



---

Total Marks : 50

Attempt All Questions.

---

**Question No 1.**

10

- A. Consider a lubricating oil tank in Industrial Plant having 2 sensors, one is put near to the bottom and one near to top, to fill the tank, motor A will pump oil to tank until the high level sensor turns on, at that point the motor A turns OFF. Motor A is turned ON when the level fall below the low level sensor. Explain the states of PLC operating cycle with help of neat ladder diagrams.

**CLO-3**

---

**Question No 2**

20

- A. Write some benefits of Industrial Automation **CLO-2**  
B. Briefly explain the components and functions of SCADA system **CLO-2**
- 

**Question No 3**

20

- A. Differentiate between Hardwired control systems and PLC system **CLO-3**  
B. What are the function of SCADA systems **CLO-2**

---

.Good Luck.

---

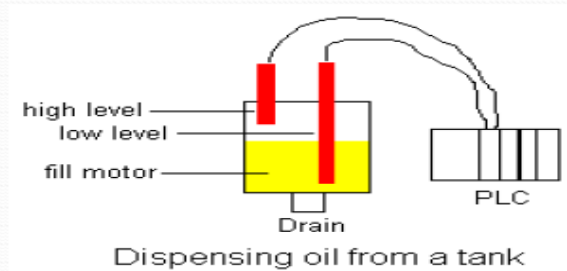
### Question No 1. A.

Consider a lubricating oil tank in Industrial Plant having 2 sensors, one is put near to the bottom and one near to top, to fill the tank, motor A will pump oil to tank until the high level sensor turns on, at that point the motor A turns OFF. Motor A is turned ON when the level fall below the low level sensor. Explain the states of PLC operating cycle with help of neat ladder diagrams.

**Ans;** For the process given below explain and draw ladder diagrams of each steps involved to control a lubricant tank in a plant.

•We are controlling lubricating oil being dispensed from a tank. This is possible by using two sensors. We put one near the bottom and one near the top, as shown in the picture below

•Here, we want the fill motor to pump lubricating oil into the tank until the high level sensor turns on. At that point we want to turn off the motor until the level falls below the low level sensor. Then we should turn on the fill motor and repeat the process.

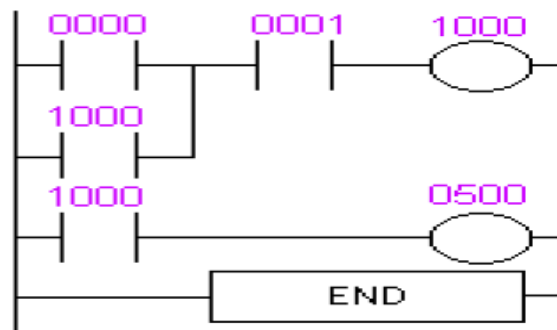


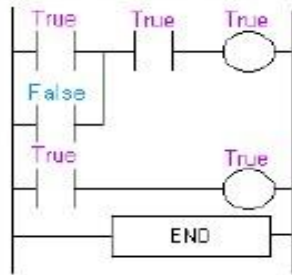
Low level sensor	0000
High level Sensor	0001

Output	Address
Motor	0500

Internal Utility Relay
1000

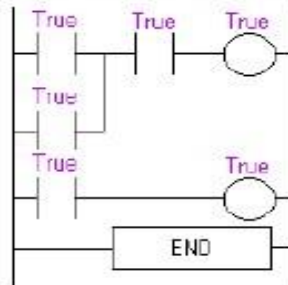
### The Ladder Diagram





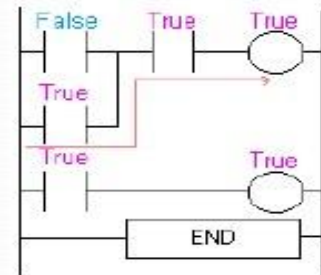
**Scan 1**

Initially the tank is empty. Therefore, input 0000 is TRUE and input 0001 is also TRUE



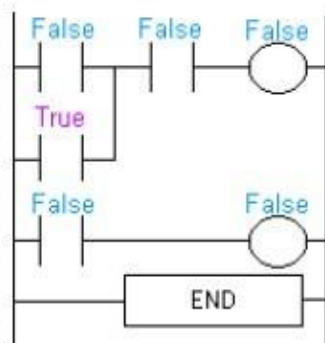
**Scan 2**

The internal relay is turned on as the water level rises.



