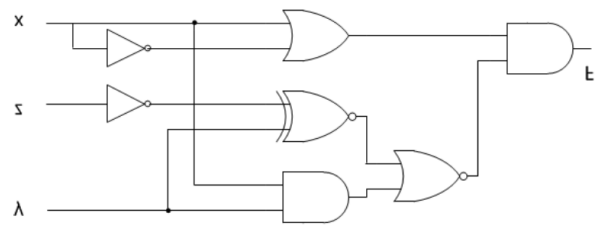
1. How many inputs does a decoder have if it has 64 outputs?

Ans 6

2. How many control lines does a multiplexer have if it has 32 inputs?

Ans 5

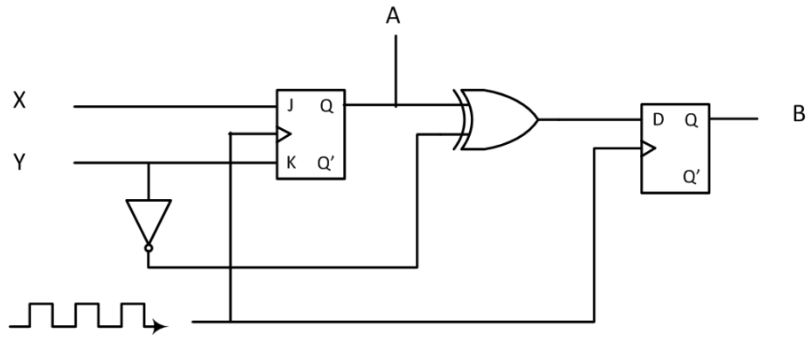
3. Findthetruthtablethatdescribesthefollowingcircuit:



Ans

x	y	z	F
0	0	0	1
0	0	1	0
0	1	0	0
0	1	1	1
1	0	0	1
1	0	1	0
1	1	0	0
1	1	1	0

4. Complete the truth table for the following sequential circuit:



Ans

			Next State	
X	Y	A	A	B
0	0	0	0	1
0	0	1	1	0
0	1	0	0	0
0	1	1	0	1
1	0	0	1	1
1	0	1	1	0
1	1	0	1	0
1	1	1	0	1

For B				Current	Next state
X	Y	A	Y'	A XOR Y'	B (D)
0	0	0	1	1	1
0	0	1	1	0	0
0	1	0	0	0	0
0	1	1	0	1	1
1	0	0	1	1	1
1	0	1	1	0	0
1	1	0	0	0	0
1	1	1	0	1	1

For A		Current	Next state
X	Y	A	JK(X Y)
0	0	0	0
0	0	1	1
0	1	0	0
0	1	1	0
1	0	0	1
1	0	1	1
1	1	0	1
1	1	1	0

5. 59. A Mux-Not flip-flop (MN flip-flop) behaves as follows: If M = 1, the flip-flop complements the current state. If M = 0, the next state of the flip-flop is equal to the value of N.

1. a) Derive the characteristic table for the flip-flop.
2. b) ShowhowaJKflip-flopcanbeconvertedtoaMNflip-flopbyaddinggate(s)and inverter(s).

Ans.

a) The characteristic table for the MN flip-flop:

M	N	Q(t+1)
0	0	0
0	1	1
1	0	Q'(t)
1	1	Q'(t)

b) To convert a JK flip-flop to an MN flip-flop, we must express J and K in terms of M and N, as follows (remember with a JK flip-flop, 01 as input means reset, 10 means set, 00 means no change, and 11 means toggle):

M	N	J	K
0	0	0	1
0	1	1	0
1	0	1	1
1	1	1	1

From the above we can see that J is M + N and K is M + N'. So we have: