

SECTION A: Instruction: Answer all questions.

Total (10 marks)

Question 1

List down 5 programming rules for designing PLC coding.

(5marks)

Question 2

What are the three elements of a PLC. Illustrate your answer with a diagram and label accordingly.

(5marks)

SECTION B: Instruction: Answer all questions.

Total (40 marks)

1. Define the term SCADA?

List down 3 Manufacturing Company that use this system.

(5marks)

2. Design a program that starts a timer. The timer will time for 10 seconds and then increment the counter. There are 5 motors which will come on one at a time i.e.: 1st motor at 10 sec, 2nd at 20 and so on. There should be a stop button which will de-energizes all the outputs when pressed. This circuit is for Multi – Conveyor startup system

Description	Address
Start Button	0.00
Stop Button	0.02
Motor 1	100.01
Motor 2	100.02
Motor 3	100.03
Motor 4	100.04
Motor 5	100.05
Timer	T0000
Counter	00002 - 00005

(15 marks)

3. Design a program that will enable the car park attendant to monitor the car park space.

Include the following:

- i. A sensor which detects cars entering;
- ii. A sensor which detects car exiting;
- iii. Two indicator lights – one indicating when the car park is in full capacity;
- iv. Another to indicate when there are space available; and
- v. A reset switch for resetting the counter

(10marks)

4. Design a circuit that will run the motor in forward direction when the forward push button is pressed. Also include when the reverse push button is pressed the conveyor runs in reverse direction. Lastly, interlock the auxiliary contacts to prevent the motor from being energized simultaneously. Illustrate with a hard wiring.

(10marks)

SECTION C

Instruction:

Answer all questions.

Question 1

The control circuit is used to detect and count the number of products being carried on an assembly line. When it counts five products, the circuit energizes a solenoid. The solenoid is energized for a period of two seconds and is then shunts off, causing it to retract.

(15 marks)

Question 2

When PB1 (START Push Button) is pressed, the box conveyor moves. Upon detection of box present, the box conveyor stops and the Apple conveyor starts. Part sensor will count for 10 apples. Apple conveyor stops and box conveyor starts again. Counter will be reset and operation repeats until PB2 (STOP Push Button) is pressed.

Input	Devices
0.00	START Push Button (PB1)
0.01	STOP Push Button (PB2)
0.02	Part Present (SE1)
0.03	Box Present (SE2)

Output	Devices
100.00	Apple Conveyor
100.01	Box Conveyor

(15 marks)

Question 3

You are given a project on Citect SCADA.

List down the steps on how to create a new project, this include: Clusters, Servers, Communication and Variable tags.

(20 marks)

THE END

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