FINAL

CSE 260

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Sec : 1 (NRT)

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Ans to the qr no 1

Given,

$F(A,B,C) = A'B'C' + A'B'C + AB'C + ABC' + ABC$

$= \Sigma(000, 001, 101, 110, 111)$

$= \Sigma(0, 1, 5, 6, 7)$

Grouping :

group 0 : {000}

group A : {001}

group B : {101, 110}

group C : {111}

Tabulation table is given below :

Min	ABC	1
0	✓000	(0,1) 00–
1	✓001	(1,5) –01
5	✓101	(6,7) 11–
6	✓110	(5,7) 1–1
7	✓111	

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Prime implicant chart from table :

	ABC	0	1	5	6	7
(0,1) 00-	A'B'	X	X			
(1,5) -01	B'C		X	X		
(6,7) 11-	AB				X	X
(5,7) 1-1	AC			X		X

Answer in SOP: $A'B' + B'C + AB$

Ans to the qr no 2

Given, if $A - 5 > 2B$ output 1

Let $A - 5 = S_i$, $2B = K_i$, $i = 2,3,1,0$

$S \odot K = x_i$

Circuit,

$$Y = S_2K_2' + x_2 S_1 K_1' + x_2 x_1 S_0 K_0'$$

Here, $A = A_2 A_1 A_0$, A_2 being MSB, A_0 LSB

$B = B_2 B_1 B_0$, B_2 = MSB, B_0 = LSB

we know, $(5)_{10} = (0101)_2 = (1010)_{1's}$ complement

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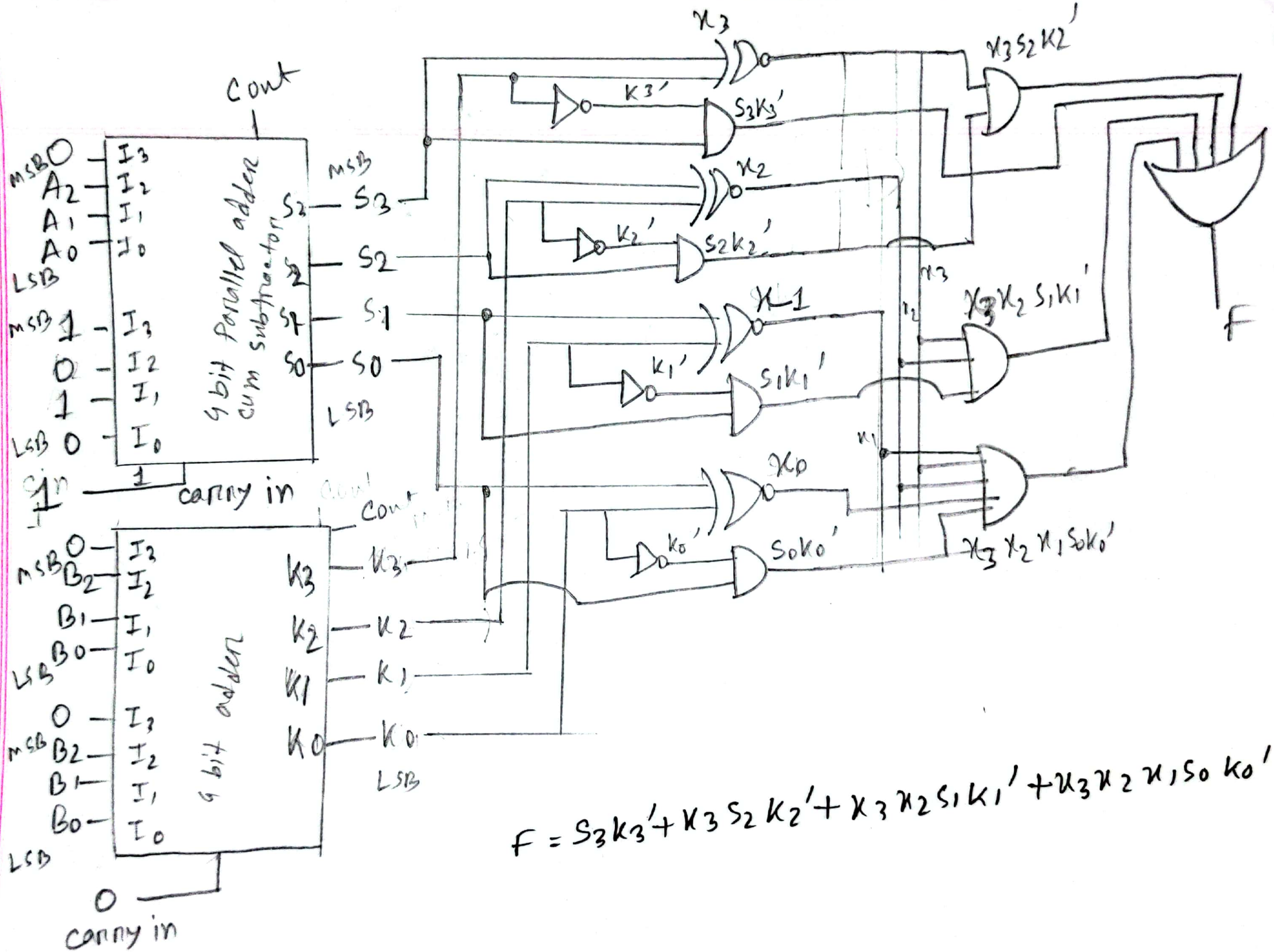

