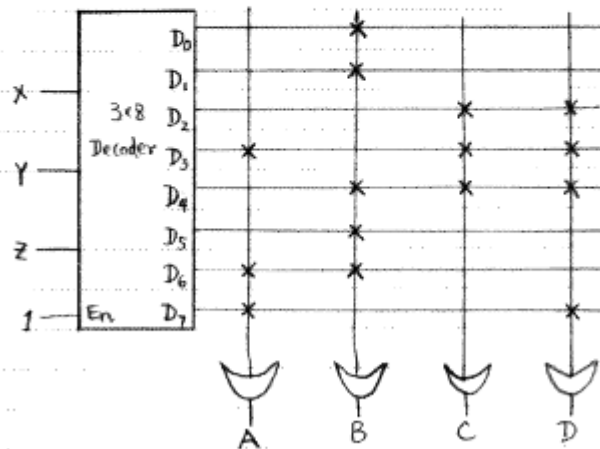


Assignment 3 – Partial Solutions

Q1

a)

XYZ	ABCD	XYZ	ABCD	XYZ	ABCD	XYZ	ABCD
000	0100	010	0011	100	0111	110	1100
001	0100	011	1011	101	0100	111	1001

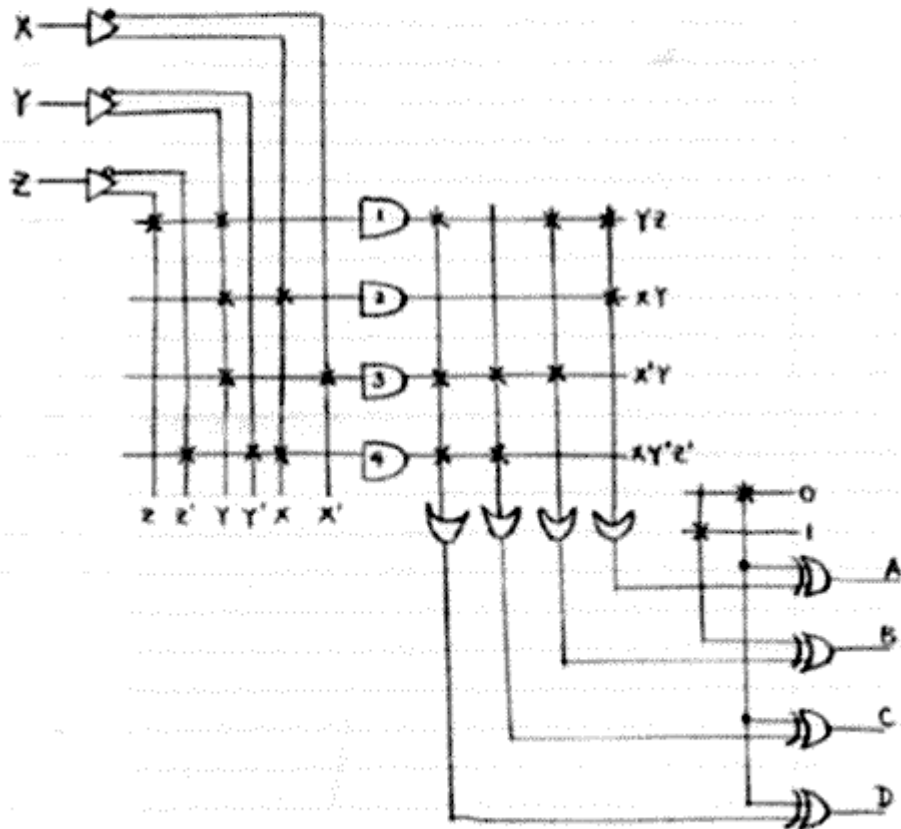


- b) $A = XY + YZ$ $A' = Y' + X'Z'$
 $B = Y' + XZ'$ $B' = YZ + X'Y$
 $C = X'Y + XY'Z'$ $C' = X'Y' + Y'Z + XY$
 $D = X'Y + YZ + XY'Z'$ $D' = X'Y' + Y'Z + XYZ'$
 Best option: A, B', C, D (4 terms).

