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

   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

5.   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

   d.   Capacitor

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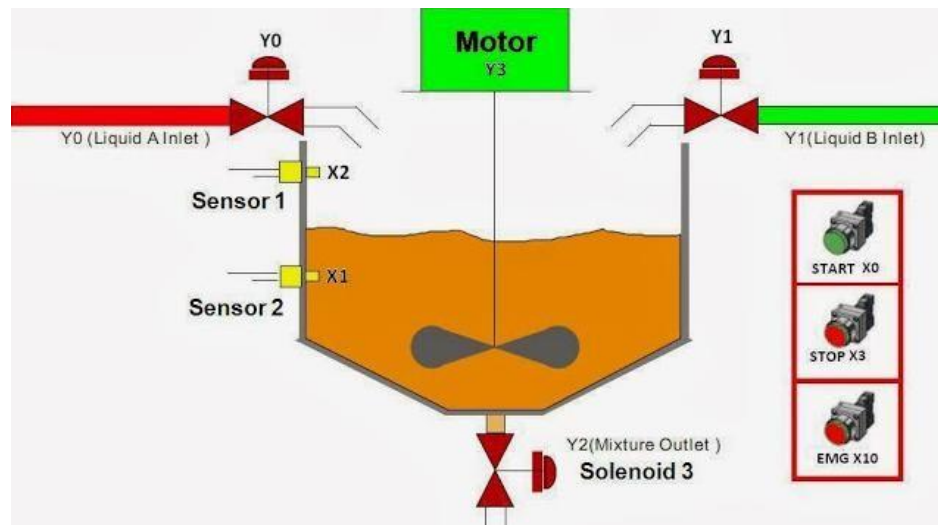**Question No 2**   10

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'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**

.Good Luck.

NAME = Raham zeb   (1)   Solution paper.

Question no 1:- Multiple choice questions.

(1) An increase in body resistance.

(2) opening a manually operated high volage disconned switch

(3) Third

(4) Reducing

(5) Transducer

Qno2:- Draw digital logic circuit and ladder diagram that is equivalent to the following Boolean function that will initiate a motor "M" to start?

Ans:- $\qquad M = (\bar{B}\cdot C\cdot \bar{D}) + (\bar{B}\cdot C\cdot E) + (\bar{B}\cdot C\cdot F)$

