22475

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 <u>FIVE</u> of the following :**   **10**

a) List the four main components of a typical SCADA system.

b) Define logs with respect to SCADA.

c) List the types of alarms in SCADA system.

d) Draw neat sketch of coaxial cable showing different components.

e) List the types of drives categorised on the different parameters.

f) What is HMI ?

g) Identify any four graphic objects for car washing system.

Marks

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

   a) Explain five levels of automation hierarchy.

   b) What is star topology ? Explain with neat diagram.

   c) Explain the functions of HMI in automation.

   d) Explain single acting pneumatic cylinder with neat diagram.

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

   a) Draw the block diagram of MTU and explain it's use in SCADA system.

   b) Explain tree topology with neat diagram.

   c) Explain types of operator interfaces based upon their display.

   d) Explain with neat diagram how double acting pneumatic cylinder are interconnected to PLC.

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

   a) Explain the features of intouch software used in SCADA system.

   b) Explain typical MODBUS architecture with diagram.

   c) Draw and explain PLC and PC integration with HMI.

   d) Prepare PLC ladder program for water level control system assuming suitable components.

   e) Explain double acting pneumatic cylinder with neat diagram.

Marks

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

  a) For a specific automation application, to establish communication between PLC and SCADA over OPC DA server, Explain the steps to follow in order to automate the application.

  b) For a robotic pick and place mechanism, Prepare the following

     i) OPC tag database

     ii) PLC ladder program

  c) Develop PLC based application for road traffic signal, assume suitable components.

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

  a) Explain four quadrant operation of an electric drive in detail.

  b) For sorting and stacking system, prepare the following -

     i) OPC tag database

     ii) PLC ladder program.

  c) State and explain the type of bus access method used for the following Protocol variants

     i) MODBUS TCP / IP

     ii) PROFIBUS DP

     iii) Foundation Fieldbus H1

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