

22534

**11920**

**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) State the need of Automation.
- (b) Draw a neat block diagram of PLC power supply.
- (c) State the I/O module selection criteria with respect to PLC.
- (d) List the types of comparison instruction used in PLC.
- (e) Give any two relay type instructions with their symbols.
- (f) State the need of electric drives.
- (g) List any four applications of SCADA.

**2. Attempt any THREE of the following :**

**12**

- (a) Compare fixed and programmable automation on any four points.
- (b) Explain redundancy in PLC with suitable diagram.
- (c) Draw a neat block diagram of PLC and explain the function of CPU and memory.
- (d) Draw a symbol of OFF delay timer instruction. State the function of following :
  - (i) Enable bit
  - (ii) Done bit
  - (iii) Timer timing bit

- 3. Attempt any THREE of the following : 12**
- (a) State the function of each block of analog output module with block diagram.
  - (b) Draw a basic block diagram of electrical drive and explain each block in brief.
  - (c) Compare PLC and SCADA on any four points.
  - (d) Explain any four data handling instruction used in PLC.
- 4. Attempt any THREE of the following : 12**
- (a) Draw block diagram of SCADA system and explain its parts.
  - (b) Describe the steps involved in interfacing of PLC based application to a SCADA system.
  - (c) Describe memory organisation of PLC with neat sketch.
  - (d) Explain (V/f) control method of AC drive with suitable diagram.
  - (e) Explain how SCADA is used in water distribution system with diagram.
- 5. Attempt any TWO of the following : 12**
- (a) Select device that can be used with PLC to control the speed of DC motor. Explain how.
  - (b) Draw ladder diagram for stepper motor control in clockwise direction.
  - (c) Explain special I/O modules used in PLC.
- 6. Attempt any TWO of the following : 12**
- (a) Describe the steps involve developing SCADA application with an simple system.
  - (b) State the types of programming languages and explain any two.
  - (c) Draw a ladder diagram for a two motor system having following condition :
    - (i) Start push button, starts motor M1.
    - (ii) After 10 sec, motor M1 is OFF and motor M2 is ON.
    - (iii) After 5 sec motor M2 is OFF.
    - (iv) STOP push button, stop both motors M1 and M2 if pressed any time during process.
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