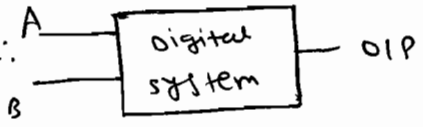
✱ Don't Care Condition:

→ In a digited system for a non-occuring i/p, the o/p can be consider as either 0 (or) 1 during its simplification and it is called the don't care condition.

∴ $F(A,B) = \Sigma m(0,2) + d(3)$.

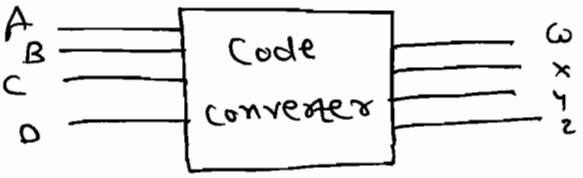


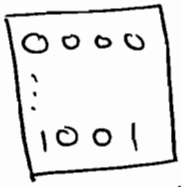
AB	F
00	1
01	0
10	1
11	1/0 ← don't care condition.

Ex-1 Design BCD to 9's Comp. of BCD Code converter.

Ans:

9's Comp. BCD.

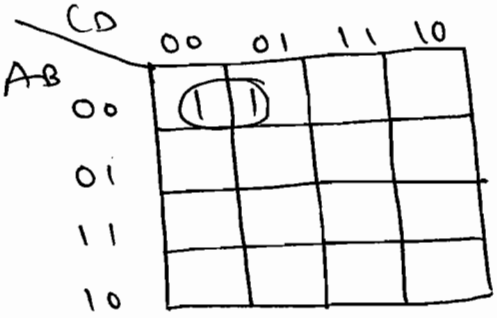




Don't care { 1011 → x ... 1111 → x

	BCD				9's Comp. of BCD			
	A	B	C	D	W	X	Y	Z
0	0	0	0	0	1	0	0	1
1	0	0	0	1	1	0	0	0
2	0	0	1	0	0	1	1	1
3	0	0	1	1	0	1	1	0
4	0	1	0	0	0	1	0	1
5	0	1	0	1	0	1	0	0
6	0	1	1	0	0	0	1	1
7	0	1	1	1	0	0	1	0
8	1	0	0	0	0	0	0	1
9	1	0	0	1	0	0	0	0

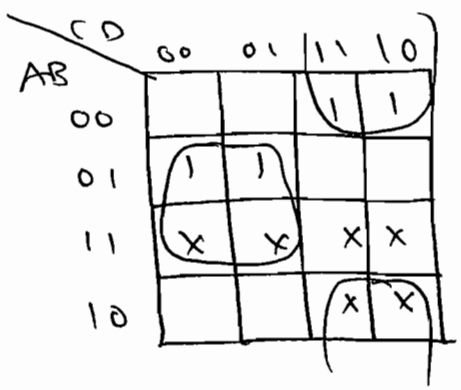
(i) for W:



$W = \bar{A}\bar{B}\bar{C}$

(ii) for X:

$X = \Sigma m(2,3,4,5) + d(m11, \cdots 15)$



$X = B\bar{C}$

(iii) $Y = C$

direct from T.T

(iv) $z = \bar{0}$

direct from T-T

*** NOTE:**

→ The purpose of minimization is to reduce the number of logic gates and no. of inputs.

Ex-1 (i) $F_1(A,B,C) = \Sigma m(0,2,3,5,1) + d(1,6,7)$.

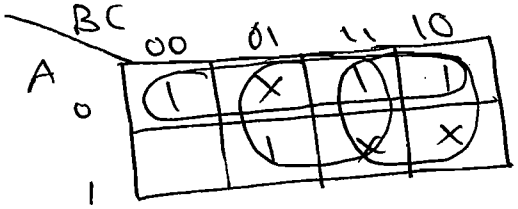
(ii) $F_2(A,B,C) = \Sigma m(0,1,2,3,6) + d(4,5,7)$.

Find $F_3 = F_1 + F_2$

$F_4 = F_1 \cdot F_2$.

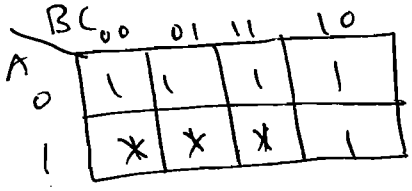
Ans:

(i) $\Sigma m(0,2,3,5) + d(1,6,7)$.



$F_1 = \bar{A} + C + B$.

(ii) $\Sigma m(0,1,2,3,6) + d(4,5,7)$.



$F_2 = 1$.

$\therefore F_3 = F_1 + F_2 = 1 + (\bar{A}+C) \cdot 1 = 1$

$F_4 = F_1 \cdot F_2 = F_1 \cdot = \bar{A} + C$

(OR)

$1 + d = 1$	$0 \cdot d = 0$
$0 + d = d$	$1 \cdot d = d$
$d + d = d$	$d \cdot d = d$

$F_3 = F_1 + F_2 = \Sigma m(0,1,2,3,5,6) + d(4,7)$

$F_4 = F_1 \cdot F_2 = \Sigma m(4,2,3) + d(1,6,7,5)$.