Logic Diagram- $M = B'C'D + B'C'E + B'C'F$

Logic Diagram
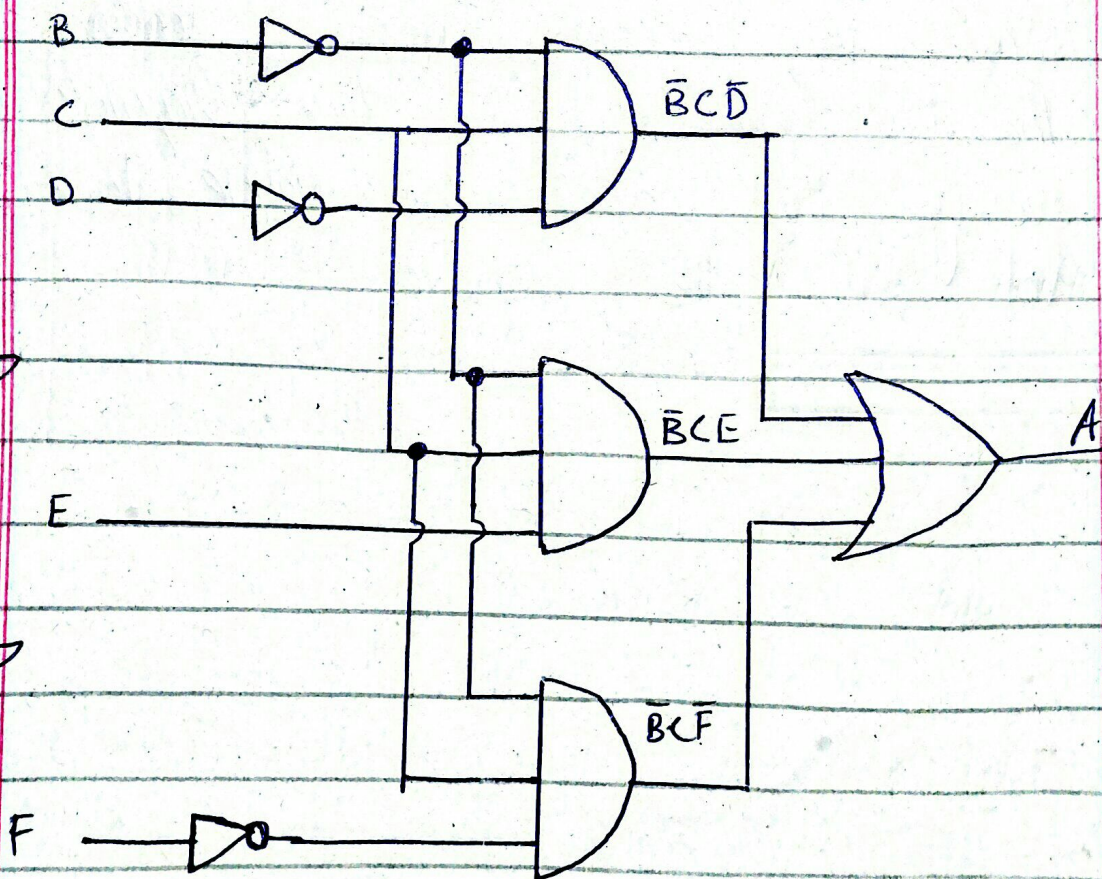
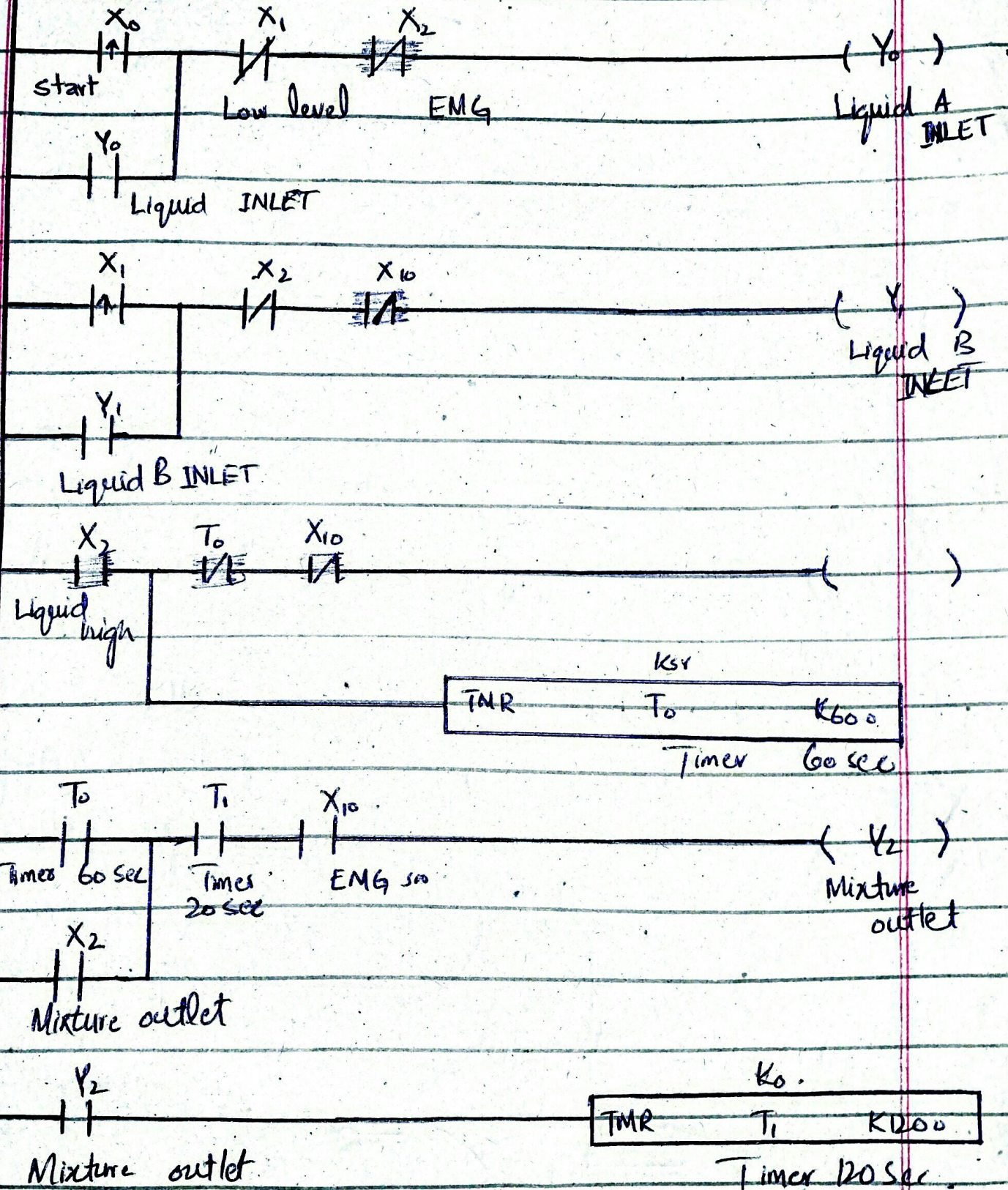## Ladder Diagram
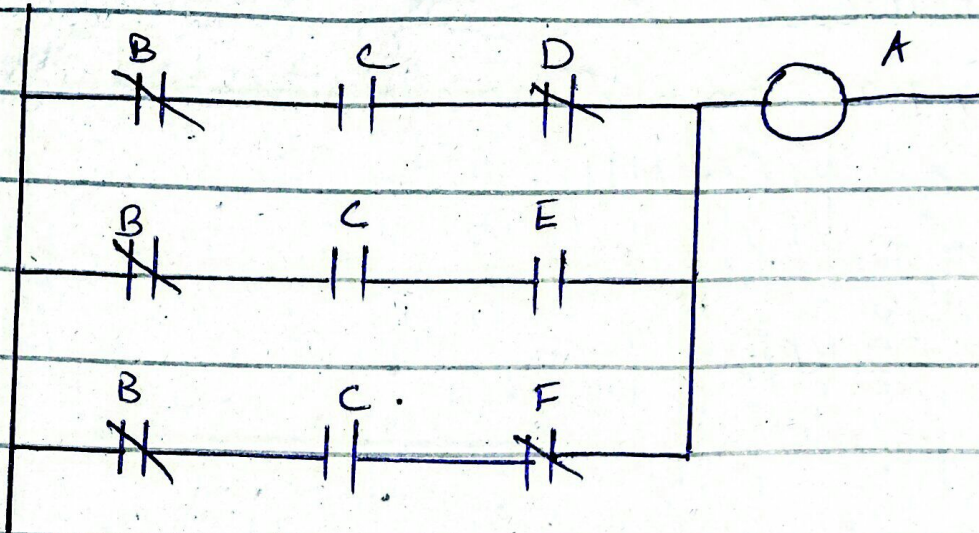
Question no 3:-

