

2053

B.E. (Electrical and Electronics Engineering)

Sixth Semester

EE-611: Programmable Logic Controller and Distributed Control System

Time allowed: 3 Hours

Max. Marks: 50

NOTE: Attempt five questions in all, including Question No. 1 which is compulsory and selecting two questions from each section.

x-x-x

Q 1)

(5x2)

- List six distinct advantages that PLCs offer over conventional relay based control systems.
- What is the difference between open and proprietary PLC architecture?
- Define Scan cycle of PLC.
- Draw Relay based logic circuit for AND logic function.
- In what way are timers and counters different?

Section A

Q 2)

- Explain in detail the factors responsible for difficulties encountered in implementation of process control. (5)
- Write the advantages and disadvantages of PLC. (5)

Q 3)

- Draw the connection diagram and ladder program for motor control in forward and reverse direction with interlocking. (5)
- Design a PLC program and prepare a typical I/O connection diagram and ladder logic program for the following motor control specifications:
 - Three starters are to be wired so that each starter is operated from its own start/stop pushbutton station.
 - A master stop station is to be included that will trip out all starters when pushed.
 - Overload relay contacts are to be programmed so that an overload on any one of the starters will automatically drop all of the starters.
 - All pushbuttons are to be wired using one set of NO contacts. (5)

Q 4)

- Design a PLC program and prepare a typical I/O connection diagram and ladder logic program for the following motor control specifications:
 - A motor must be started and stopped from any one of three start/stop pushbutton stations.
 - Each start/stop station contains one NO start pushbutton and one NC stop pushbutton.
 - Motor OL contacts are to be hardwired. (5)
- Why is isolation required while connecting input or output devices to the PLC? Explain with suitable diagram how I/O devices can be isolated from PLC. (5)

P.T.O.

(2)

Section B

Q5. There are two garages for parking four wheelers in the building. Each garage occupies maximum of 5 cars at a time. Each time cars enters PLC automatically counts it to a total sum of cars found in the garage. If Limit exceeds, garage filled lamp should turn ON and directs other drivers to Gate 2 garage parking. If Limit exceeds in both Gate 1 & 2, parking closed signal will turn on that a garage is full and notifying other drivers not to enter because there is no space available.

(10)

Q6.

a) Write a program that will increment a counter's accumulated value 1 count every 60 s. A second counter's accumulated value will increment 1 count every time the first counter's accumulated value reaches 60. The first counter will reset when its accumulated value reaches 60, and the second counter will reset when its accumulated value reaches 12.

(5)

b) What is DCS . How does it differ from SCADA. Discuss the various levels of DCS.

(5)

Q7)

a) Construct a PLC ladder diagram for the following:

When a switch is turned on, C goes on immediately and D goes on 9 seconds later.

Opening the switch turns both C and D off.

(5)

b) Differentiate between data logging and data acquisition.

(5)