

22526

21222

3 Hours / 70 Marks

Seat No.

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15 minutes extra for each hour

- 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 :

5 × 2 = 10

- (a) Explain the function of Push button and limit switch used in control circuit.
- (b) Distinguish between two wire and three wire control.
- (c) Draw the symbols of following component used in industrial control circuit :
 - (i) ON/OFF push button
 - (ii) OLR Control contact
- (d) Draw the block diagram of PLC in detail.
- (e) State the use of Human Machine Interface.
- (f) Draw the ladder program for verifying the AND and OR Logic gates.
- (g) State the function of seal in circuit with respect to PLC.

2. Attempt any THREE of the following :

3 × 4 = 12

- (a) Explain the concept of control and power circuit diagram using DOL starter.
- (b) Explain the block diagram and function of each part in PID controller.
- (c) Draw the symbols of following relay type inspections :
 - (i) IF – OPEN
 - (ii) IF – CLOSE
- (d) Develop a PLC Ladder Logic of DOL starter with OLR contact.

- 3. Attempt any THREE of the following :** **3 × 4 = 12**
- (a) Develop the control circuit for Star/Delta starter using timer, for starting of a 3 ϕ Induction motor.
 - (b) Draw block diagram of Analog Input–Output module of PLC with its specification.
 - (c) Classify timers of PLC and explain T_{ON} timer in detail.
 - (d) Develop the Ladder Logic program for Forward-Reverse control of 3 ϕ induction motor.
- 4. Attempt any THREE of the following :** **3 × 4 = 12**
- (a) Explain the working of Soft starter with block diagram.
 - (b) Draw block diagram of Digital Input/Output module of PLC with its specification.
 - (c) Classify counter of PLC and explain any one counter function in detail.
 - (d) State the function of Latching relay using PLC.
 - (e) Explain block diagram of SCADA. Identify different components of it.
- 5. Attempt any TWO of the following :** **2 × 6 = 12**
- (a) Develop control and power circuit for lifting magnet used as a material handling equipment.
 - (b) Explain the block diagram and function of each part in communication module.
 - (c) Develop the PLC Ladder Logic for stepper motor control.
- 6. Attempt any TWO of the following :** **2 × 6 = 12**
- (a) Describe a generalised DCS architecture.
 - (b) Draw Ladder diagram for two Motor system with following conditions :
 - (i) Starting push-button starts Motor-1.
 - (ii) After 10 sec. Motor-2 is ON.
 - (iii) Stopping switch stops motor 1 and 2.
 - (c) Develop the PLC Ladder Logic for water level controller.
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