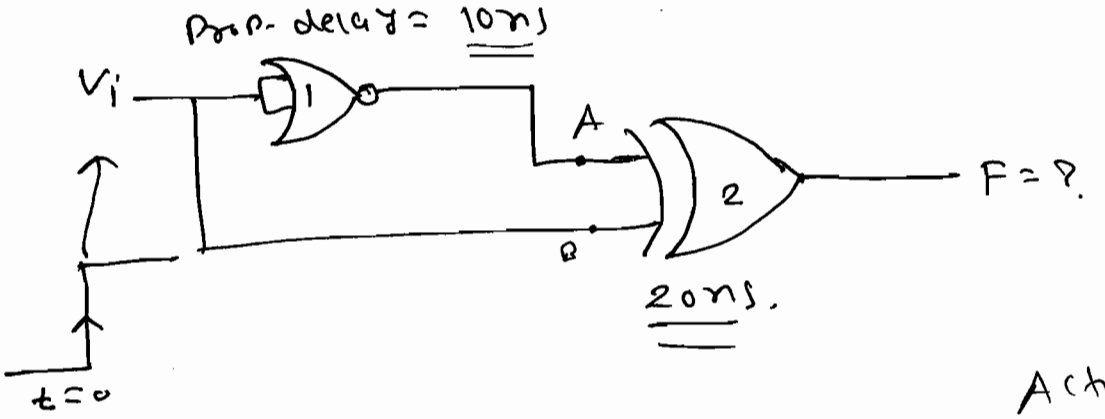
Ex-2 $F_1(A,B,C) = \Sigma m(0,3,5,6) + d(2,4,7)$.

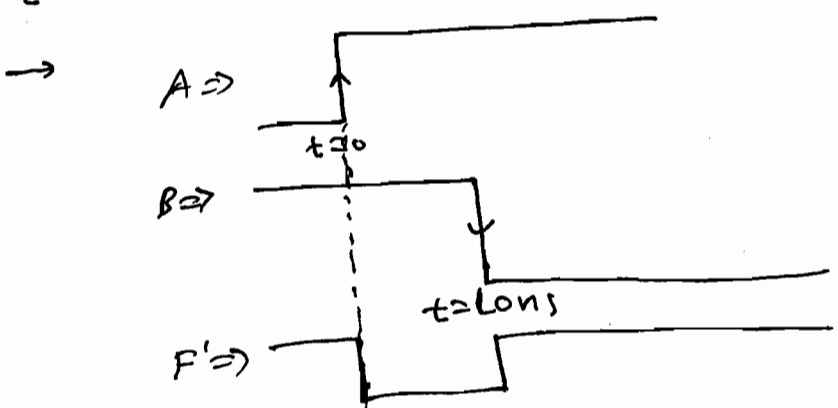
$F_2(A,B,C) = \Sigma m(1,2,3,6) + d(0,5,7)$.

Ans: $F_3 = F_1 + F_2 = \Sigma m(0,1,2,3,5,6) + d(2,4,7)$.

$F_4 = F_1 \cdot F_2 = \Sigma m(3,6) + d(0,2,5,7)$.

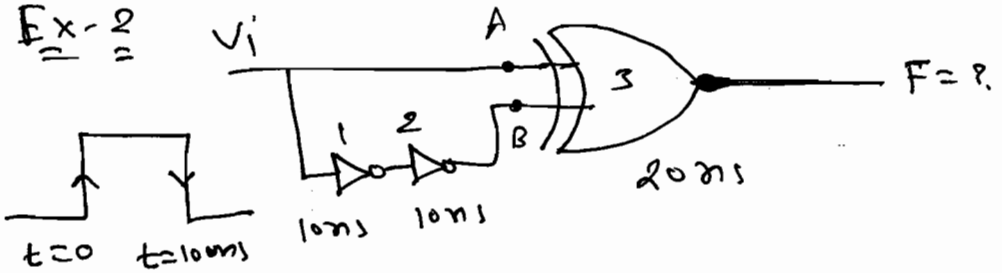
Ex-3 Determine the waveform at the o/p of the following logic ckt.



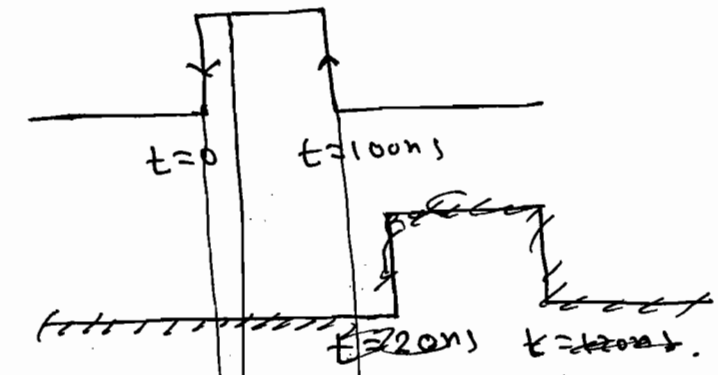


Actual o/p.

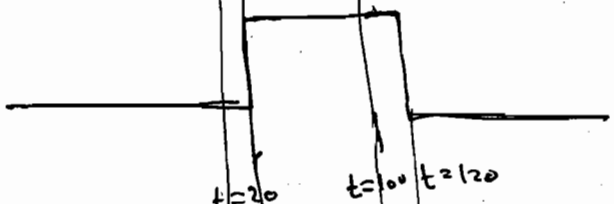
Ex-2



→ A ⇒



B ⇒



F ⇒

Actual o/p
⇓
F ⇒