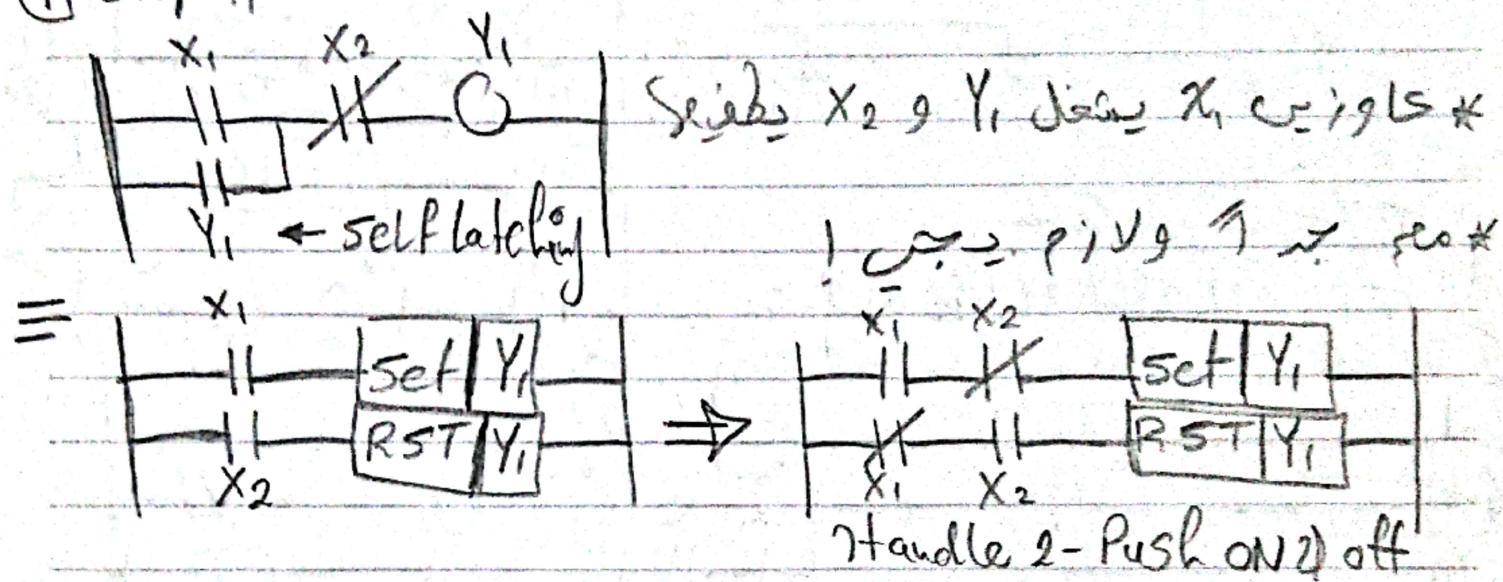


let x_i be any
Condition

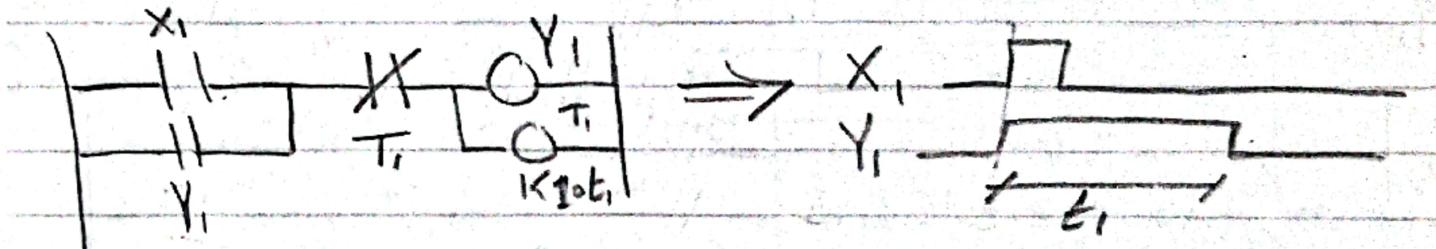
PLC Patterns Part 1

5h X1
Time +
Count S

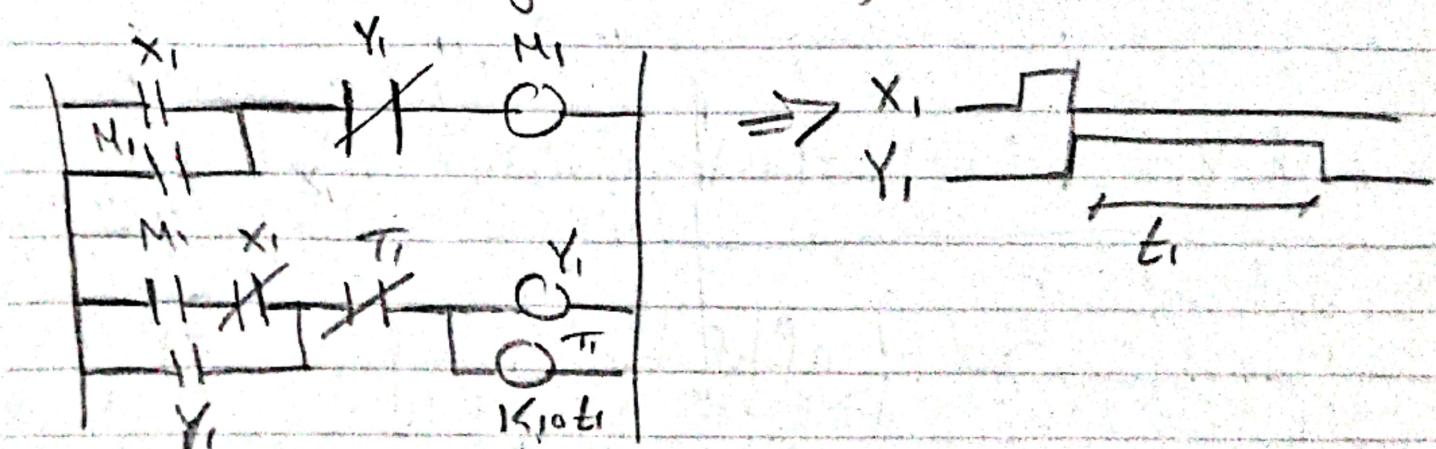
① ON/off



