حل تمرین سری نهم درس مدار منطقی

پاسخ سوال ۱ :

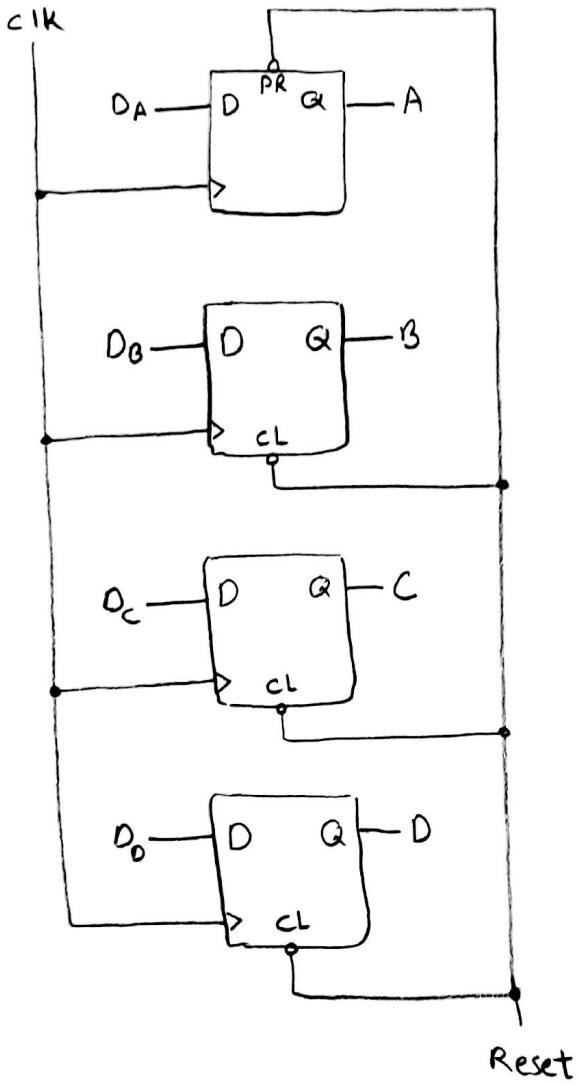
الف)

$$D_A = A\bar{x} + D$$

$$D_B = Ax + B\bar{x}\bar{y} + C\bar{y}$$

$$D_C = Bx\bar{y} + By\bar{z}$$

$$D_D = Byz + Cy$$



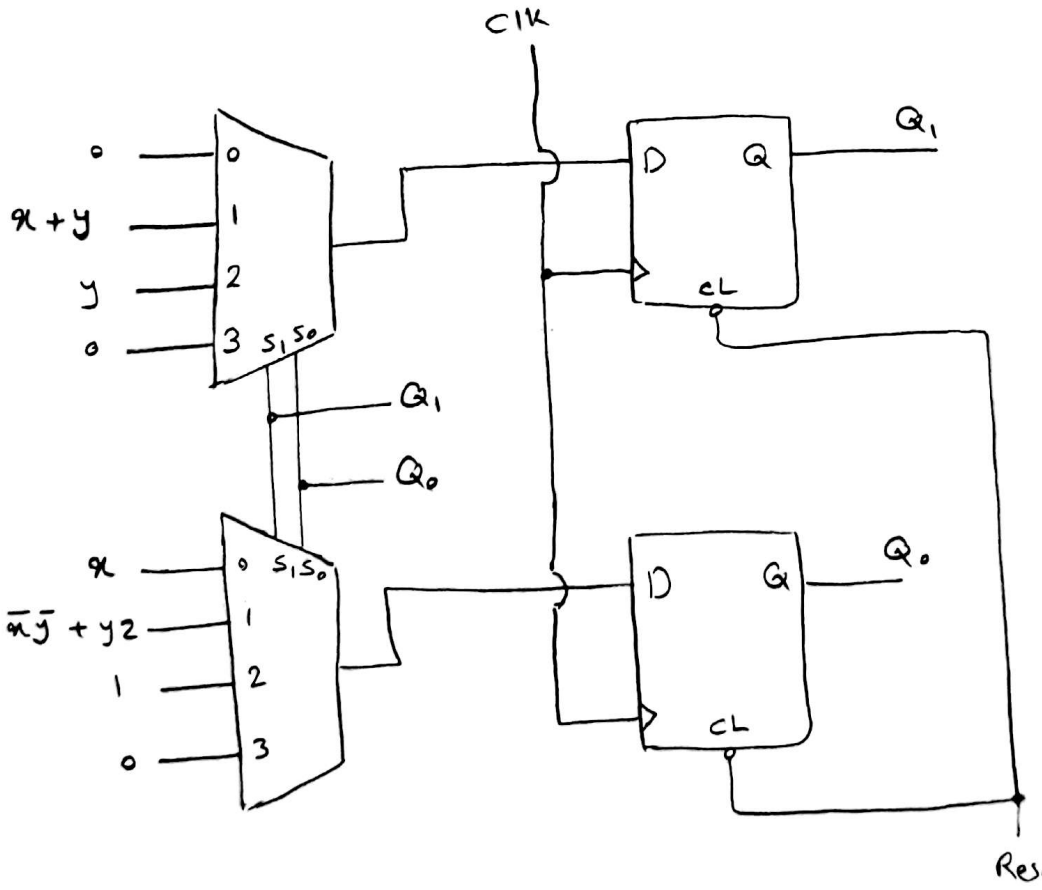
خروجی ها :

