



Industrial Electronics  
Assignment

Question No 1. Multiple choice Questions

1. Does the severity of an electric shock increase or decrease with each of the following changes?

- a. A decrease in the source voltage decreases
- b. An increase in body current flow increases
- c. An increase in body resistance decreases
- d. A decrease in the length of time of exposure decreases

2. State the piece of electrical safety equipment that should be used to perform each of the following tasks:

- a. A switching operation where there is a risk of injury to the eyes or face from an electric arc. Face shields
- b. Using a multimeter to verify the line voltage on a 3-phase 480 volt system. Protection Apparel
- c. Opening a manually operated high-voltage disconnect switch. Hot sticks

3. In which industrial revolution the use of IT and Electronic systems further automated the production of industrial sector

- a. First.
- b. Second.
- c. Third.
- d. Fourth. ✓

4. Industrial safety is primarily a management activity which is concerned with \_\_\_\_\_, Controlling, Eliminating hazards from the industries.

- a, Reducing ✓
- b, Increasing
- c, suppressing

The \_\_\_\_\_ is defined as the device which convert the one form of energy into another form of the energy.

- a. Sensor
- b. Transducer ✓
- c. Resistor
- c. Capacitor



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Question No 2

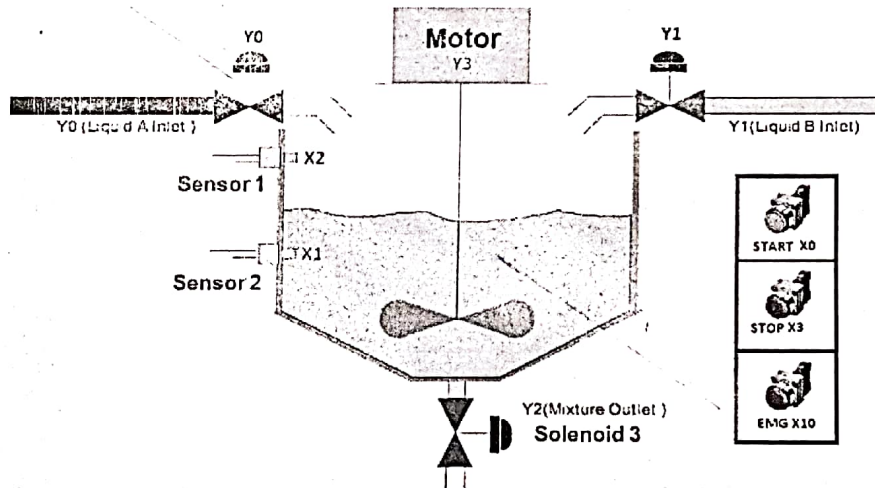
10

- A. Draw digital logic circuit and ladder diagram that is equivalent to the following Boolean function that will initiate a motor "M" to start? (10) CLO-2  
 $M = B'C'D' + B'CE + B'CF$

Question No 3

10

- 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? CLO-2



.Good Luck.

Question No: 2

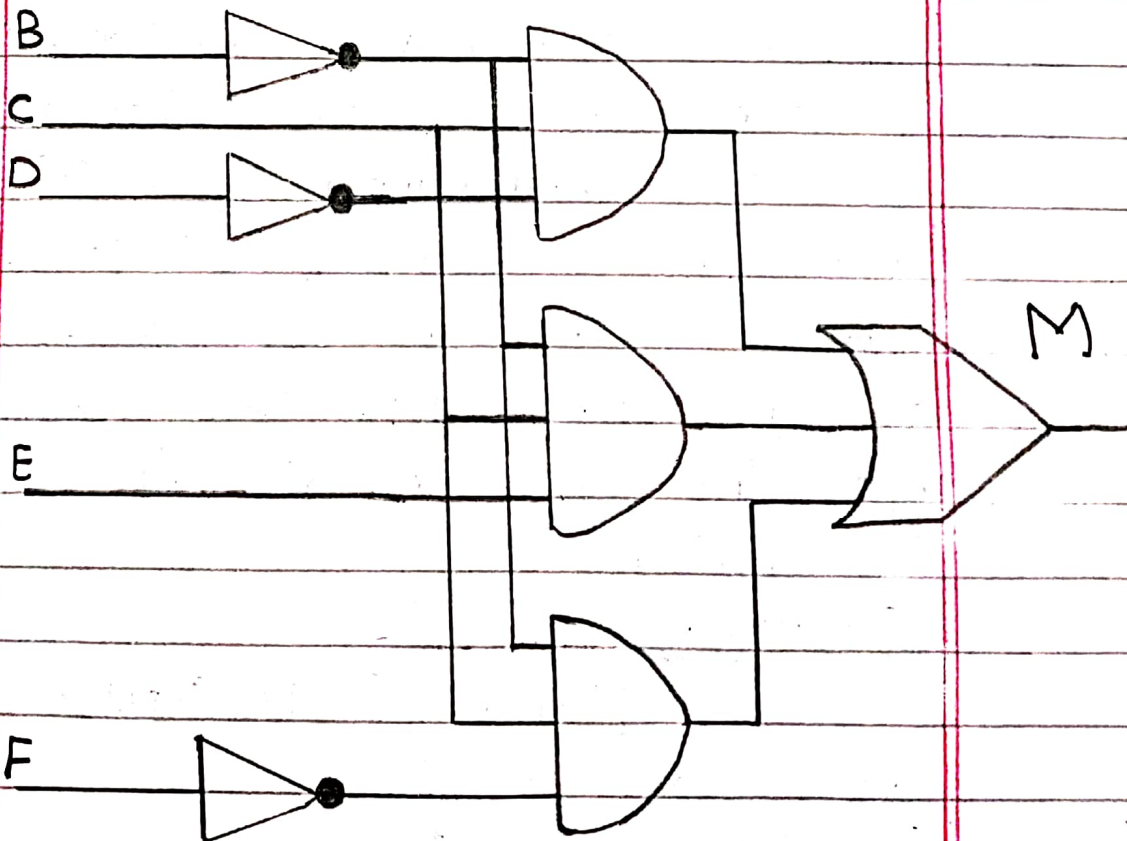
Draw digital logic circuit and ladder diagram that is equivalent to the following Boolean function that will initiate a motor "M" to start?

