

# 22640

**22223**

**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) State the benefits of Automation. (two points)
  - b) State two advantages and two disadvantages of PLC.
  - c) Mention the types of PLC programming languages.
  - d) State four applicates of SCADA.
  - e) Define w.r.t. to SCADA: Tags
  - f) List the types of Discrete input modules.
  - g) State the need of SCADA.

P.T.O.

- 2. Attempt any THREE of the following:** **12**
- a) Explain the word redundancy in PLC system with diagram.
  - b) Draw the block diagram of PLC and explain the function of each block.
  - c) Draw a neat block diagram of DC input module and explain the function of each block.
  - d) Draw sinking type and sourcing type for DC input module. Explain it in brief.
- 3. Attempt any THREE of the following:** **12**
- a) Explain analog input module with the help of block diagram.
  - b) Draw the format of ON delay timer and explain with timing waveforms.
  - c) Write PLC ladder program to measure frequency of events using timer and counter and explain it.
  - d) Write the format of UP counter and explain with waveforms.
- 4. Attempt any THREE of the following:** **12**
- a) Differentiate between SCADA and PLC. (four points)
  - b) Draw the architecture of SCADA and explain the function of the elements of SCADA.
  - c) Explain I/O module selection criteria in brief.
  - d) Explain the interfacing of PLC with SCADA system using OPC.
  - e) List logical instructions and explain any two with neat diagram.

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

- a) Draw a ladder diagram for two motor operations for the following conditions:
  - i) Start push button starts motor M1.
  - ii) After 5 sec motor M1 is OFF and motor M2 in ON.
  - iii) After 10 sec. Motor M2 is OFF.
  - iv) Stop pushbutton stops both motor M1 and M2 if pressed anytime during process.
- b) Develop water distribution system application in SCADA. List the tags to be interlinked with PLC.
- c) Draw wiring diagram to connect DC motor to PLC. Specify type of output module that can be used and justify.

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

- a) There are four outputs - R, S, T and U. Draw the ladder diagram for following conditions:
    - i) R goes off when stop switch is pressed.
    - ii) S goes off 7 seconds after R.
    - iii) T goes off 6 seconds after R.
    - iv) U goes off 3 seconds after S.
  - b) List and explain the types of relay type instructions with suitable examples.
  - c) Describe the steps involve developing SCADA application with any simple system.
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