Q1

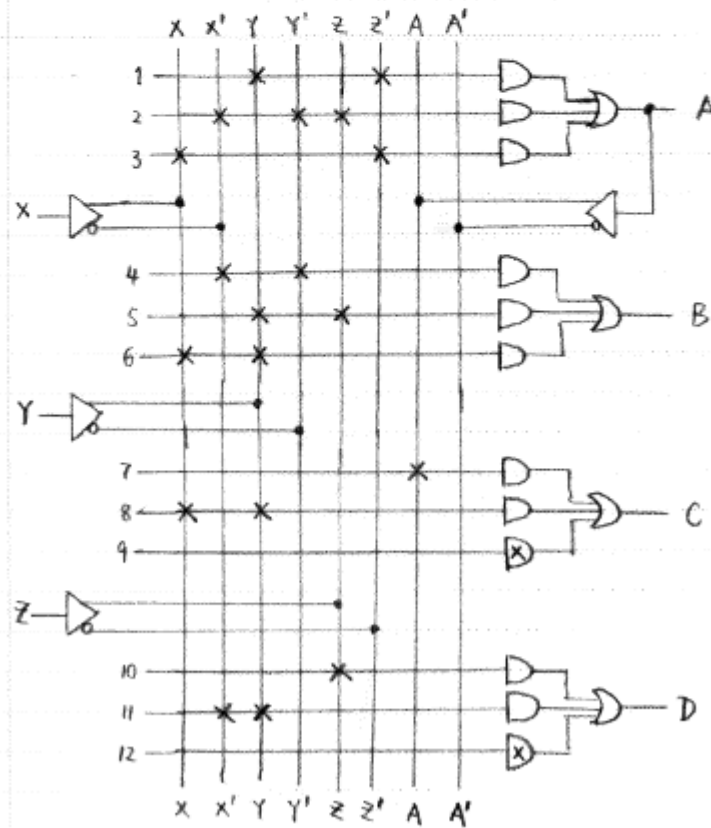
b)

ITEM	INPUT	OUTPUT
	X Y Z	A B C D
YZ	1	1 1 1 1
XY	2	1 1 1 1
X'Y	3	0 1 1 1
XYZ	4	1 0 0 1



Q2

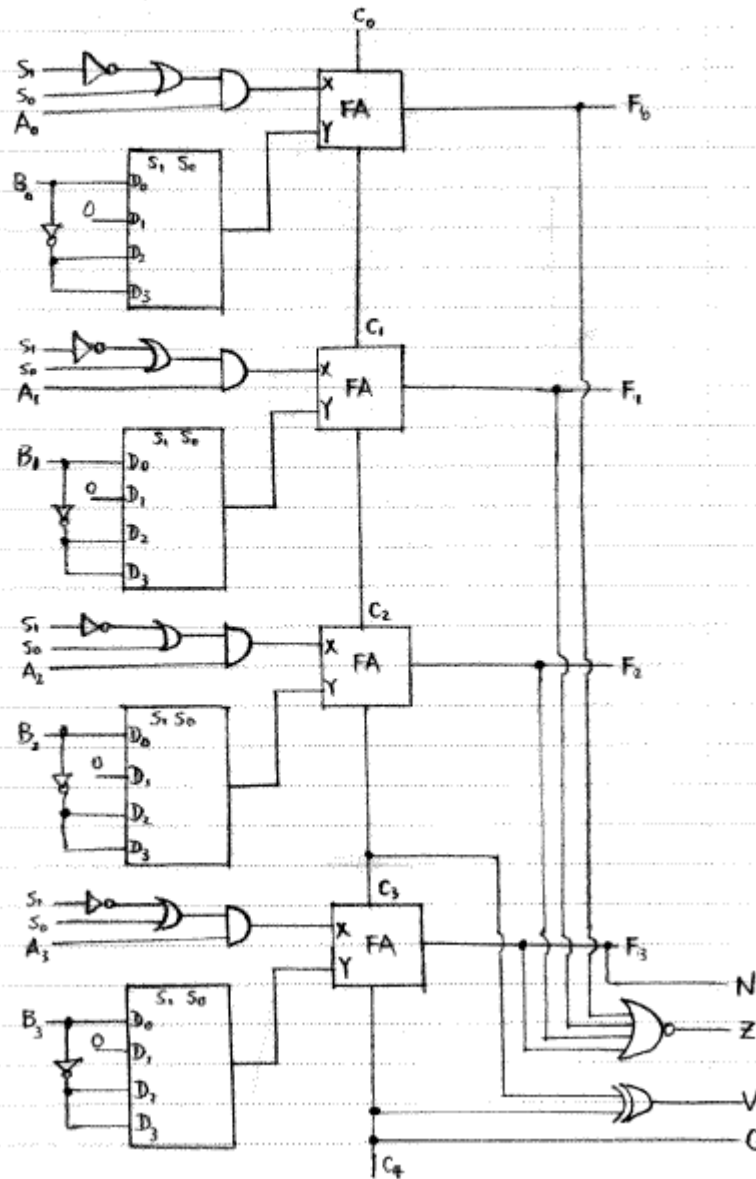
PTERM		INPUTS			
		X	Y	Z	A
YZ	1	-	1	0	-
$\bar{X}YZ$	2	0	0	1	-
XZ	3	1	-	0	-
XY	4	0	0	-	-
YZ	5	-	1	1	-
XY	6	1	1	-	-
A	7	-	-	-	1
XY	8	1	1	-	-
-	9	-	-	-	-
Z	10	-	-	1	-
$\bar{X}Y$	11	0	1	-	-
-	12	-	-	-	-