$$F = S_3K_3' + x_3S_2K_2' + x_3x_2S_1K_1' + x_3x_2x_1S_0K_0'$$

Ans to the qr no 3

Given:

$F(A,B,C,D) = (A+B') \cdot (C+D')$

$= AC' + AD' + B'C' + B'D'$

$= AC'(B+B') + AD'(B+B') + B'C'(A+A') + B'D'(A+A')$ [compliment rule]

$= ABC'(D+D') + AB'C'(D+D') + ABD'(C+C') + AB'D'(C+C')$
$+ AB'C'(D+D') + A'B'C'(D+D') + AB'D'(C+C') + A'B'D'(C+C')$ [Distructive law, compliment law]

$= ABC'D + ABC'D' + AB'C'D + AB'C'D' + ABCD' + ABC'D' +$
$AB'CD' + AB'C'D' + AB'C'D + AB'C'D' + A'B'C'D + A'B'C'D'$
$+ AB'CD' + AB'C'D' + A'B'CD' + A'B'C'D'$ [Distructive law]

$= ABC'D + ABC'D' + AB'C'D + AB'C'D' + ABCD' +$
$AB'CD' + AB'C'D' + A'B'C'D + A'B'C'D' + A'B'CD'$ [$x+x=x$]

$= \Sigma(1101, 1100, 1001, 1000, 1110, 1010, \cancel{1000},$
$0001, 0000, 0010)$

