

22534

23124

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) 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) Give two benefits of automation in industry.
- (b) List any two advantage of PLC over conventional relay logic.
- (c) Enlist the different types of PLC.
- (d) List any four name of PLC programming languages.
- (e) Draw PLC I/O addressing format.
- (f) State the need of electric drives.
- (g) List any two functions of SCADA.

2. Attempt any THREE of the following :

12

- (a) Compare fixed and flexible automation on any four points.



- (b) Explain with neat block diagram the working principle of PLC.
- (c) Compare fixed and modular PLC on any 4 points.
- (d) Explain 'Down counter' instruction with symbol and waveform.

3. Attempt any THREE of the following :

12

- (a) Draw a neat wiring diagram of following I/O devices with appropriate PLC module :
 - (i) Push button – 24 VDC
 - (ii) Solenoid valve – 230 VAC
 - (iii) Motor – 230 VAC
 - (iv) Level switch – 24 VDC
- (b) Compare A.C. and D.C. drives on any four points.
- (c) State different systems for industrial automation. Explain any one in brief.
- (d) Draw ladder diagram symbol with proper addressing for following instructions :
 - (i) masked move
 - (ii) T_{off} timer

4. Attempt any THREE of the following :

12

- (a) Draw typical architecture of SCADA. Explain its parts.
- (b) Compare PLC and SCADA system (four points).
- (c) Draw memory organization of PLC. Explain function of any two element of memory organization.
- (d) Explain (V/F) control method of A.C. drives with suitable diagram.
- (e) Explain how SCADA is used in water distribution system with diagram.

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

- (a) Draw general block diagram of electric drive and explain with specifications.
- (b) Develop the ladder program for following logic gates :
 - (i) Ex-OR
 - (ii) NOR
 - (iii) OR
- (c) Sort out following Input Output devices into discrete input device, discrete output device, analog input device, analog output device :
 - (i) Motor
 - (ii) Proximity switch
 - (iii) Relay
 - (iv) Thermocouple
 - (v) Indicator lights
 - (vi) Solenoid valve
 - (vii) Temperature sensor
 - (viii) Buzzer
 - (ix) Push button
 - (x) Graphical display
 - (xi) Spray Brush
 - (xii) Microphone

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

- (a) Draw SCADA screen of water distribution application. List various dynamic animation linkage.

- (b) Develop ladder program for tank level control system.

The event sequence is :

- (i) START the pump
 - (ii) FILL the tank first
 - (iii) When tank first is full START to fill tank second.
 - (iv) When both tanks are full, light indicator 'ON'.
 - (v) STOP the pump
- (c) Develop ladder program for following Boolean expression :

$$\bar{A} \cdot (B + C \cdot D) \cdot E \cdot F = Y_1$$

$$(G \cdot \bar{H} \cdot I) + J = Y_2$$

$$Y_1 \cdot Y_2 = Q$$