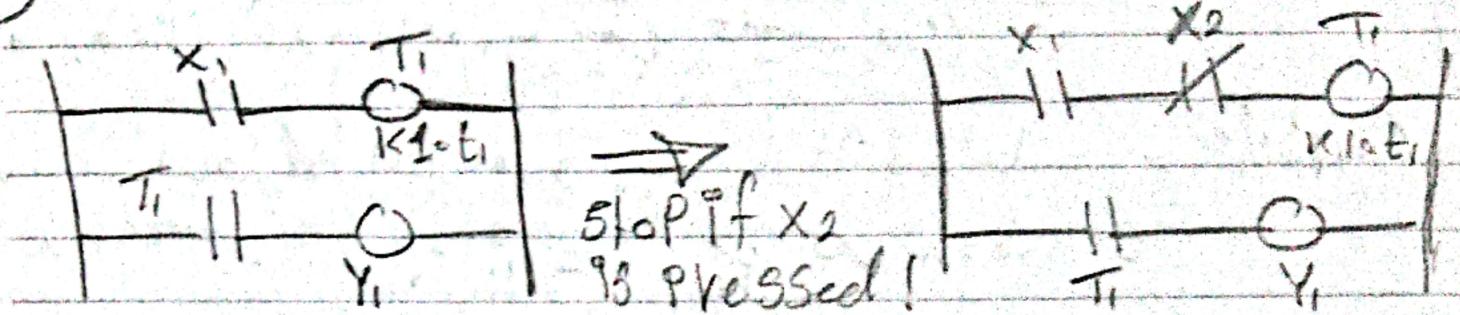
② Start with x_1 , ON for t_1 , then off (automatically)



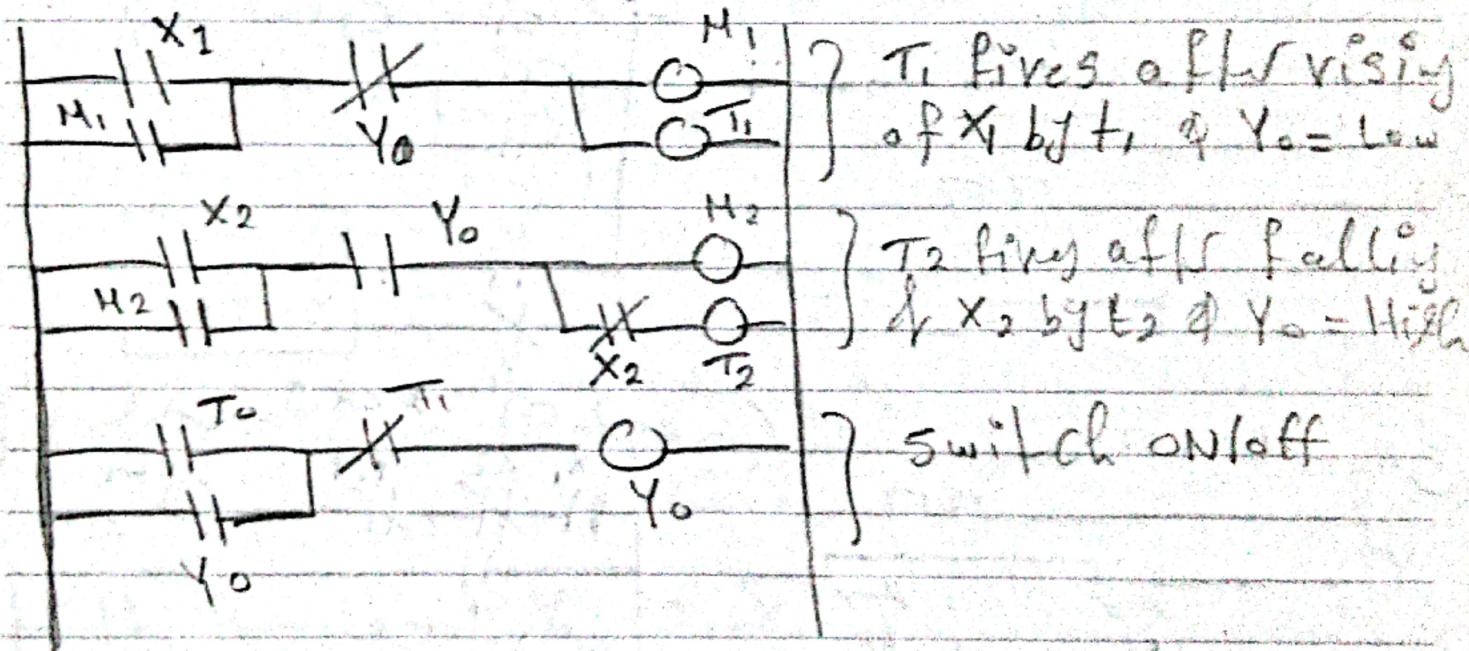
start with falling edge of x_1 , ON for t_1 , then off



