

CSE260 - Assignment-03

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Section: 14

①

If $x_1 = 0$ then,

$C_{in} = 0$ and

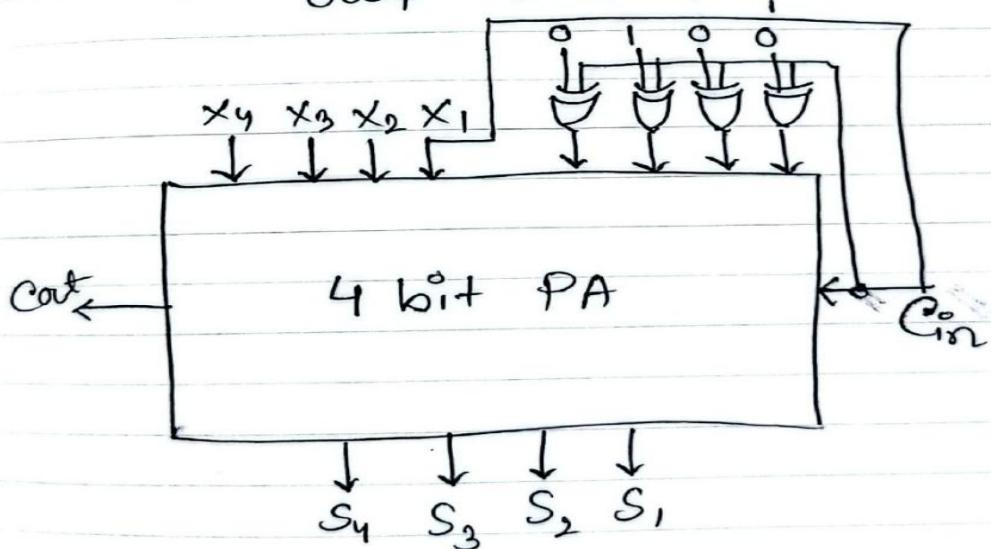
output = $A + 4$

| X_1 | Y_1 | C_{in} |
|--------|-------|----------|
| even 0 | 0 | 0 |
| odd 1 | 0 | 1 |

