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Industrial electronics:

Q1 A. Consider a lubricating oil tank in Industrial plant having 2 sensors.

Sol: 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.

Inputs

Low level sensor

High level sensor

output

Motor

Addresses.

0000

0001.

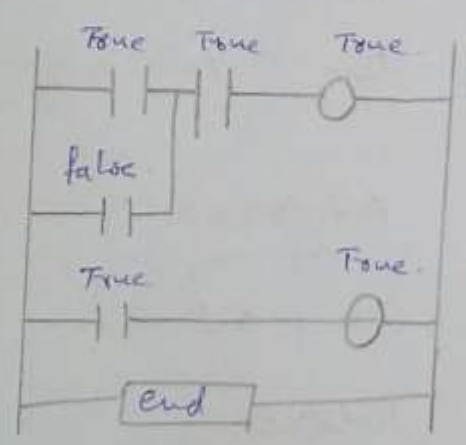
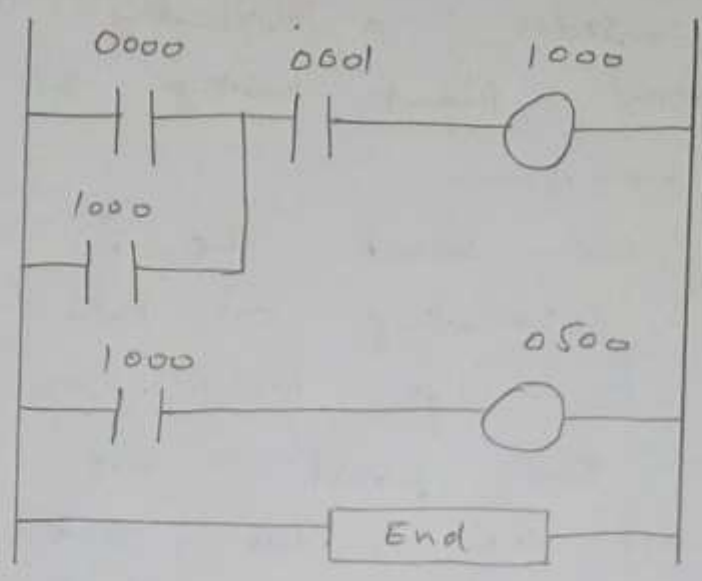
Address

0500

Internal utility Relay

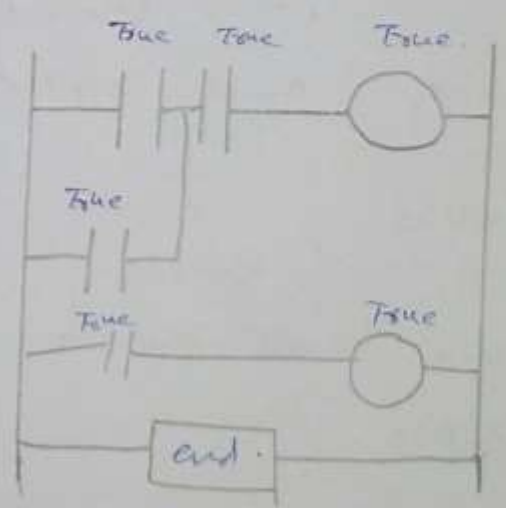
1000

Ladder diagram.



Scan 1

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



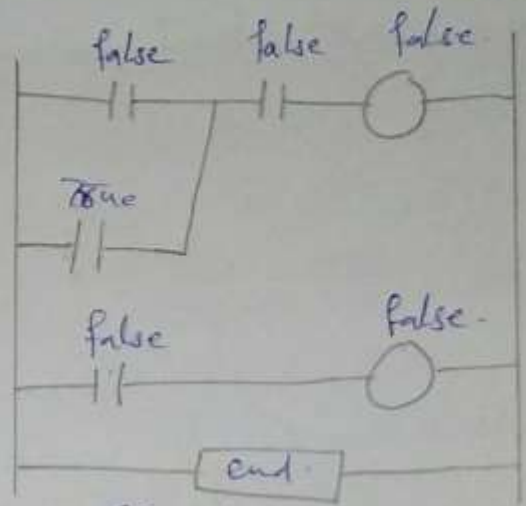
Scan 2

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

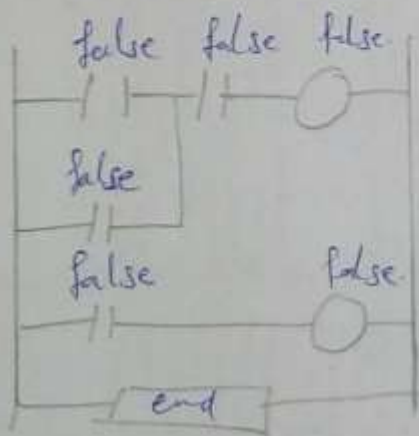
3



Scan 3
 After scan 2 the oil level rises above the low level sensor and it becomes open.



Scan 4
 After scan 4 the oil level rises above the high level sensor at it also becomes open.



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.

Q2 A: Benefits of Industrial Automation.

Ans: Benefits commonly attributed to automation include higher production rates and increased productivity, more efficient use of materials, better product quality, improved safety, shorter workweeks for labour and reduced factory lead time. Higher output and increased productivity have been two of the biggest reasons in justifying the use of automation. Despite the claims of high quality from good workmanship from good workmanship by humans.

Worker safety is an important reason for automating an industrial operation.

Another benefit of automation is the reduction in the number of hours worked on average per week by factory workers.

Question
2 B :

Components and
Functions of SCADA
System :

(9)

Ans: SCADA (Supervisory Control
and Data Acquisition) .

Components: The components of SCADA
system, which include hardware
(input and output), controllers, networks,
communications equipment, user
interface and software.

The term SCADA refers to the
entire central system. The central
system usually monitors data from
various sensors that are either in
close proximity or off site.

Functions:

(5)

A SCADA system perform the following functions.

- 1) Data acquisition.
- 2) Networked data communication.
- 3) Data presentation.
- 4) Control.

These functions are performed by four kinds of SCADA components.

- 1) Sensors and control relays that directly interface with the managed system.
- 2) Remote telemetry units (RTUs):
RTUs serve as local collection points for gathering reports from sensors and delivering commands to control relays.
- 3) SCADA master units: It provide a human interface to the system.
- 4) The communication network: that connects the SCADA master unit to the RTUs in the field.

Q3 A

(7)

Difference b/w Hardwired
Control Systems and PLC system:

Ans: The difference between hardwired control system and PLC system are given below.

- 1) In the hardwired control systems the functions are determined by the physical wiring. while in PLC system the functions are determined by a program stored in the memory.
- 2) In the hardwired control system the changing function means changing the wiring. while in the PLC systems the control functions can be changed simply by changing the program.
- 3) In the hardwired control system can be contact making type (relays, contactors) or electronic type. while PLC consist of control device, to which all the sensors and actuators are connected.

Question No 3

(8)

B

function of SCADA
Systems :

Ans: - SCADA (Supervisory Control and Data Acquisition).

- Real-time, computer based industrial process control systems.
- It gathers and analyzes real data to monitor and control industrial equipment.

Functions :

- Centrally monitors and controls thousands of industrial equipment such as Motors, Valves, Pumps, Relays, sensors etc.
- Display current state of remote process.
- Displays alarms / Events Log.