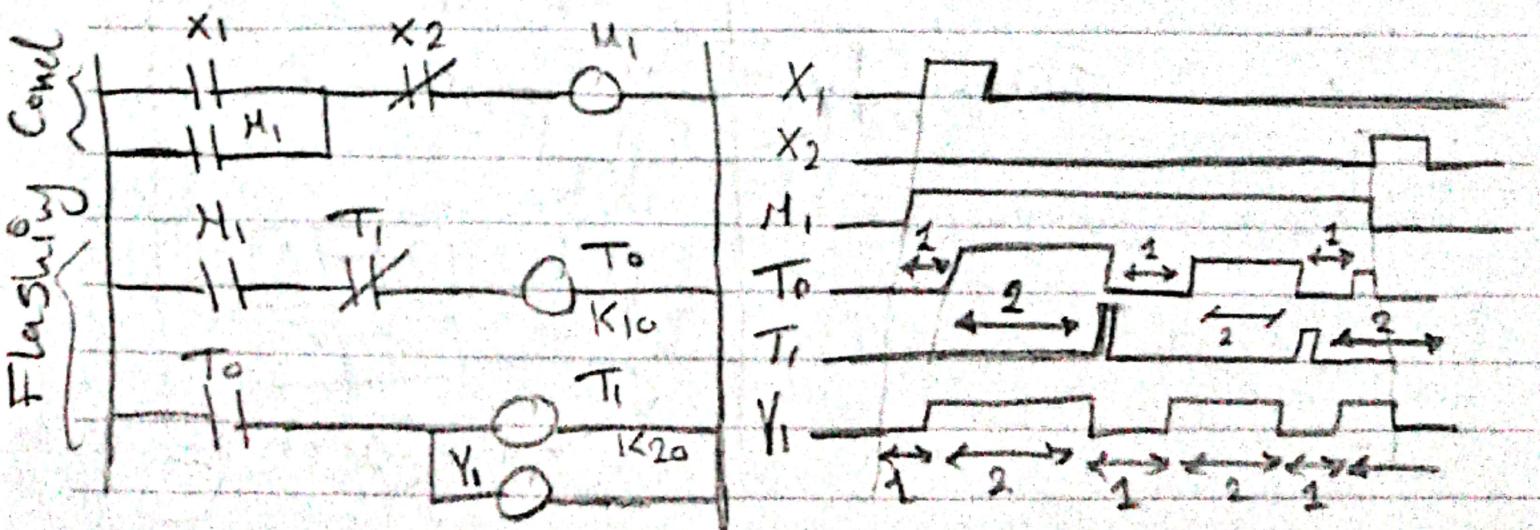
3) Do if $X_1 = 1$ for time t_1 , without interrupt



4) Start after pressing X_1 b/t t_1
Stop after releasing X_2 b/t t_2



5) Make a flashing lamp \rightarrow start by X_1 \rightarrow stop by X_2



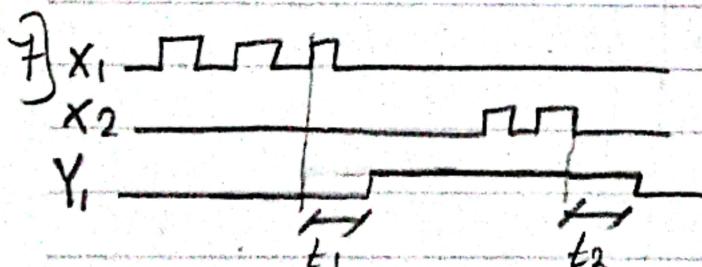
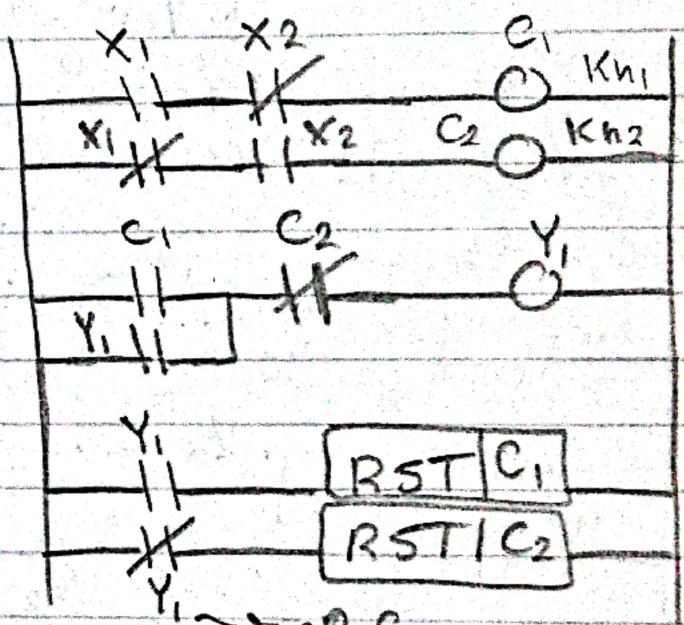
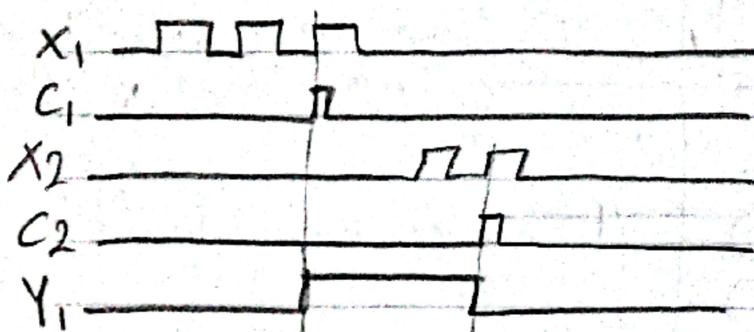
Note

time = t \rightarrow

Timers \rightarrow (1) يطلب بعده High \rightarrow طول ما يطلب \rightarrow time = t
 \rightarrow (Low) \rightarrow time \rightarrow time \rightarrow time \rightarrow time