else,

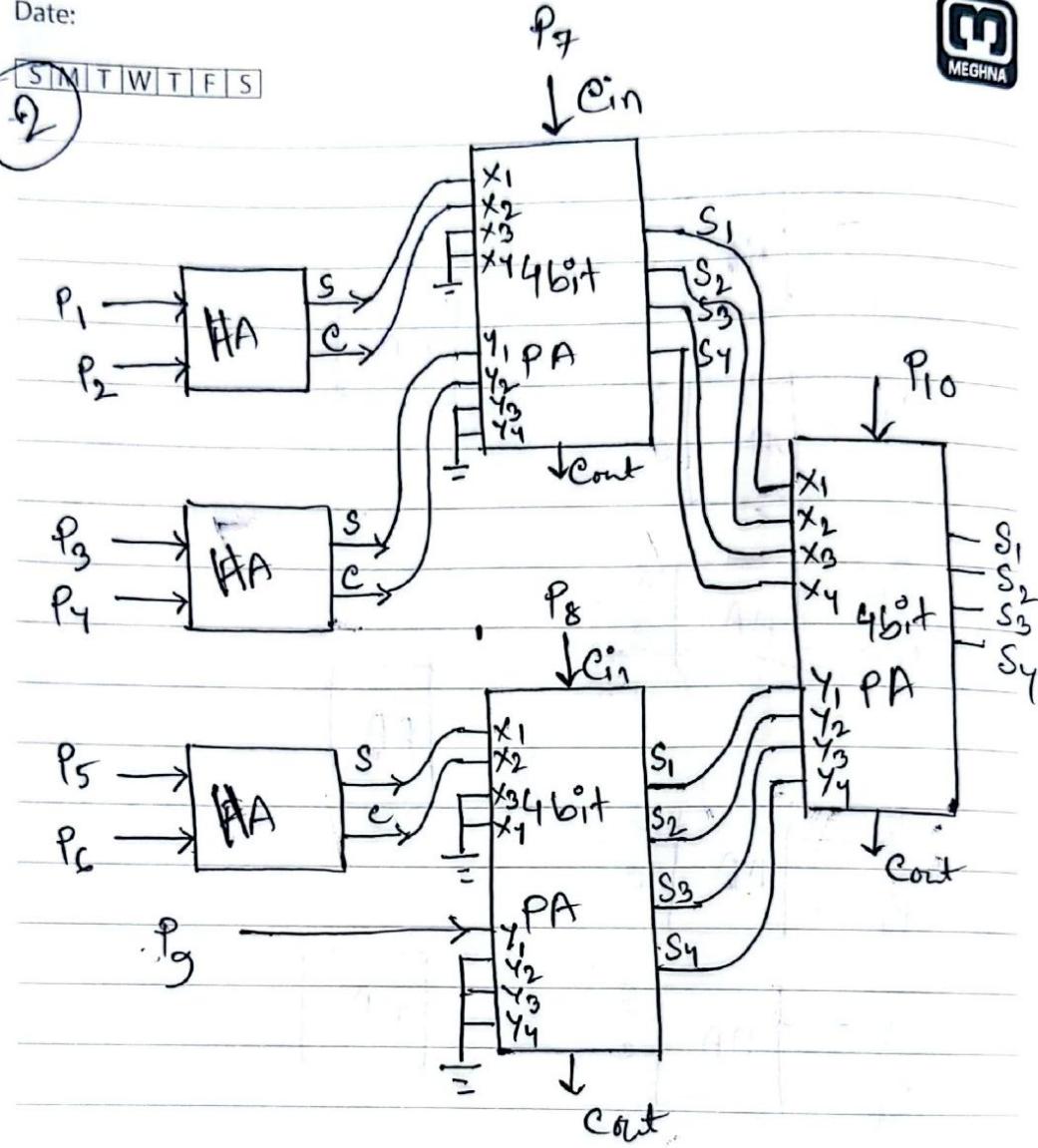
$C_{in} = 1$ and

output = $A - 4$



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