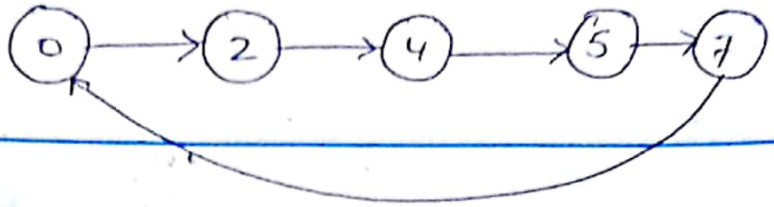
State Diagram



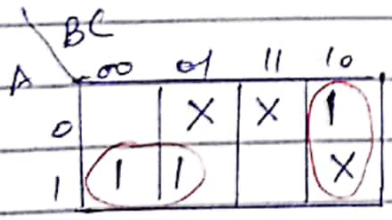
Q #1:

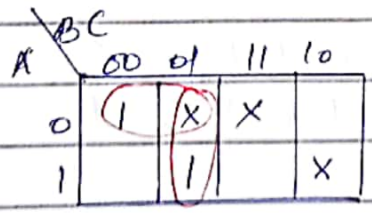
Present State			Next State			Flip-flop I/Ps		
A(t)	B(t)	C(t)	A(t+1)	B(t+1)	C(t+1)	D_A	D_B	D_C
0	0	0	0	1	0	0	1	0
0	0	1	X	X	X	X	X	X
0	1	0	0	0	0	1	0	0
0	1	1	X	X	X	X	X	X
1	0	0	1	0	1	1	0	1
1	0	1	1	1	1	1	1	1
1	1	0	X	X	X	X	X	X
1	1	1	⊗	⊗	⊗	⊗	⊗	⊗

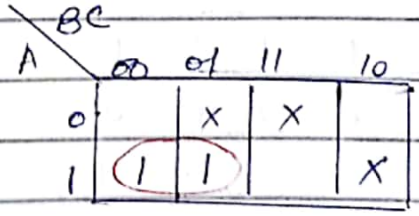
$$D_A = \sum m(2,4,5) + \sum d(1,3,6)$$

$$D_B = \sum m(0,5) + \sum d(1,3,6)$$

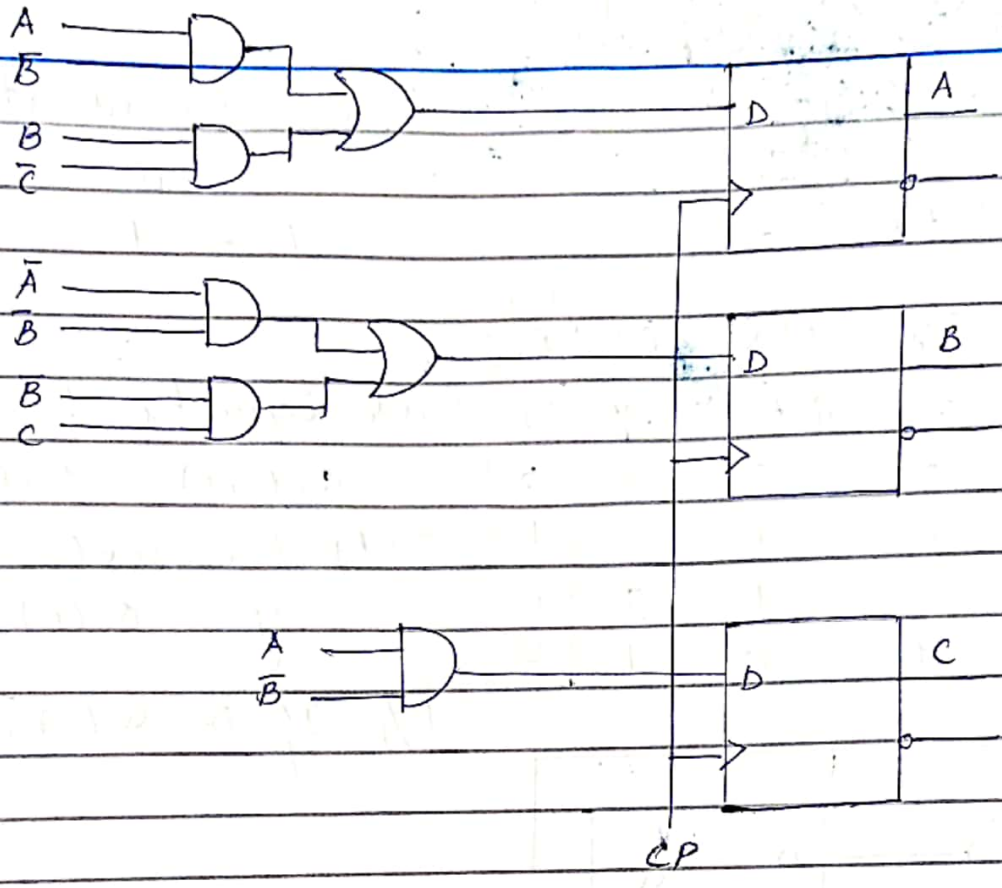
$$D_C = \sum m(4,5) + \sum d(1,3,6)$$







$D_A = A\bar{B} + B\bar{C}$ $\quad D_B = \bar{A}\bar{B} + \bar{B}C$ $\quad D_C = A\bar{B}$



Q.#2: F/Fs input equations:

