

Q

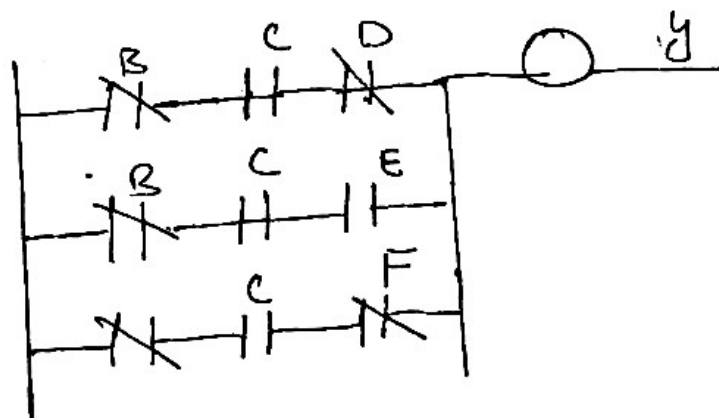
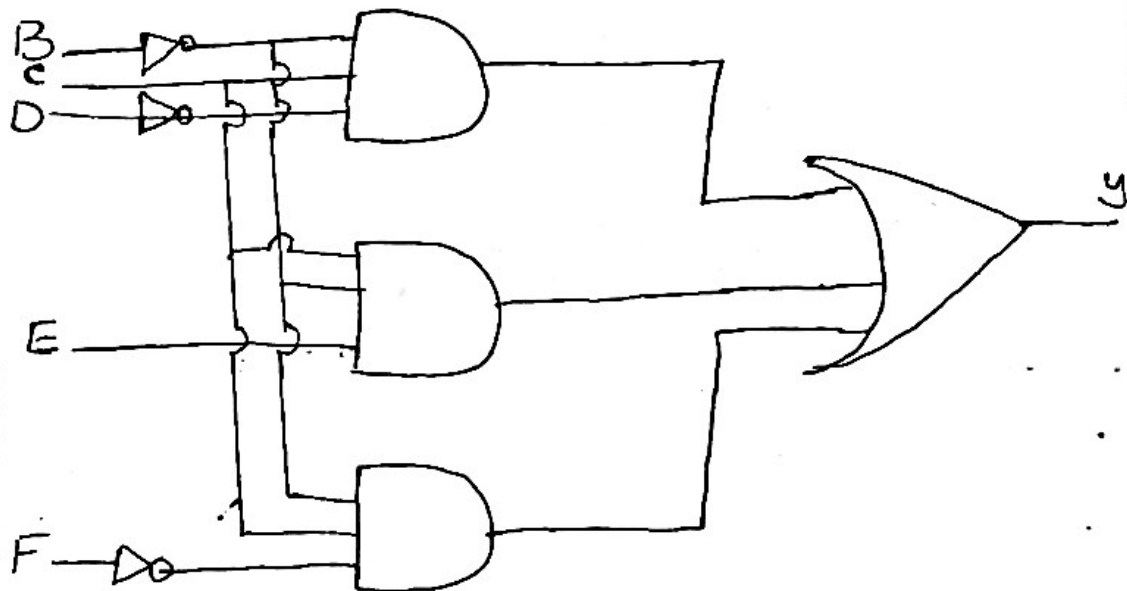
Question no 2

A Part

Draw digital logic circuit and ladder diagram that is equivalent to the following Boolean function that will initiate a Motor "M" to start?

$$M = B'CD' + B'CE + B'CF'$$

Solution:



Page # 2

 $\Rightarrow$  B is off ~~TT~~ $\Rightarrow$  C is ON TT $\Rightarrow$  D is off ~~TT~~ $\Rightarrow$  B is off ~~TT~~ $\Rightarrow$  C is ON TT $\Rightarrow$  E is ON TT $\Rightarrow$  B is off ~~TT~~ $\Rightarrow$  C is ON TT $\Rightarrow$  F is OFF ~~TT~~

## Question no. 1

## Multiple choice Question:

1

This is inconclusive the reason is decrease.

2

Opening a manually operated high-voltage disconnect switch.

3

Third

4

Reducing

5

Transducer.

Question No 3

- A. Describe and draw ladder diagram for the below given process having a container infused with liquids A and B in order when START is pressed. When it reaches the set level, mix the two liquids evenly then open the valve to let out the mixture?

**Answer::****PLC Ladder Practice Problem:**

Automatically infusing the container with liquids A and B in order when START is pressed When it reaches the set level, mix the two liquids evenly then open the valve to let out the mixture.

**Number of PLC Inputs Required**

X1 - Start Switch.

X1 - Low level float sensor. X1 = ON when the liquid level reaches X1.

X2 - High level float sensor. X2 = ON when the liquid level reaches X2.

X3 - Stop Switch.

X10 - EMERGENCY STOP button. X10 = ON when the button is pressed.

