22475

22223

3 Hours / 70 Marks Seat No. | | | | | | | | |

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) List the four fundamental components of any SCADA system.

b) Give the difference between real time and historical trends.

c) State the need of Electric drives in industries.

d) Draw a neat cut section figure of coaxial cable and name it.

e) Define 'Tag' with respect to SCADA system.

f) List the benefits of HMI in automation system.

Marks

g) Identify the following objects from the SCADA object library.

i)

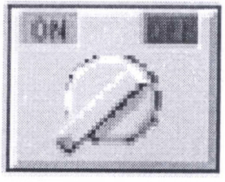

Fig. No. 1

ii)

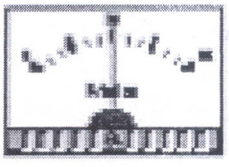

Fig. No. 2

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

a) Draw five-layer automation hierarchy pyramid and explain the function of each level.

b) List any four network topologies used in industries network communication and explain any one with advantages and disadvantages.

c) List any two differences and two similarities between SCADA and HMI.

d) Explain single acting pneumatic cylinder with neat diagram.

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

a) Draw general architecture of a SCADA system and describe functions of each component in short.

b) Explain tree topology with neat diagram, give its advantages and disadvantages.

c) Give four data handling features of a good HMI panel.

d) Explain with a neat diagram how single acting pneumatic cylinders are interconnected to PLC.

Marks

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

a) What is MTU in SCADA system? Give its function.

b) State the types of foundation fieldbus. Give their features.

c) Draw and explain a typical connection diagram between HMI panel with PLC and PC.

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

e) Explain with a neat diagram double acting pneumatic cylinder.

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

a) Explain with suitable diagram the general steps required to integrate any given RTU (PLC) with a given SCADA software. (assume PLC and SCADA used are from two different manufactures)

b) For a sequential motor control system given below, prepare the following:

i) PLC ladder program (assume suitable sequence)

ii) List SCADA library objects to be selected to design a graphic screen. Fig. No. 3

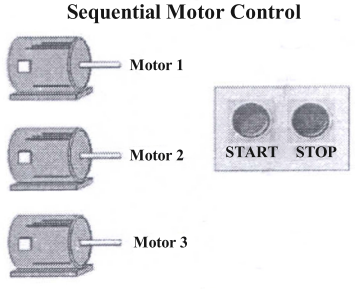

Fig. No. 3

c) Develop PLC based application for pulse counting system using conveyor, assume suitable components.

Marks

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

a) Explain the function of following wrt SCADA:

i) Alarms

ii) Tags

iii) Trends

iv) Logs

v) Reports

vi) Object library

b) For a temperature control system given below prepare the following:

i) OPC tag database

ii) List SCADA screen objects to be selected to design a graphic screen. Refer Fig. No. 4

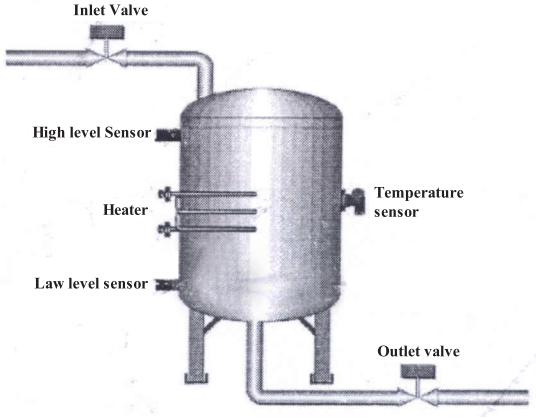

Fig. No. 4

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

i) Modbus TCP/IP

ii) Profibus DP