University, Peshawar **Name: Saad Bin Tariq**
Department of Electrical Engineering
Spring 2020 **REG.No: 5534**

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

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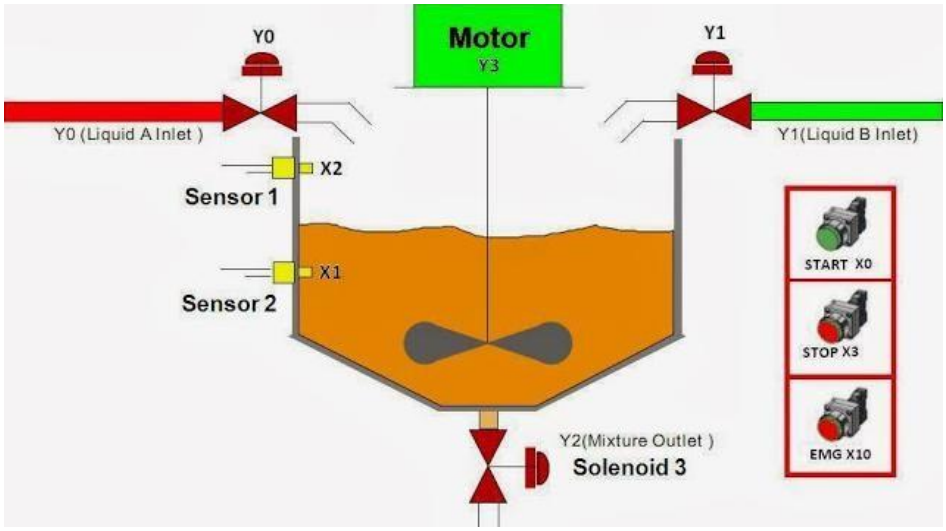
Assignment

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'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**



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Question No 2:-

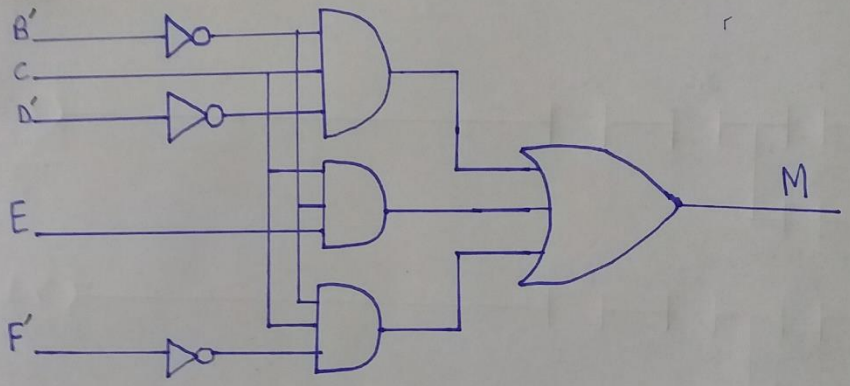
A. Draw digital Logic circuit and Ladder diagram function that will initiate a motor "M" to start?

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

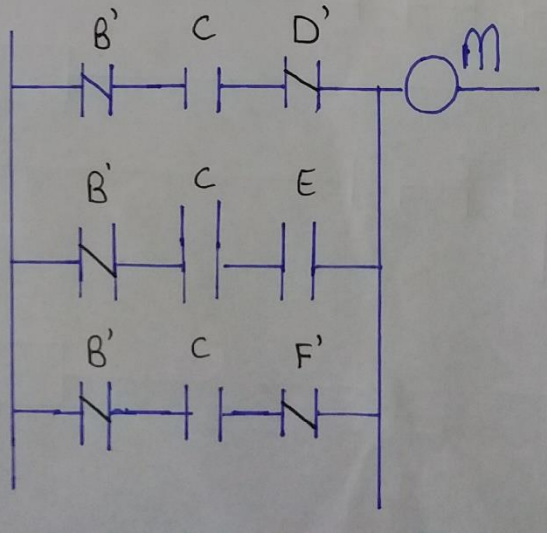
Solution:-

$M = (B' \cdot C \cdot D') + (B' \cdot C \cdot E) + (B' \cdot C \cdot F')$

LOGIC CIRCUIT:-



LADDER DIAGRAM:-



Pg #03

Q 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 value to let out the mixture.

LADDER PROGRAM DESCPRITION

1. X0 = ON when Start is pressed. Y0 will be ON and latched and the value will be opened for infusing Liquid A until the level reaches the low-level float sensor.
2. X1 = ON when the level reaches the low-level float sensor. Y1 will be ON and latched, and the value will be opened for infusing Liquid B until the level reaches the high-level float sensor.
3. X2 = ON when the level reaches thes 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 agitor motor Y3 will stop working. Y2 will be ON and latched and the mixture will drain out of the container.
4. When Y2 = ON timer T1 will start to count for 120 sec T1 will be ON and Y2 will be off. The draining process will be stoped.
5. When an error occur press Emergency Stop button X10 The NC contact X10 will be ON to Disable all the outputs. The system will then stop runing.