$$out1 = B + C\bar{y}$$

$$out2 = D + By$$

ب)

	P.S $Q_1\ Q_0$	N.S $Q_1^+\ Q_0^+$	ورودی	ورودی های mux: mux1	mux0
A	0 0	0 0	$\bar{x}$	$I_0 = 0$	$I_0 = x$
		0 1	x		
B	0 1	0 1	$\bar{x}\bar{y}$	$I_1 = x\bar{y} + y\bar{z} + yz$	$I_1 = \bar{x}\bar{y} + yz$
		1 0	$x\bar{y} + y\bar{z}$	$= x\bar{y} + y = x + y$	
		1 1	yz		
C	1 0	0 1	$\bar{y}$	$I_2 = y$	$I_2 = 1$
		1 1	y		
D	1 1	0 0	—	$I_3 = 0$	$I_3 = 0$



خروجی ها:

$$out1 = \bar{Q}_1 Q_0 + Q_1 \bar{Q}_0 \bar{y}$$

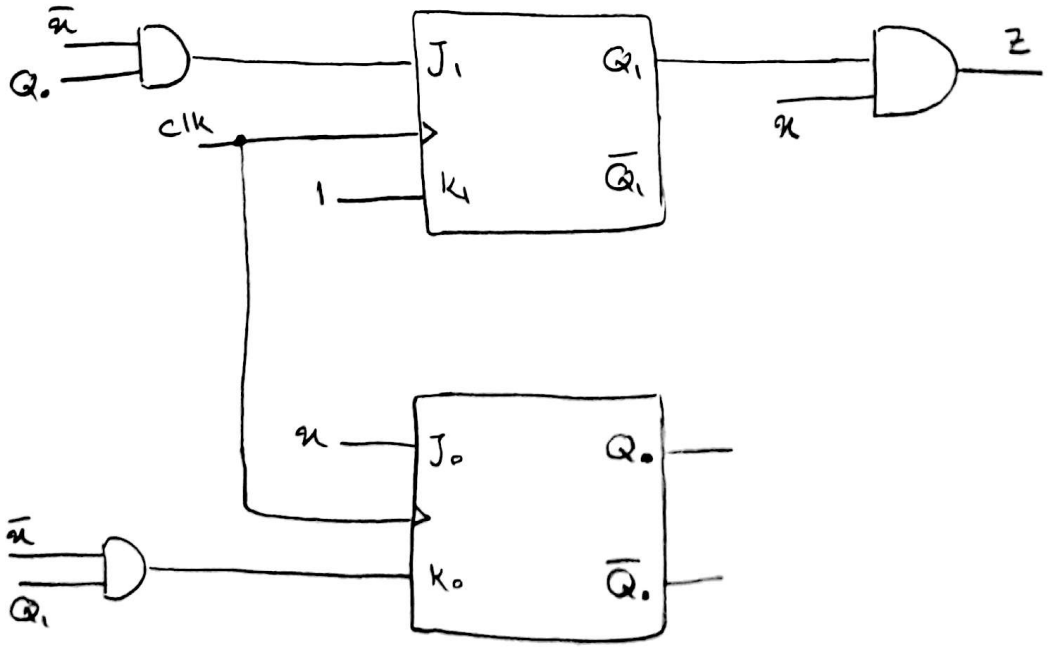
$$out2 = \bar{Q}_1 Q_0 y + Q_1 Q_0$$

پاسخ سوال ۲ :