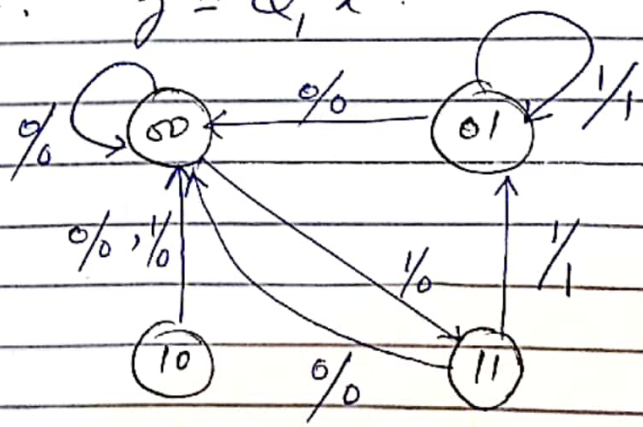
$$D_1 = Q1(t+1) = Q_1 x + Q_2' x$$

$$D_2 = Q_2(t+1) = Q_1' Q_2' x$$

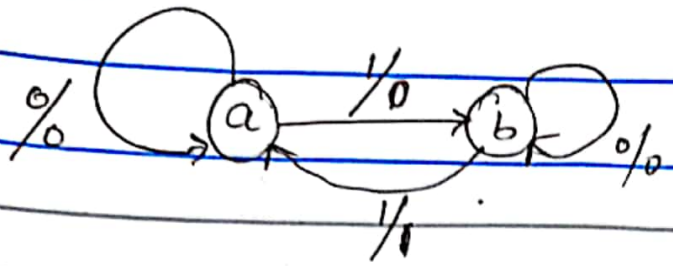
Output equation: $z = Q_1 x$

State table:

P.S.	I/P	N.S.	O/P
Q_2 Q_1	x	Q_2^+ Q_1^+	z
0 0	0	0 0	0
0 0	1	1 0	0
0 1	0	0 0	0
0 1	1	0 1	1
1 0	0	0 0	0
1 0	1	0 0	0
1 1	0	0 0	0
1 1	1	0 1	1



Q. #3 :



State Assignments

a — 0

b — 1

State Table

P.S.	I/p	N.S.	O/p	F/F I/p
Q(t)	x	Q(t+1)	y	D
0	0	0	0	0
0	1	1	0	1
1	0	1	0	1
1	1	0	1	0

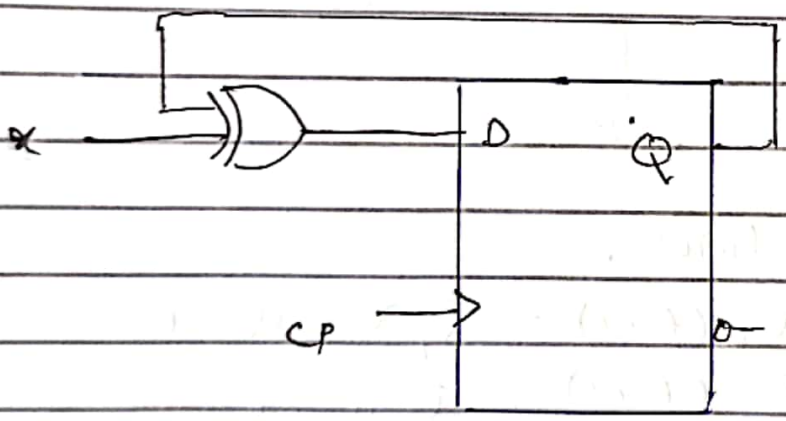
State Equation :

$$Q(t+1) = Q(t) \oplus x$$

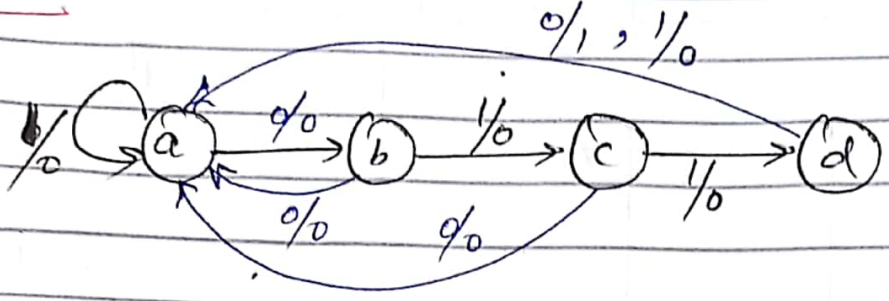
Output Equation

$$y = Q(t) \cdot x$$

F/F I/p $D = Q(t) \oplus x$.



Q. # 4 :



State Diagram of Sequence Recognizer

State Assignments :

a — 00
b — 01
c — 10
d — 11

State table

P.S.	I/P	N.S.	O/P	F/F I/PS	
A B	x	A(t+1) B(t+1)	y	D_A	D_B
0 0	0	0 0	0	0	0
0 0	1	0 0	0	0	0
0 1	0	0 0	0	0	0
0 1	1	1 0	0	1	0
1 0	0	0 0	0	0	0
1 0	1	1 1	0	1	1
1 1	0	0 0	1	0	0
1 1	1	0 0	0	0	0

$D_A = A'Bx + AB'x$

$= (A \oplus B)x$

$D_B = A'B'x' + AB'x$

$= (A \oplus x)' \cdot B'$

$y = ABx'$