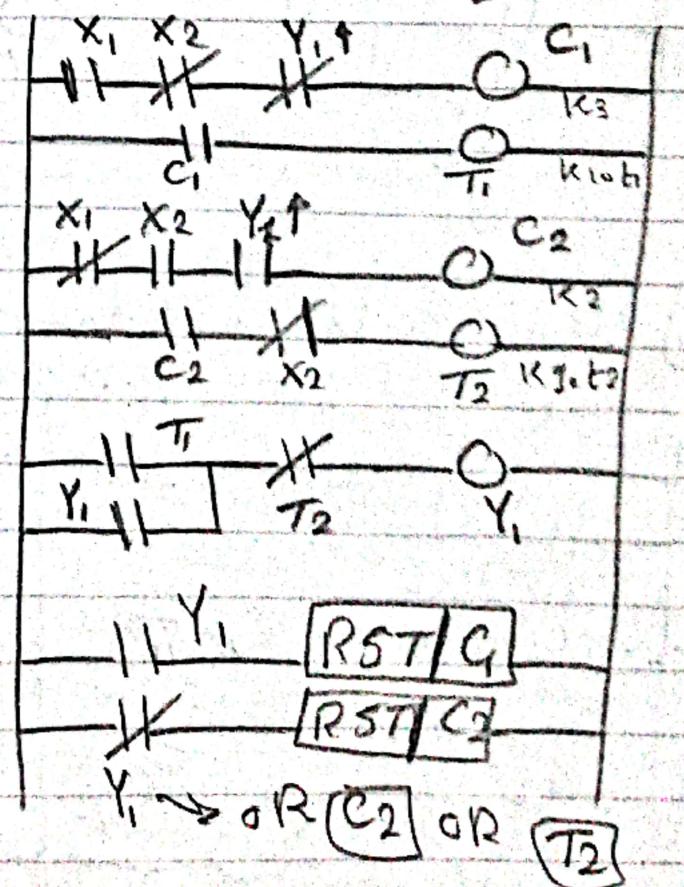
Counters \rightarrow level High و rising edges \rightarrow Count = n \rightarrow RST \rightarrow start

- ① $Y_1 = 1$ after n_1 edges on X_1
 $Y_2 = 0$ after n_2 edges on X_2



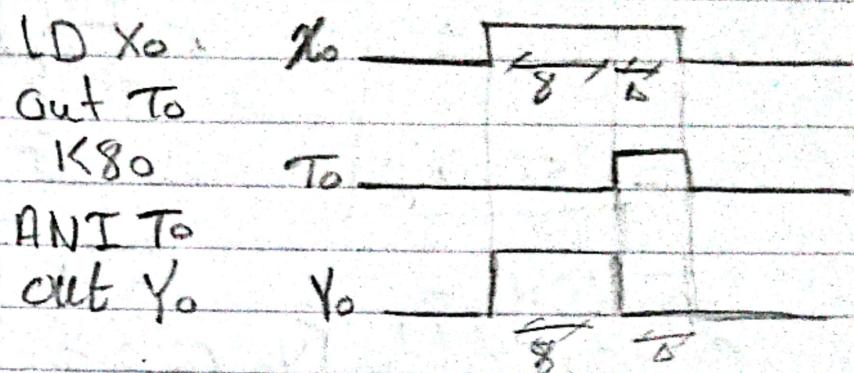
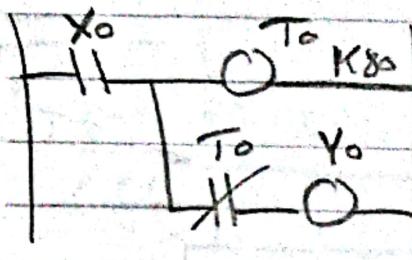
start after releasing X_2

switching of Y_1



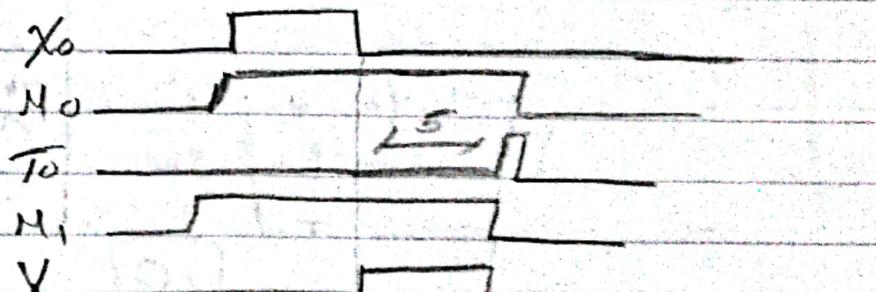
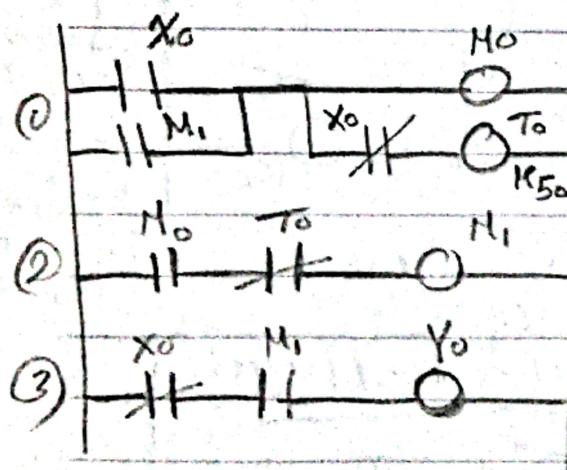
PLC Sheet 1

