



Industrial Electronics

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
- b. An increase in body current flow
- c. An increase in body resistance
- d. A decrease in the length of time of exposure

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.
- b. Using a multimeter to verify the line voltage on a 3-phase 480 volt system.
- c. Opening a manually operated high-voltage disconnect switch.

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



Industrial Electronics
Assignment

Question No 2

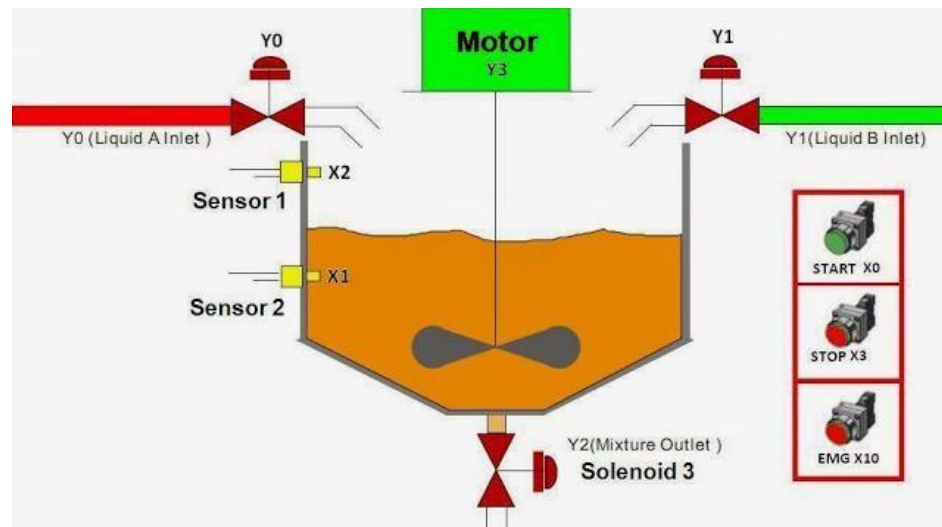
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- A. Draw digital logic circuit and ladder diagram that is equivalent to the following Boolean function that will initiate a motor “M” to start? (10) **CLO-2** $M = B' C D' + B' C E + B' C F'$

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**



Q#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
- (b) An increase in the body ^{current} flow.
- (c) An increase in body resistance
- (d) A decrease in the length of time of exposure

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

- (a) A switching where is a risk of injury to the eyes or face from an electric arc.
- (b) Using multimeter to verify the line voltage on a 3 phase 480 volt system.
- (c) opening manually operated high voltage disconnect switch.

3) In which industrial revolution the use of IT and electronic system 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 Reducing Controlling & eliminating hazards from the industry.

- (a) Reducing
- (b) Increasing
- (c) Suppressing

5) The Transducer is defined as the device which convert the one form of energy into another form of energy.

- (a) Sensor
- (b) Transducer
- (c) Resistor
- (d) Capacitor.