Present state	P.S $Q_1\ Q_0$	Input x	N.S $Q_1^+\ Q_0^+$	FF inputs $J_1\ K_1\ J_0\ K_0$	output Z
T_0	0 0	0	0 0	0 x 0 x	0
	0 0	1	0 1	0 x 1 x	0
T_1	0 1	0	1 1	1 x x 0	0
	0 1	1	0 1	0 x x 0	0
T_2	1 1	0	0 0	x 1 x 1	0
	1 1	1	0 1	x 1 x 0	1

$$\begin{cases} J_1 = \bar{x} Q_0 \\ K_1 = 1 \end{cases} \qquad \begin{cases} J_0 = x \\ K_0 = \bar{x} Q_1 \end{cases}$$

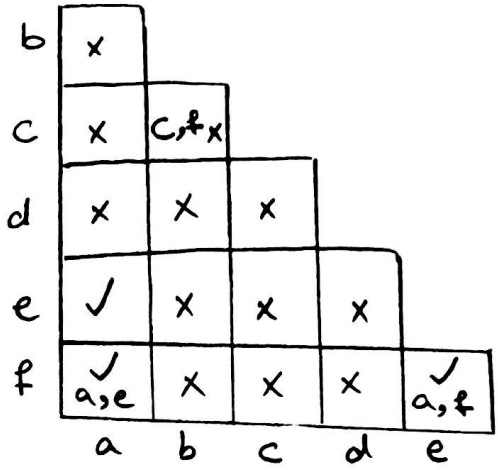
output : $Z = Q_1 x$

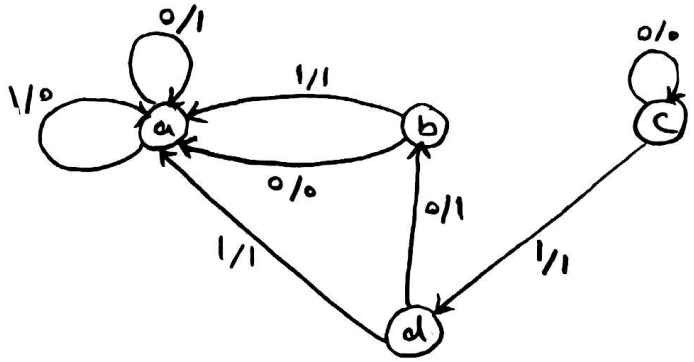


پاسخ سوال ۳ :

P.S	N.S		output	
	x=0	x=1	x=0	x=1
a	a	f	1	0
b	f	e	0	1
c	c	d	0	1
d	b	f	1	1
e	e	f	1	0
f	e	a	1	0