A. Describe and draw ladder 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?

Ans:-

```
      X₀              X₁         X₂
    ──┤↑├──┬────────┤/├───────┤/├──────────────────────( Y₀ )
    start  │       Low level    EMG                      Liquid A
           │                                             INLET
      Y₀   │
    ──┤ ├──┘
      Liquid INLET


      X₁              X₂         X₁₀
    ──┤↑├──┬────────┤/├───────┤/├──────────────────────( Y₁ )
           │                                             Liquid B
           │                                             INLET
      Y₁   │
    ──┤ ├──┘
    Liquid B INLET


      X₂              T₀         X₁₀
    ──┤ ├──┬────────┤/├───────┤/├──────────────────────(    )
    Liquid │
    high   │
           │                              ┌─────────────Ksr──────────┐
           └──────────────────────────────│ TMR      T₀      K₆₀₀    │
                                          └───────────────────────────┘
                                                    Timer 60 sec


      T₀              T₁         X₁₀
    ──┤ ├──┬────────┤ ├───────┤ ├──────────────────────( Y₂ )
  Timer 60 sec│    Timer      EMG s∞                    Mixture
           │     20 sec                                 outlet
      X₂   │
    ──┤ ├──┘
    Mixture outlet


      Y₂                                  ┌─────────────K₀──────────┐
    ──┤ ├───────────────────────────────│ TMR      T₁      K₂₀₀    │
                                         └───────────────────────────┘
    Mixture outlet                                Timer 120 sec
```

Number of PLC Inputs.

X_1 - Start Switch

X_1 - Low level float Sensor.

$X_1 = ON$ when the level reches X_1.

X_2 - High level float Sensor.

$X_2 = ON$ when the button is pressed.

$X_3 = $ Stop Switch

X_{10} - Emergency stop button.

$X_{10} = ON$ when the button is pressed.

Number of PLC Outputs.

Y_0 - Liquid A inlet.

Y_1 - Liquid B inlet.

Y_2 - Mixture outlet -

Y_3 - Agitator / stirrer.

Number of PLC Timers Required.

~~T 60 sec~~ , 100ms

T_0 - 60 second Timer, 100 ms Time Base   60k present value timer

T_1 - 120 second Timers, 100 ms Time Base   1200 prest value timers

Ladders Program Description.

* X_0 = ON when start is pressed. Y_0 will be ON and latched and the value will be opened for infusing liquid A until the level reaches the low float sensor.

* X_1 = ON when the level reaches the low-level float sensor. Y_1 will be on and latched and the value will be opened for infusihing 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 timers.

To will start to ~~Goto~~ count for 60 sec. T_0 will stop working. Y_2 will be ON and latched and the mixture will drain out of the container.

* When $Y_2 = ON$ timer T_2 will start to count for 120 sec. After 120 sec T_1 will be ON and Y_2 will be off the draining process will be stopped