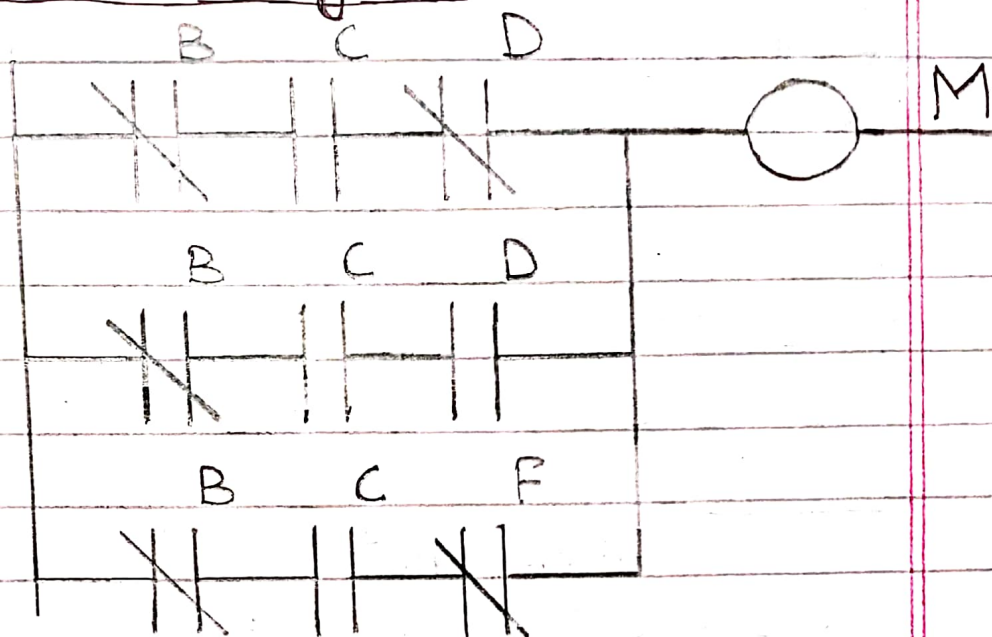
$$M = B'CD' + B'CE + B'CF'$$

Solution:

Given that

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

Digital Logic Circuit:

Ladder Diagram:

Question No: 3

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?

Solution:Number of PLC Inputs:

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:

Y0 - Liquid A Inlet

Y1 - Liquid B Inlet

Y2 - Mixture Outlet

Y3 - Agitator/stirrer

### Number of PLC Timers:

T0 - 60 second timer, 100 ms time base.

T1 - 120 second timer, 100 ms time base.

### Descriptions:

→ 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 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.

→  $X_2 = ON$  when the level reaches the high-level float sensor.  $Y_3$  will be  $ON$  and activates the agitator.

Also timer  $T_0$  will start to count 60 seconds and after 60 seconds  $T_0$  will be  $ON$  and the agitator motor  $Y_3$  will stop working.  $Y_2$  will be  $ON$  and latched and the mixture will drain out of the container.

→  $Y_2 = ON$ , timer  $T_1$  will start to count for 120 seconds and after 120 seconds  $T_1$  will be  $ON$  and  $Y_2$  will be  $OFF$ . the draining process will be stopped.

→ When an error occurs press EMERGENCY STOP button  $X_{10}$ . the NC contact  $X_{10}$  will be  $ON$  to disable all the outputs. the system will then stop running.

P-T-O



DIAGRAM :