$= \Sigma(13, 12, 9, 8, 14, 10, 1, 0, 2)$

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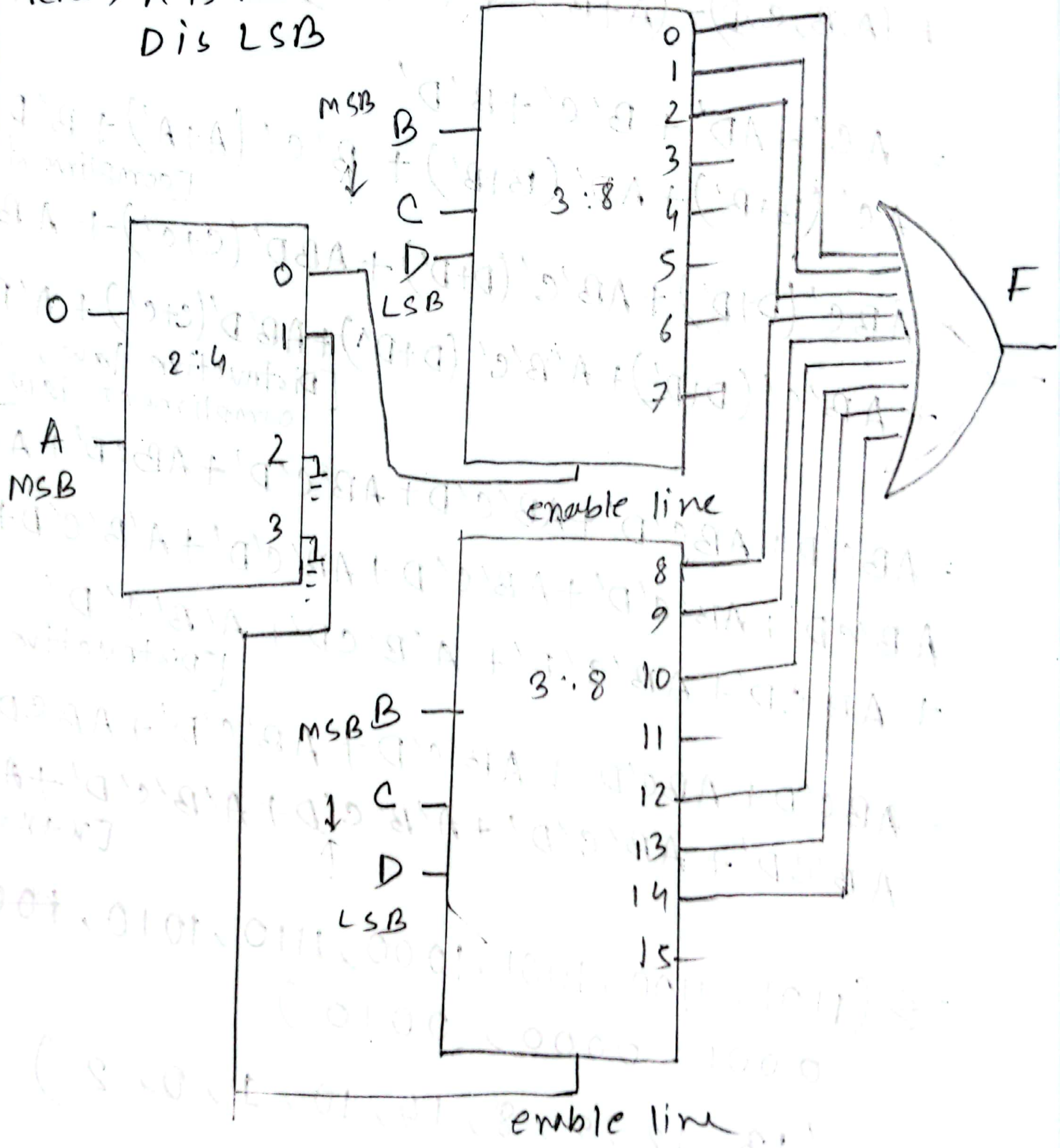
Our minterms,

$F(A,B,C,D) = \Sigma(0,1,2,8,9,10,12,13,14)$

Here, A is MSB

D is LSB



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Ans to the qr no. 4

Equations of the flip flop :

$JA = (A+x)B'$

$KA = B$

$JB = x \odot B'$

$KB = Bx$

Based on these equations state table :

A	B	x	JA	KA	JB	KB	A+	B+
0	0	0	0	0	0	0	0	0
0	0	1	1	0	1	0	1	1
0	1	0	0	1	1	0	0	1
0	1	1	0	1	0	1	0	0
1	0	0	1	0	0	0	1	0
1	0	1	1	0	1	0	1	1
1	1	0	0	1	1	0	0	1
1	1	1	0	1	0	1	0	0

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state diagram is below :