**Number of PLC Outputs Required**

Y0 - Liquid A Inlet

Y1 - Liquid B Inlet

Y2 - Mixture Outlet

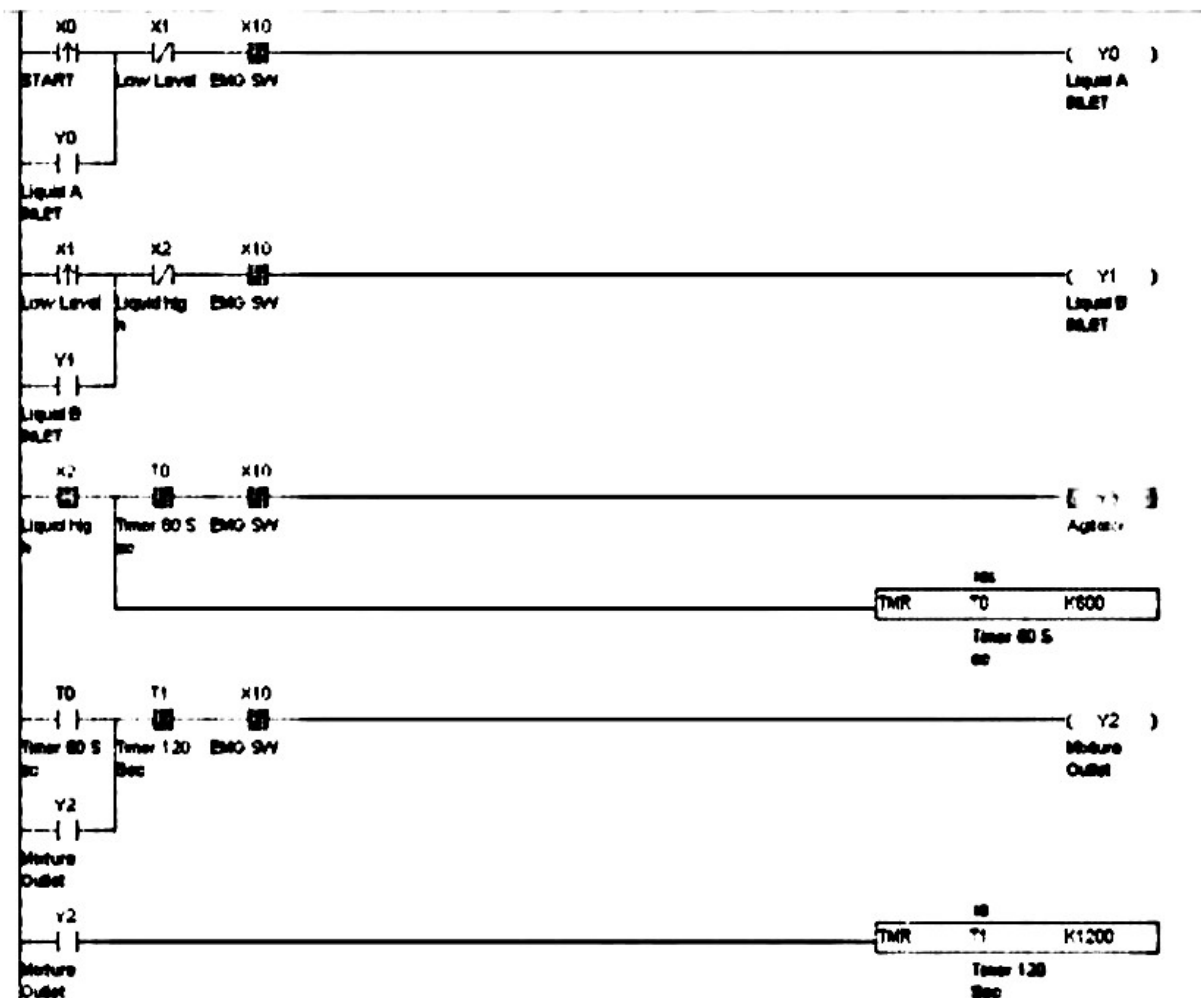
Y3 - Agitator /Stirrer

**Number of PLC Timer Required**

T0 - 60 second Timer, 100 ms Time Base. (See K60 Preset Value for Timer)

T1 - 120 second Timer, 100 ms Time Base. (See K1200 Preset Val. for Timer)

## PLC Ladder Programming:



### PLC Ladder Program Description:

- X0 = ON when START is pressed. Y0 will be ON and latched, and the valve will be opened for infusing liquid A until the level reaches the low-level float sensor.
- X1 = ON when the level reaches the low-level float sensor. Y1 will be ON and latched, and the valve will be opened for infusing liquid B until the level reaches the high-level float sensor.
- X2 = ON when the level reaches the high-level float sensor. Y3 will be ON and activates the agitator. Also, timer T0 will start to count for 60 sec. After 60 sec, T0 will be ON, and the agitator motor Y3 will stop working. Y2 will be ON and latched, and the mixture will drain out of the container.
- When Y2 = ON, timer T1 will start to count for 120 sec. After 120 sec, T1 will be ON and Y2 will be OFF. The draining process will be stopped.
- When an error occurs, press EMERGENCY STOP button X10. The NC contact X10 will be ON to disable all the outputs. The system will then stop running.