Q.1



Jed, High \rightarrow true, false \rightarrow PLC fires \Rightarrow output T 11
! false \rightarrow false \Rightarrow true else

Q.2

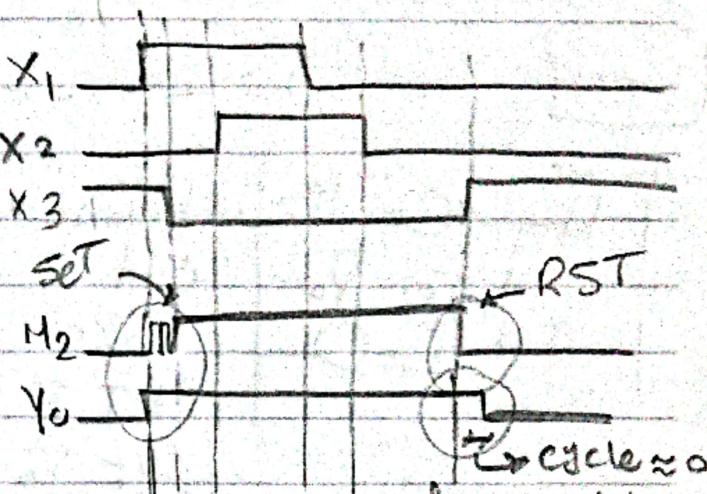
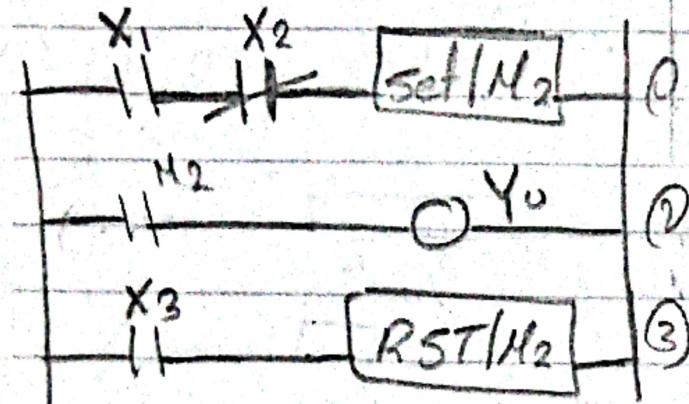


① ② ③
LD X0 LD N0 LD X0

AND M1 ANI N0 AND M1
out N0 out X0 out Y0

ANI X0
out To
K50

Q:3 The program runs in a sequential manner. $1 \rightarrow 2 \rightarrow 3$



$LD X_1$
 $AN I X_2$
 $SET M_2$
 $LD X_3$
 $RST M_2$

$\{ 0 \}$
 $00 T Y_0 \} 2$
 $LD X_3 \} 3$

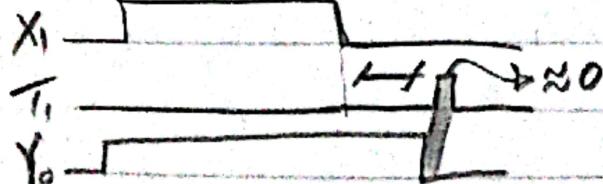
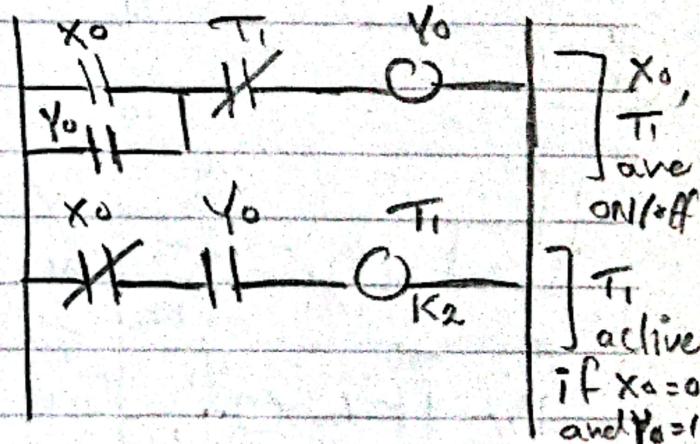
$[Y_0 can't set the RST for M_2 until]$
 $[the next cycle!]$