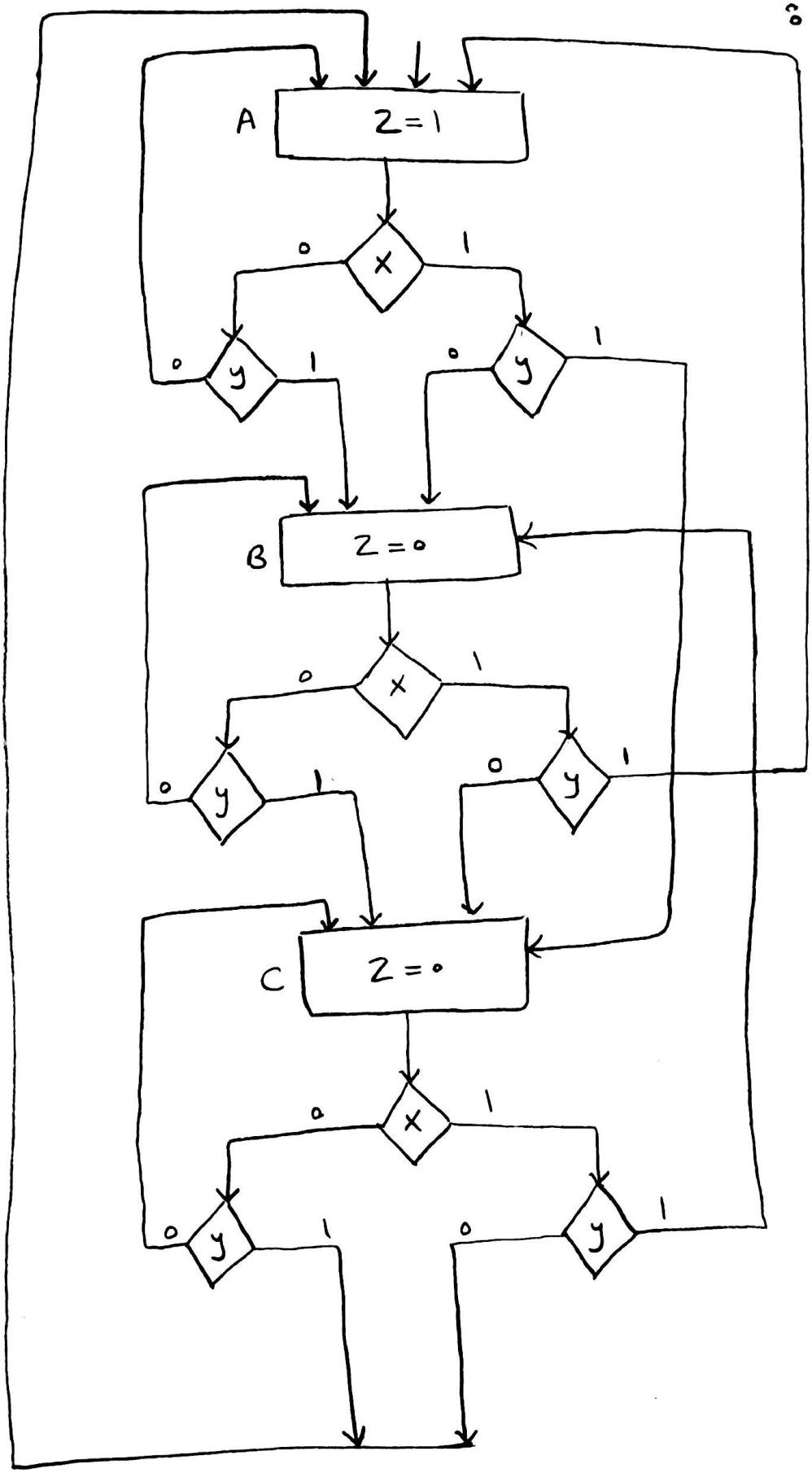
(a,e,f) , b , c , d





مدار از نوع میلی است زیرا
خروجی هم به حالت فعلی بستگی دارد
و هم به ورودی .

پاسخ سوال ۴ :



پاسخ سوال ۵:

P.S		input			N.S		output		
A	B	x_1	x_2	x_3	A^+	B^+	Z_1	Z_2	Z_3
0	0	0	0	0	0	0	1	1	0
		0	0	1	0	0	1	1	0
		0	1	0	0	1	1	1	0
		0	1	1	0	1	1	1	0
		1	0	0	0	1	1	0	1
		1	0	1	1	0	1	0	1
		1	1	0	0	1	1	0	1
		1	1	1	1	0	1	0	1
0	1	0	0	0	0	1	0	0	1
		0	0	1	0	1	0	0	1
		0	1	0	0	1	0	0	1
		0	1	1	0	1	0	0	1
		1	0	0	1	0	0	0	0
		1	0	1	1	0	0	0	0
		1	1	0	1	0	0	0	0
		1	1	1	1	0	0	0	0
1	0	0	0	0	0	1	0	1	0
		0	0	1	0	1	0	1	0
		0	1	0	0	0	0	1	0
		0	1	1	0	0	0	1	0
		1	0	0	0	1	0	1	0
		1	0	1	0	1	0	1	0
		1	1	0	0	0	0	1	0
		1	1	1	0	0	0	1	0

با توجه به جدول حالت معادلات خروجی را بدست می آوریم :

$$\begin{cases} D_A = A^+ = B x_1 + \bar{A} x_1 x_3 \\ D_B = B^+ = B\bar{x}_1 + A\bar{x}_2 + \bar{A}\bar{x}_1\bar{x}_2 + \bar{A}\bar{B}x_1\bar{x}_3 \\ z_1 = \bar{A}\bar{B} \\ z_2 = A + \bar{B}\bar{x}_1 \\ z_3 = \bar{A}\bar{B}x_1 + \bar{A}B\bar{x}_1 \end{cases}$$