23124

3 Hours / 70 Marks Seat No.

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 need of industrial automation.

b) Enlist types of automation.

c) List any four output devices used for PLC.

d) Explain concept of sinking with neat sketch.

e) Define and explain : scan cycle.

f) Write PLC program for AND gate.

g) List any four benefits of SCADA.

2. Attempt any THREE of the following : 12

a) Explain types of digital control used in automation with suitable example.

b) Classify PLC. Also write criterion for selection of PLC for specific application.

c) Explain FBD and SFC PLC programming language with suitable example.

d) Draw function block diagram of ON-delay timer. Give function of done (DN), enable (EN) and timers time (TT) bit of timer.

P.T.O.

3. **Attempt any THREE of the following :** 12

   a) List types of automation and compare them (Any 3 points)

   b) Draw and explain memory organisation of PLC.

   c) Write and explain logical addressing format for input output in PLC.

   d) Write ladder program for traffic light control system with following conditions.

      i) Red and green light ON for 35 sec each.

      ii) Yellow light ON for 5 sec as soon as red light is OFF.

      iii) Green light is ON as soon as Yellow light is OFF.

      iv) The process continues until OFF button is pressed.

   e) List the types of SCADA. Explain any two types in detail.

4. **Attempt any THREE of the following :** 12

   a) State need of PLC over Hardwired relay logic. Also write any two benefits and two limitations of PLC in industrial automation.

   b) List any four input devices used with PLC also write their functions.

   c) List Do's and Dont's for PLC installation.

   d) A coal handling plant has three coal conveyor C_1, C_2 and C_3. C_1 is fed from output of crusher, C_2 is mid belt and C_3 push coal to bunker. The requirements of plant are as follows :

      i) C_1 and C_2 will be ON only when C_3 is ON.

      ii) C_1 is ON only when C_2 and C_3 is ON.

      iii) C_1 and C_2 trips when C_3 trips

      iv) C_1 trips when C_2 trips but C_3 is ON

      v) C_1 trips when C_2 and C_3 trips.

      Design ladder diagram for above conditions.

   e) Write down the steps for creating SCADA screen for simple object.

Marks

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

   a) Explain AC discrete input module with respect to following points.

      i) Block diagram

      ii) Function of each block

      iii) Wiring diagram

      iv) Any four specifications

   b) Write PLC program for stepper motor control. Assume suitable system design for the same.

   c) Compare PLC and SCADA (Any six points)

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

   a) Write down counter instruction format. List and explain types of status bit of counter.

   b) Explain concept of seal in circuit. Explain Ladder diagram for seal in circuit with suitable example.

   c) Draw and explain application of SCADA in water treatment plant.

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