Q:4 Rel \rightarrow if $x_0 = 1$
 $\rightarrow Y_0 = 1$

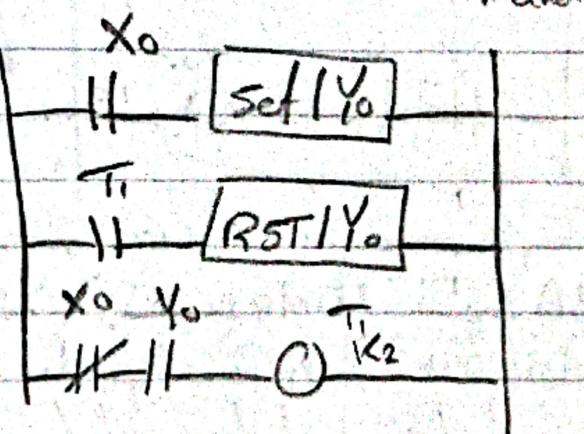
if $x_0 = 0$

$\rightarrow Y_0 = 0$

after $t = 2.5$ sec

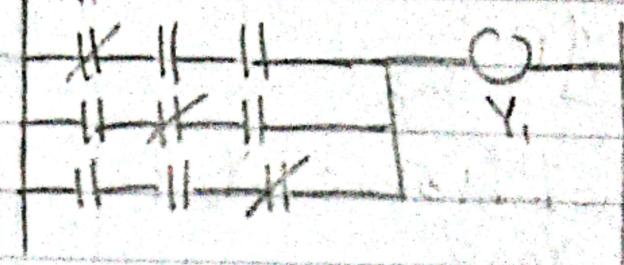


OR



Q: 5 if any two in PLS are high $\rightarrow Y_1 = \text{high}$
 $\text{e.g. } (1, 0, 3) \rightarrow Y_1 = \text{high}$

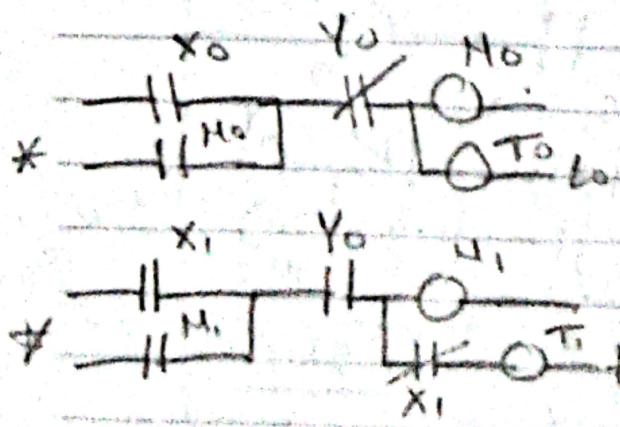
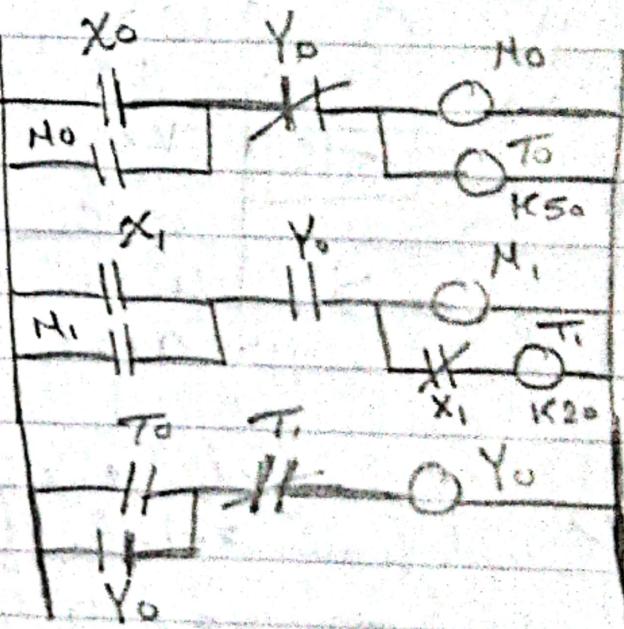
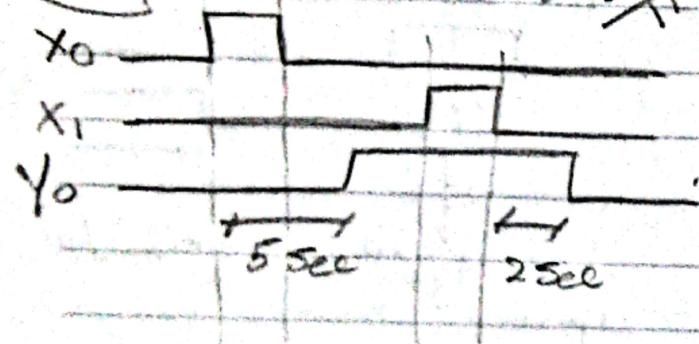
$X_1 \ X_2 \ X_3$



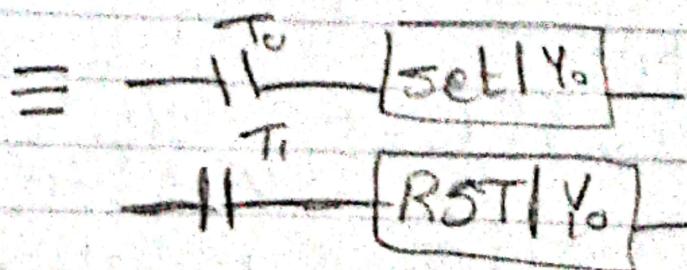
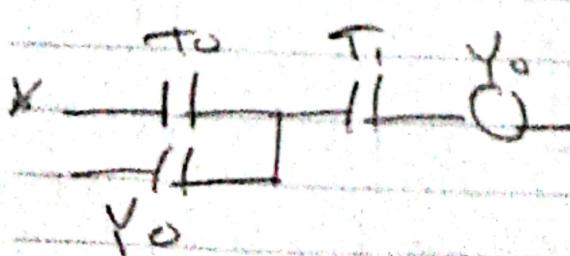
$$Y_1 = (\bar{X}_1 \cdot X_2 \cdot X_3) + \left\{ \begin{array}{l} (X_1 \cdot \bar{X}_2 \cdot X_3) + \\ (X_1 \cdot X_2 \cdot \bar{X}_3) \end{array} \right\}$$