NUMBER OF PLC INPUTS REQUIRED:-

X1- Start Switch

~~X1~~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 button is pressed.

NUMBER OF PLC OUTPUTS REQUIRED:-

Y0 - Liquid A Inlet

Y1 - Liquid B Inlet

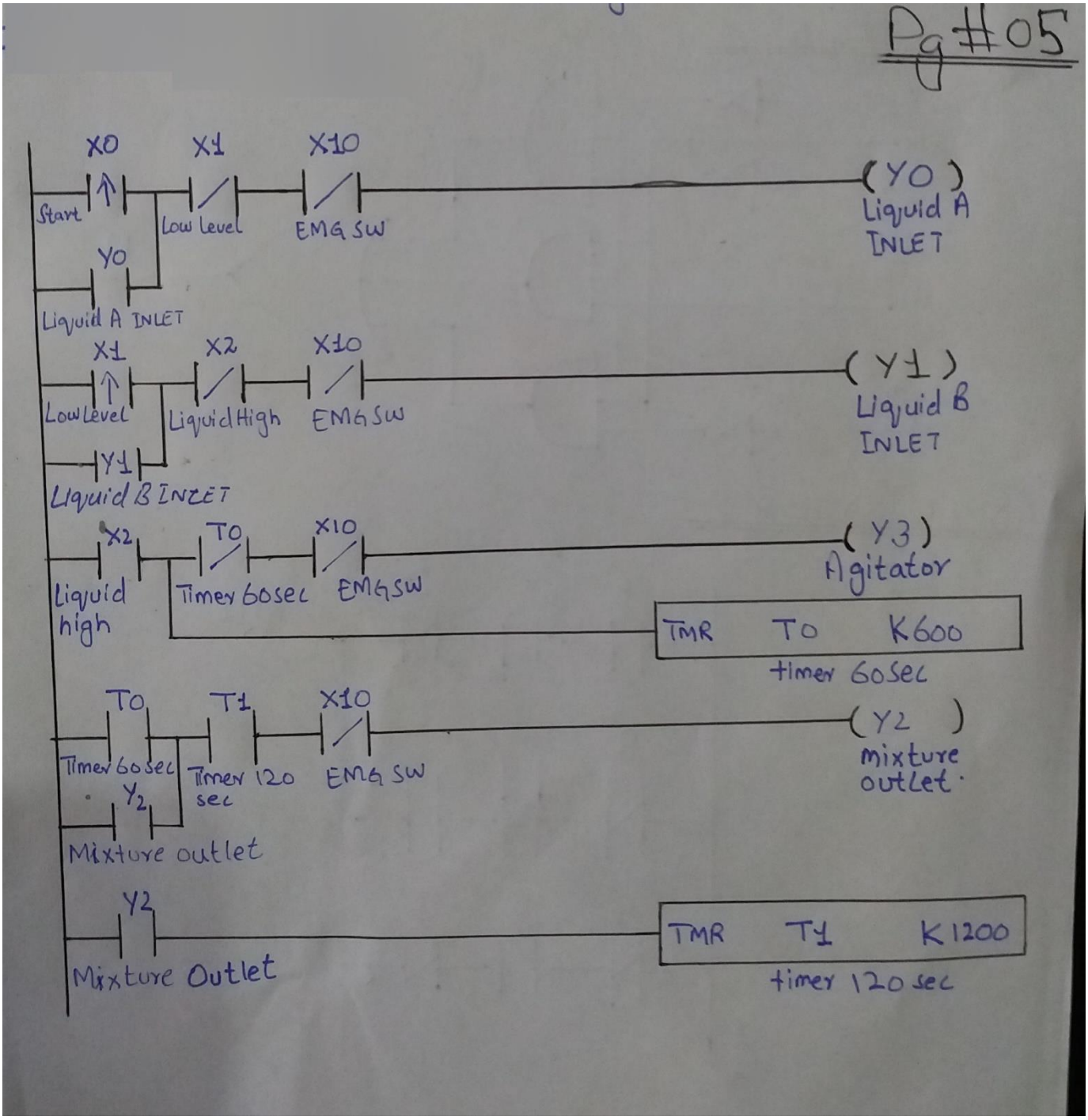
Y2 - Mixture Outlet

Y3 - Agitator / Stirer

Number of PLC Timer REQUIRED:-

T0 - 60 second timer 100ms Time Base &

T1 - 120 second timer, 100ms time Base


X0
X1
X10
Start
Low Level
EMG SW
(Y0)
Liquid A INLET
Y0
Liquid A INLET
X1
X2
X10
Low Level
Liquid High
EMG SW
(Y1)
Liquid B INLET
Y1
Liquid B INLET
X2
T0
X10
Liquid high
Timer 60sec
EMG SW
(Y3)
Agitator
TMR T0 K600
timer 60sec
T0
T1
X10
Timer 60sec
Timer 120 sec
EMG SW
(Y2)
mixture outlet.
Y2
Mixture outlet
Y2
Mixture Outlet
TMR T1 K1200
timer 120 sec