. Attempt any FIVE of the following :

10

- (a) List any four industrial automation systems.
- (b) State various specialty I/O modules of PLC.
- (c) List any two data handling instructions of PLC.
- (d) Draw block diagram of electric drive.
- (e) List any four editors of SCADA system.
- (f) Define (i) Tags (ii) Trends with respect to SCADA.
- (g) Classify the following instructions into input and output instruction with respect to PLC : (i) Normally open (NO) (ii) Timer on delay (TON) (iii) Count Down (CTD) (iv) Reset (RES).

2. Attempt any THREE of the following :

12

- (a) Compare conventional relay based control with PLC control.
- (b) Explain the function of CPU and memory along with neat block diagram of PLC.
- (c) List comparison instructions of PLC. Explain any one instruction with example.
- (d) Compare AC drives with DC drives.

3. Attempt any THREE of the following :

12

- (a) Explain different types of automation.
- (b) Compare PLC with SCADA (any four points).
- (c) Give I/O module selection criteria for PLC.
- (d) Develop a ladder diagram in which two lights are flashed alternately every 5 seconds.



- 4. Attempt any THREE of the following :** **12**
- (a) State any four redundancy modules used in PLC.
 - (b) Draw the ladder diagram for following logic gates :
 - (i) OR gate
 - (ii) NAND gate
 - (iii) NOT gate
 - (iv) XOR gate
 - (c) Draw the timing diagram of TON timer showing status of DN bit, TT bit and EN bit.
 - (d) Explain V/F control method of AC drives with suitable example.
 - (e) Draw block diagram of SCADA and explain its parts.
- 5. Attempt any TWO of the following :** **12**
- (a) Draw block diagram of an AC discrete input module. State common ratings for discrete I/O interface modules.
 - (b) Design a ladder diagram that will control stepper motor so that it moves 10 steps forward, waits for 20 seconds and then causes the motor to move 10 steps in reverse direction.
 - (c) Explain four quadrant operation of an electric drive driving a hoist load.
- 6. Attempt any TWO of the following :** **12**
- (a) Develop a ladder program for Traffic light control system with following conditions :
 - (i) Red light ON for 30 sec.
 - (ii) Green light ON for 25 sec
 - (iii) Yellow light ON for 5 sec
 - (iv) Repeat the sequence until stop push button is pressed.
 - (b) List any two logical instructions of PLC. Write ladder diagram for $Y = \sqrt{(A \cdot B) + C}$.
 - (c) Assume suitable PLC and SCADA software and state the steps to develop SCADA application.
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