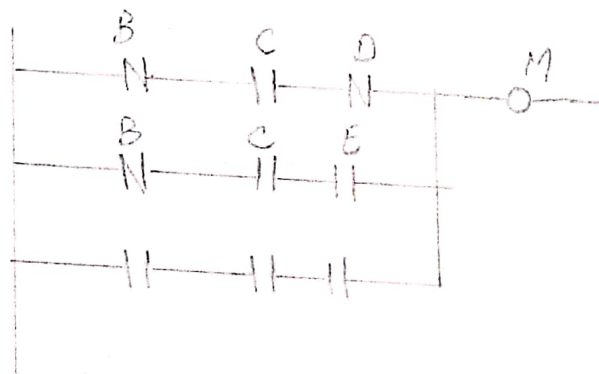
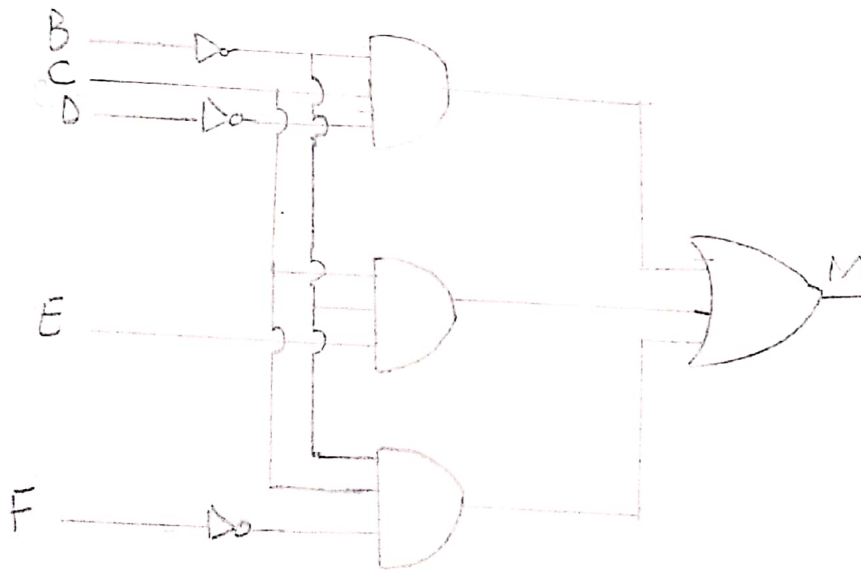
Q No 2- Draw a digital logic circuit and ladder diagram that is equivalent to the following Boolean function that will initiate the motor 'M' to start?

$$M = \bar{B}C\bar{D} + \bar{D}CE + \bar{B}C\bar{F}$$

Ans: Digital Logic circuit diagram:-

According to the equation

$$M = \bar{B}C\bar{D} + \bar{D}CE + \bar{B}C\bar{F}$$



Q/3 Describe and draw the ladder diagram for the below given process having a container infused with liquid A and B in order when start is pressed. When it reaches the set level. Mix the two liquid even then open to open the valve to let out the mixture?

Ans Number of PLC input 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 to $X2$.

X3 - stop switch

X10. Emergency STOP. $X10 = ON$ when the button is pressed.

Number of PLC output required.

Y0 - liquid A inlet

Y1 - liquid B inlet.

Y2 - mixture outlet

Y3 - stirrer.

Number of PLC Timer Required

T0 - 60 second timer, 100 ms Time Base

T1 - 120 second timer, 100 ms Time Base

Ladder Diagram Description:-

→ X0 = ON when Start is pressed Y0 will be ON and latched, and the valve will be opened for infusing liquids A until the level reached the low level float sensor.

→ X1 = ON when the level reaches the low level float level sensor. Y1 will be ON and latched the valve will be opened for infusing liquid B until the level reaches to high level float sensor.

→ X2 = ON when the level reaches the high level float sensor Y3 will be ON and activates the stirrer also timer T0 will be start to count for 60 sec after 60 sec T0 will be ON and the stirrer motor Y3 will stop working. Y2 will be ON and latched the mixture will drain out the container.

Number of PLC Timer Required

~~T0~~ T0 - 60 second timer, 100 ms Time Base

T1 - 120 second timer, 100 ms Time Base

Ladder Diagram Description:-

→ X0 = ON when start is pressed Y0 will be ON and latched, and the valve will be opened for infusing liquids A until the level reached the low level float sensor.

→ X1 = ON when the level reaches the low level float level sensor. Y1 will be ON and latched the valve will be opened for infusing liquid B until the level reaches to high level float sensor.

→ X2 = ON when the level reaches the high level float sensor Y3 will be ON and activates the stirrer also timer to will be start to count for 60 sec after 60 sec to will be ON and the stirrer motor Y3 will stop marking. Y2 will be ON and latched the mixture will drain out the container.

→ When $Y_2 = ON$ timer T_1 will start to count for 120sec. 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.