LD X_1 LD X_1 LD X_1 out Y_1
 AND X_2 AND X_2 AND X_2
 AND X_3 AND X_3 AND X_3
 ORB ORB

(Q: 6) ~~Ans~~



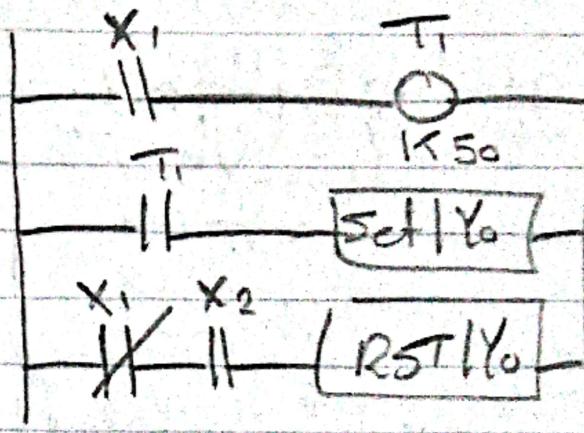
Look $\rightarrow Y_0$ goes high when X_0 goes high and X_1 goes high
 fire T_0 or X_0 to initial
 $Y_0 = \text{High}$ if X_1 goes high, fire T_1
 fire T_1 cause T_1 to initial



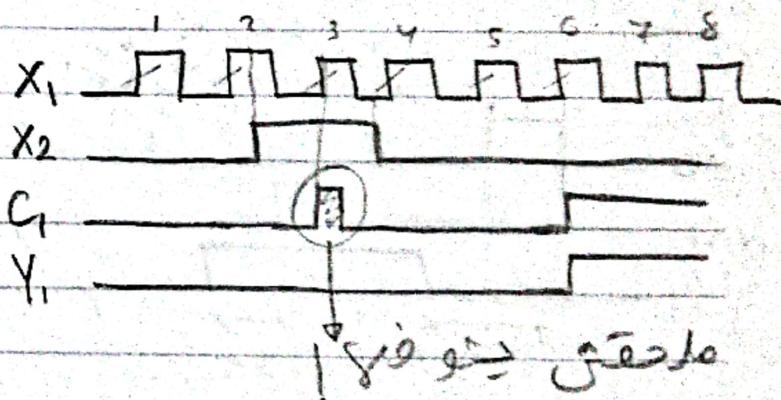
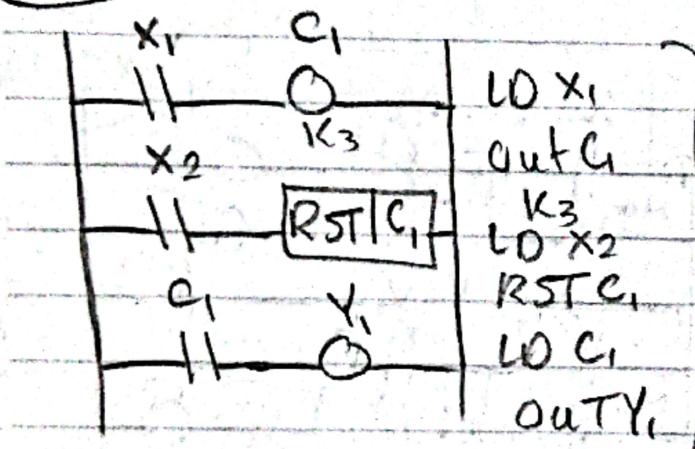
Q.7 Rel 7

If $x_1 = 1$ for 5 sec $\Rightarrow Y_0 = 1$
 else $Y_0 = 0$

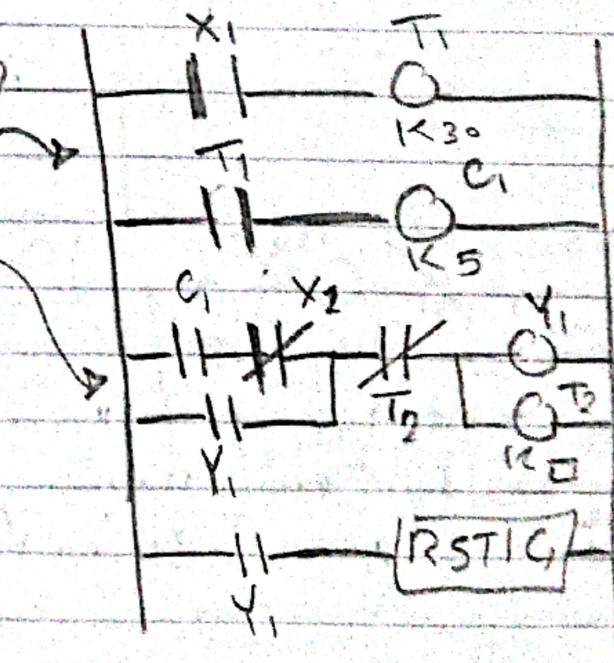
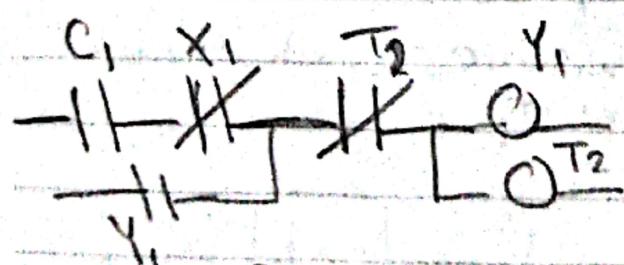
If $x_2 = 1 \Rightarrow Y_0 = 0$
 $x_1 = 0$



