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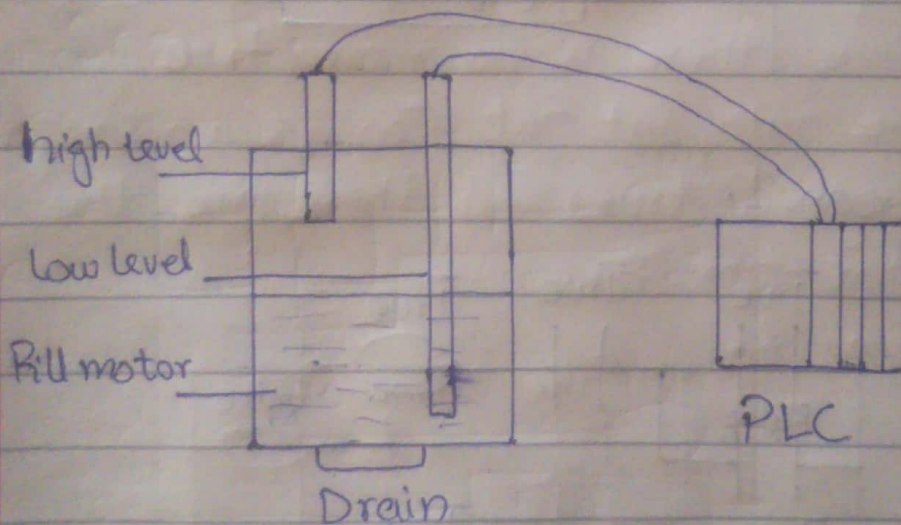
PAPER : INDUSTRIAL ELECTRONICS

Instructor: Engr Sanaullah Ahmed

Question No: 01

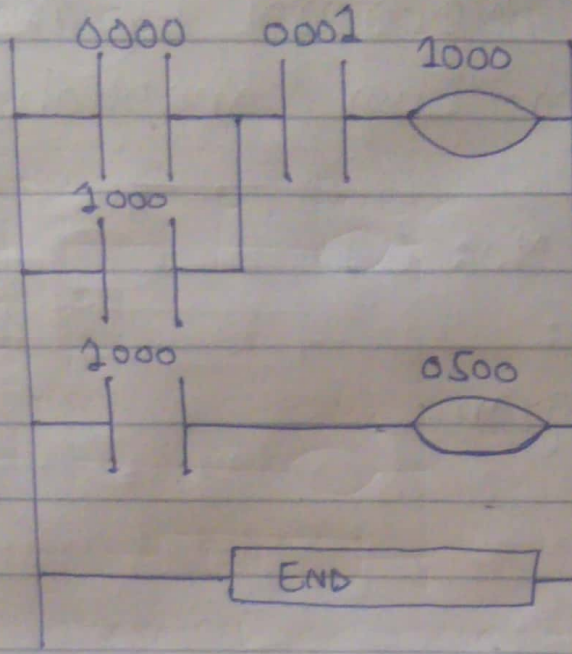
Solution:

* Diagram:

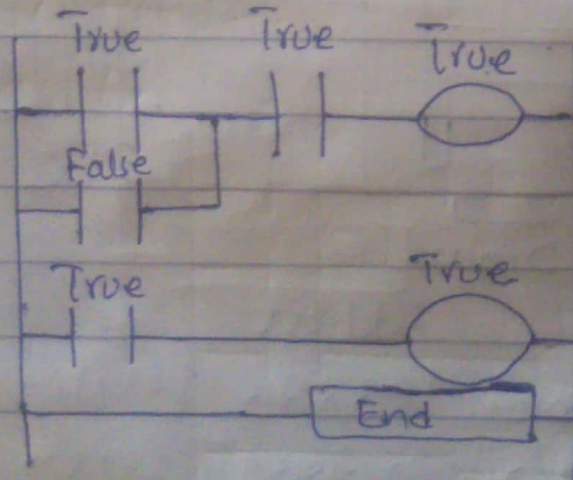


→ Inputs	Address
Low level sensors	0000
high level Sensors	0001
→ Outputs	Address
Motor	0500
→ Internal Utility Relay	1000

* Ladder Diagram:

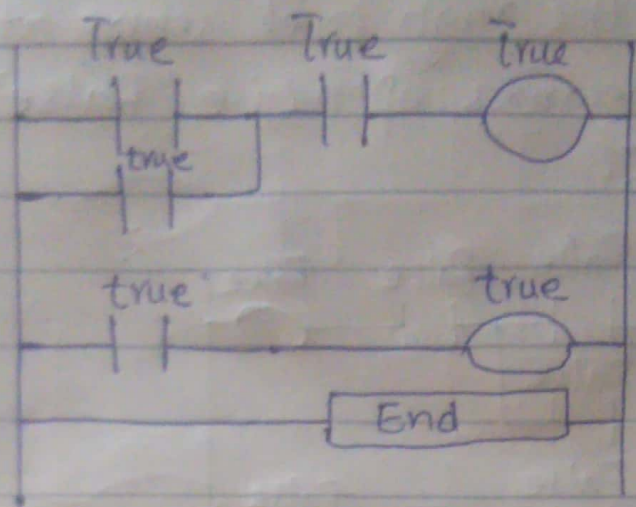


Scan 1.