Q3

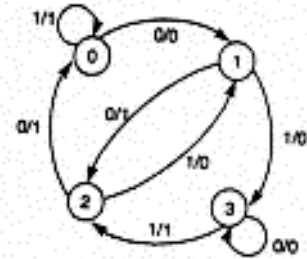
$$X = AS_1' + AS_0$$

$$Y = BS_1'S_0' + B'S_1$$



Q4. a) $JA = JB = B$, $KA = B'$, $KB = (A \oplus X)' = AX + A'X'$, $Y = A \oplus X \oplus Y$

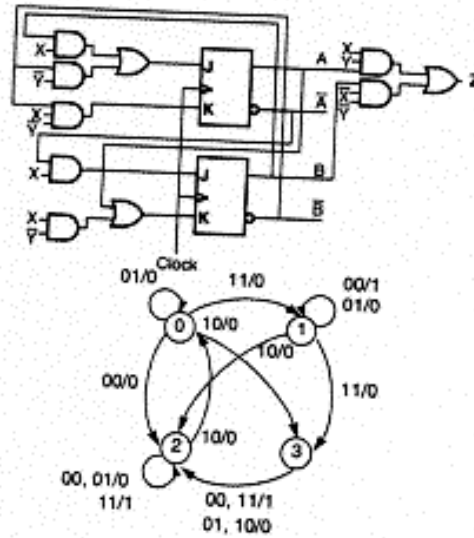
Present state		Input		Next state		Output
A	B	X		A	B	Y
0	0	0		0	1	0
0	0	1		0	0	1
0	1	0		1	0	1
0	1	1		1	1	0
1	0	0		0	0	1
1	0	1		0	1	0
1	1	0		1	1	0
1	1	1		1	0	1



b)

4-19.

Present state		Inputs		Next state		Output
A	B	X	Y	A	B	Z
0	0	0	0	1	0	0
0	0	0	1	0	0	0
0	0	1	0	1	1	0
0	0	1	1	0	1	0
0	1	0	0	0	1	1
0	1	0	1	0	1	0
0	1	1	0	1	0	0
0	1	1	1	1	1	0
1	0	0	0	1	0	0
1	0	0	1	1	0	0
1	0	1	0	0	0	0
1	0	1	1	1	0	1
1	1	0	0	1	0	1
1	1	0	1	1	0	0
1	1	1	0	1	0	0
1	1	1	1	1	0	1



Q5

a)

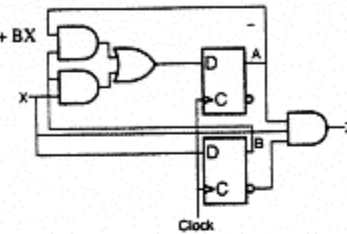
4-28.

Present state		Input	Next state		Output
A	B	X	A	B	Z
0	0	0	0	0	0
0	0	1	0	1	0
0	1	0	0	0	0
0	1	1	1	1	0
1	0	0	0	0	0
1	0	1	0	1	1
1	1	0	1	0	0
1	1	1	1	1	0

$$A(t+1) = AB + BX$$

$$B(t+1) = X$$

$$Y = ABX$$



b)

Present state		Input	Next state		FF Inputs			
A	B	X	A	B	S_A	R_A	S_B	R_B
0	0	0	0	0	0	X	0	X
0	0	1	0	1	0	X	1	0
0	1	0	1	0	1	0	0	1
0	1	1	0	1	0	X	X	0
1	0	0	1	0	X	0	0	X
1	0	1	1	1	X	0	1	0
1	1	0	1	1	X	0	X	0
1	1	1	0	0	0	1	0	1

$$S_A = B\bar{X}$$

$$R_A = BX$$

$$S_B = \bar{B}X$$

$$R_B = ABX + \bar{A}\bar{X}$$