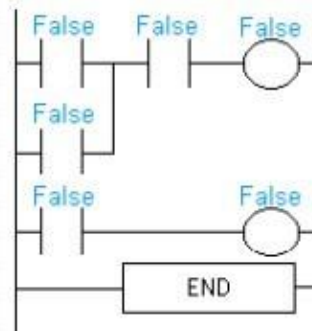
**Scan 3**

After scan 2 the oil level rises above the low level sensor and it becomes open. (i.e. FALSE)



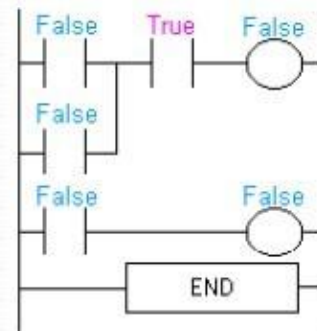
**Scan 4**

After scan 4 the oil level rises above the high level sensor at it also becomes open (i.e. false)



**Scan 5**

Since there is no more true logic path, output 500 is no longer energized (true) and therefore the motor turns off.



**Scan 6**

After scan 6 the oil level falls below the high level sensor and it will become true again.

Name khos labaf

(3)

ID 13171

Q No 2 Part a.

Write some benefits of industrial Automation?

Ans) Benefits of Industrial Automation

\* Increasing Productivity

Increased Productivity = more units/day = more money

\* Products produced more consistently

Increased consistency = higher quality = increased consumer satisfaction.

Example.

A bottled soft drink such as a Coke or Pepsi always tastes the same no matter where or when you purchase it. Consumer count on this.

Product produced more reliably

Robots can run 24 hours/day without getting tired or bored.

Decreased Labor expenses.

Automated system reduce the amount of people needed to produce the goods.

\* Increasing Safety in Working Condition

Q No 2 part no 6

Briefly explain the components and functions of SCADA system.

Ans) Main Function of SCADA:

\* SCADA is centrally monitors and controls thousand of industrial equipment, such as motors, valves, pump, relays, sensors e.t.c

\* Display current state of remote process.

\* Display alarms / events log.

SCADA Function in Electric power system:

- Electric power system is most complex man made system.

- It is the compass of generation, transmission and distribution.

- The losses that occur in the transmission and distribution are very large. This occurs because of inefficient safety monitoring and control devices that are prevailing in present system.

Components of SCADA system.

Following are the components of SCADA system given below.

(5)

\* Supervisory Control.

\* programmable logic control.

\* Communication Infrastructure Control.

\* Human Machine Interface Control.

\* Monolithic Control system (first generation)

Q No 3 part a

Differentiate b/w hardwired control system and PLC system?

Ans)

Hardwired Control System:

- \* The functions are determined by the physical wiring.
- \* Changing the function means changing the wiring.
- \* Can be contact-making type (relays, contactors) or electronic type (logic circuits).

PLC system:

- \* The functions are determined by a program stored in the memory.
- \* The control functions can be changed simply by changing the program.
- \* Consist of a control device to which all the sensors and actuators are connect.



ID

13171

Q No 3 part b:

What are the function of SCADA system?

Ans) SCADA Function:

★ Centrally monitors and controls thousand of industrial equipment, such as:

Motors, Valves, pumps, Relay, Sensor e.t.c

★ Display current state of remote process

★ Display alarms / Events log.