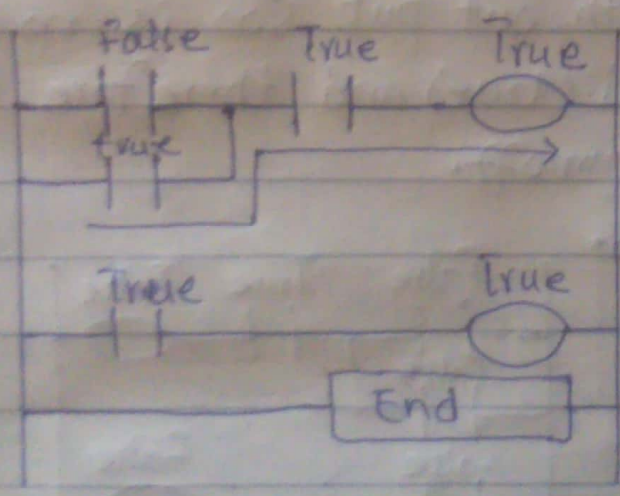
Initially the tank is empty therefore input 0000 is TRUE and input 0001 is also true.

Scan 2.



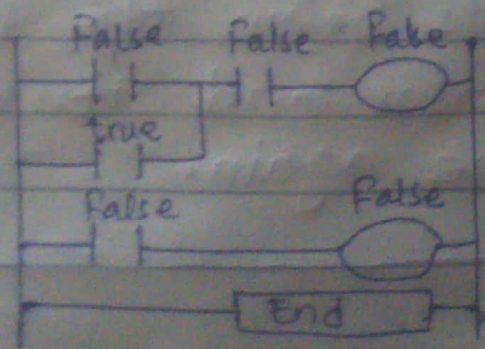
The internal relay is turned on as the water level rises.

Scan 3.



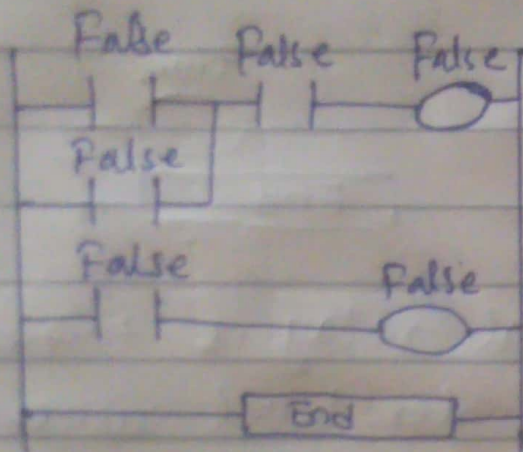
After Scan 2 the oil level rises above the low level sensor and it becomes open. (FALSE)

Scan 4.



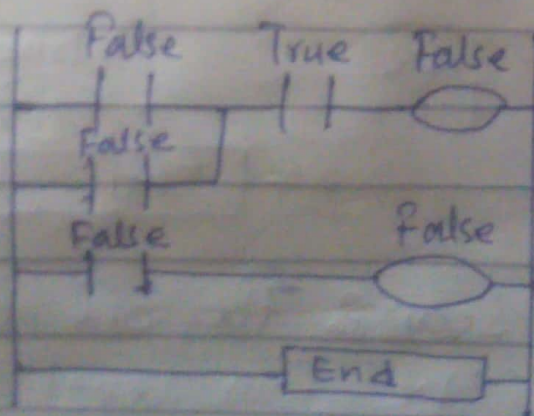
After scan 4 the oil level rises above the high level sensor and it also becomes open (i.e. false).

Scan 5.



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

Scan 6.



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

Question No: 02

A. Write some benefits of Industrial Automation.

Answer:

* 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 a Pepsi always tastes the same no matter where or when you purchase it. Consumers count on this.

→ Product Produced more reliably:

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

→ Decreased labor expenses:

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

→ Increasing Safety in working conditions.

Question NO: 02

B. Briefly explain the - - - - - ?

Answer:

SCADA:

Component:

→ Sensors.

(Either digital or analog) and control relays that directly interface with the managed system.

→ Remote terminal Units (RTUs).

These are small computerized units deployed in the field at specific sites and location. RTUs serve as local collection points for gathering reports from sensors and delivering commands to control relays.

→ SCADA master Units (MTUs).

These are larger computer consoles that serve as the central processor for SCADA system. Master units provide a human interface to the system and automatically regulate the managed system in response to sensor inputs.

→ The communications Network.

It connects the SCADA master unit to the RTUs in the field.

Functions:

- Centrally monitors and controls thousands of industrial equipment, such as
 - Motors, Valves, pumps, Relays, sensors etc.
- Displays current state of remote process (visualization).
- Displays alarms/Events log.

Question No: 03

A. Differentiate between - - - -

- - - - ?

Answer:

* Hardwired control systems:

- 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 systems:

→ 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 connected.

Question No: 03

B. What are the functions ----
----?

Answer:

* Function of SCADA System:

→ It gathers and analyzes real-time data to monitor and control thousands of industrial equipments such as

• Motors, Valves, Pumps, Relays, Sensors etc.

→ Displays current state of remote process (visualization).

→ Displays alarms/ Events log.

"The End"