Q.8



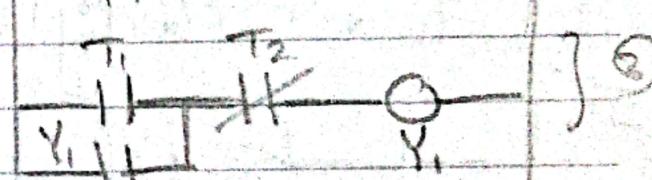
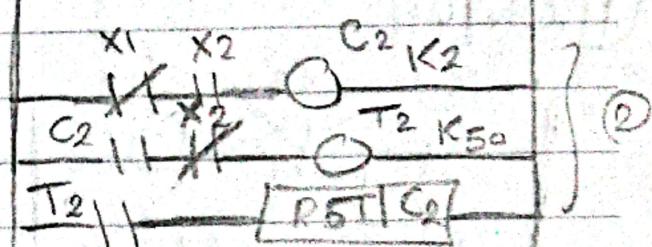
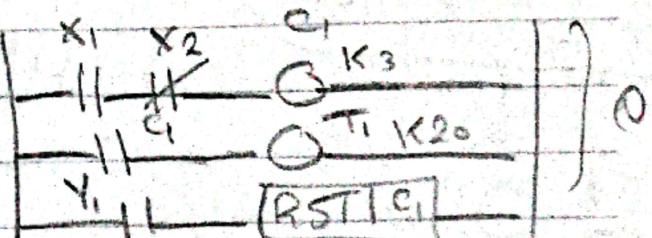
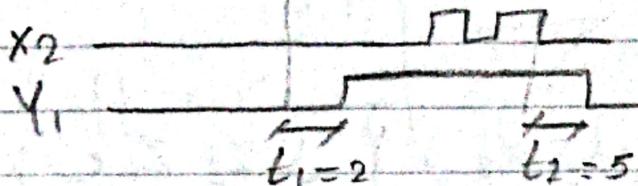
Q: If 5 rising edges on X₁,
and remain 3 sec in
each $\rightarrow Y_2 = 1$
for 20 minutes



\rightarrow If $C_1 = 1 \quad \left\{ \begin{array}{l} Y_1 = 1 \text{ if } T_2 \text{ starts Counting,} \\ (\text{Released}) X_1 = 0 \end{array} \right.$

Q: 10. تجربة لـ JK مترافق مع RS

6-a X_1

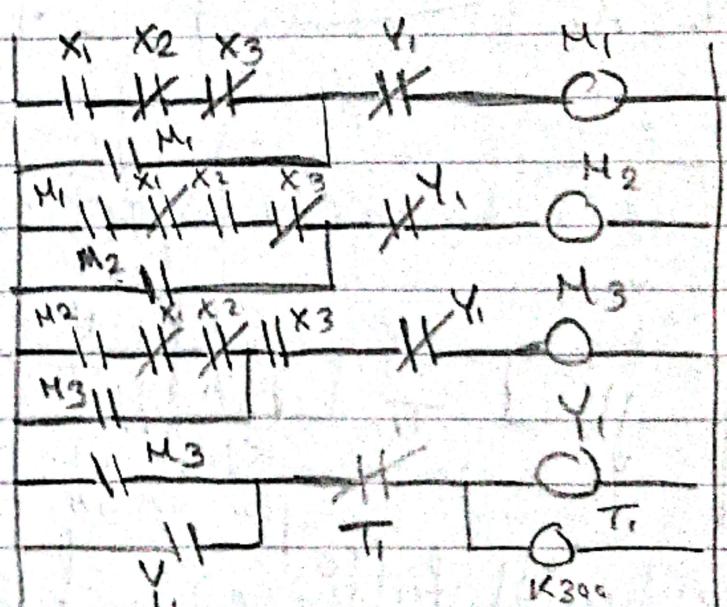
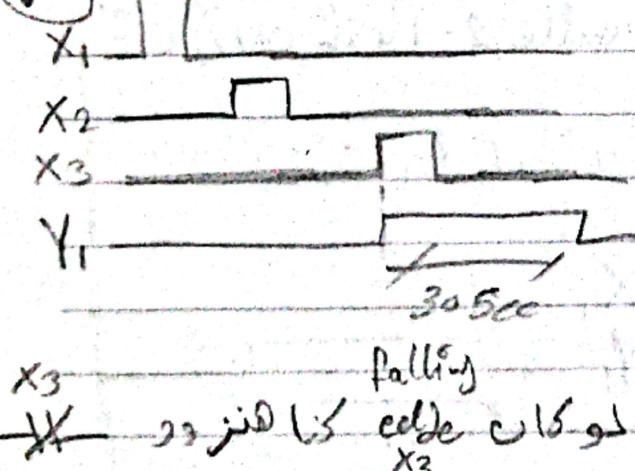


③ $T_1/T_2 = \text{ON}/\text{OFF}$

① T_1 is ON after 3 cycles by 2-sec

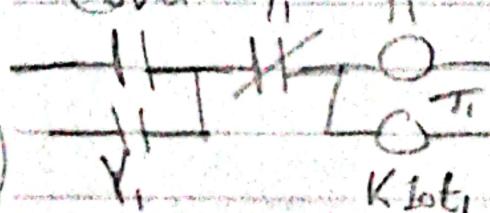
② T_2 is ON after 2 cycles by 5-sec

6-b



* if $Y_1 = 1$ (done), start again!

Cond



after the Cond fires, stay high for t, then go low!