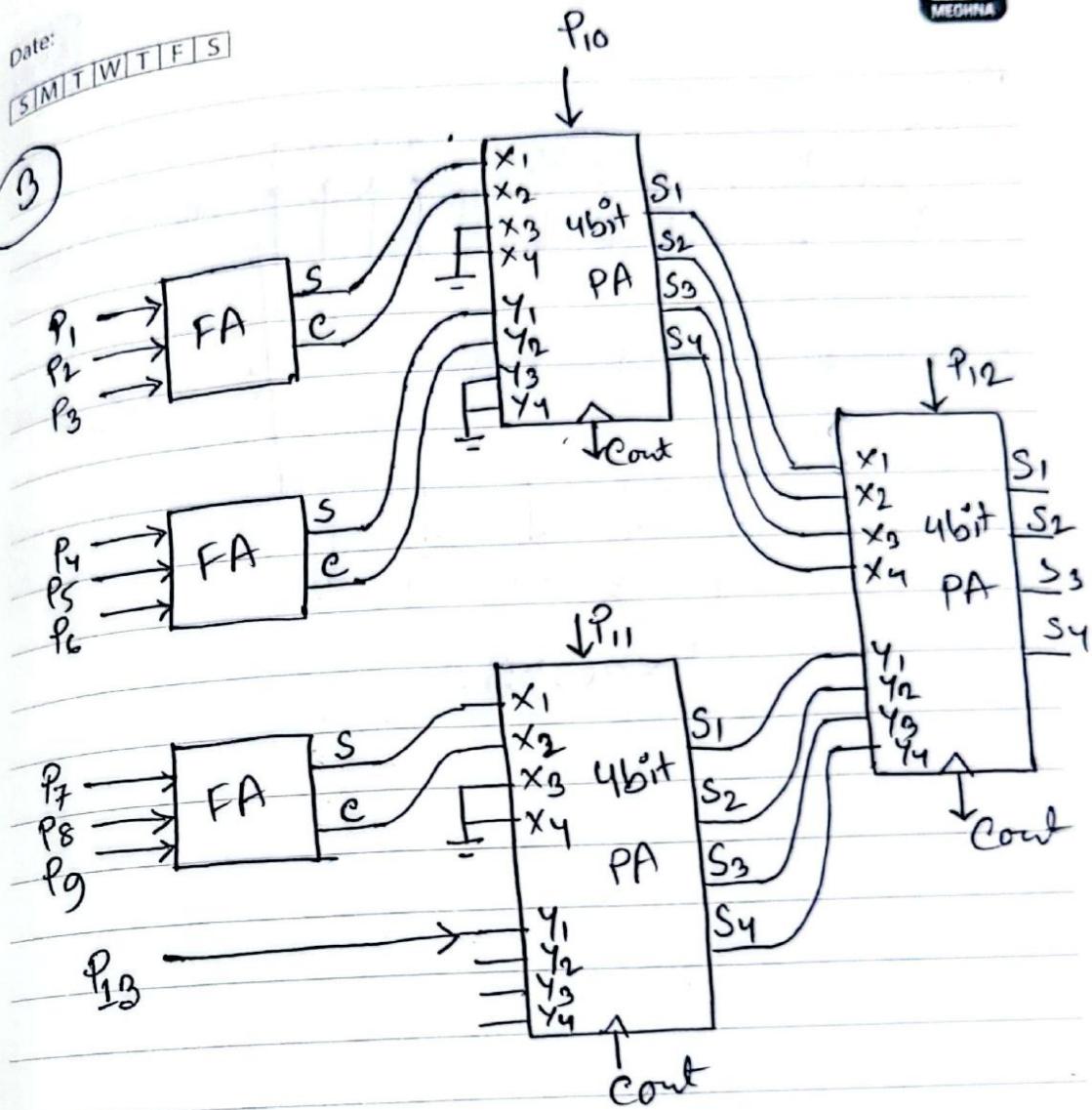
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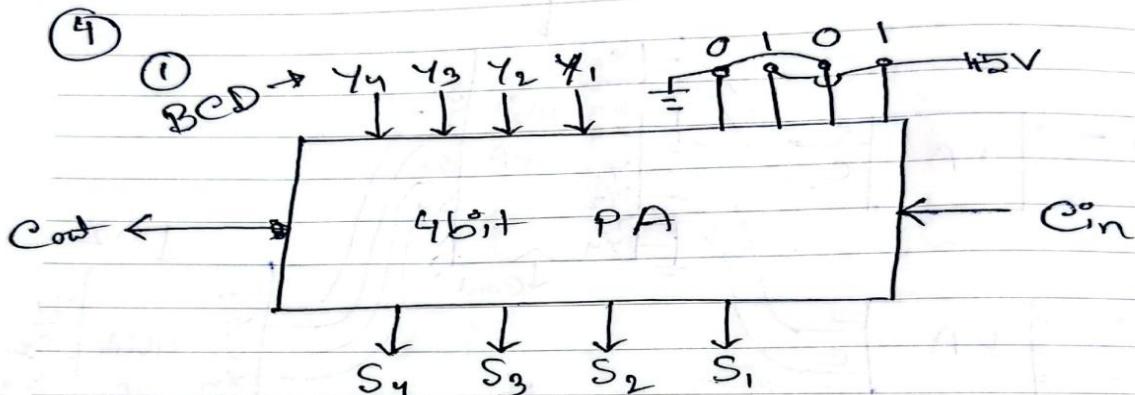


③



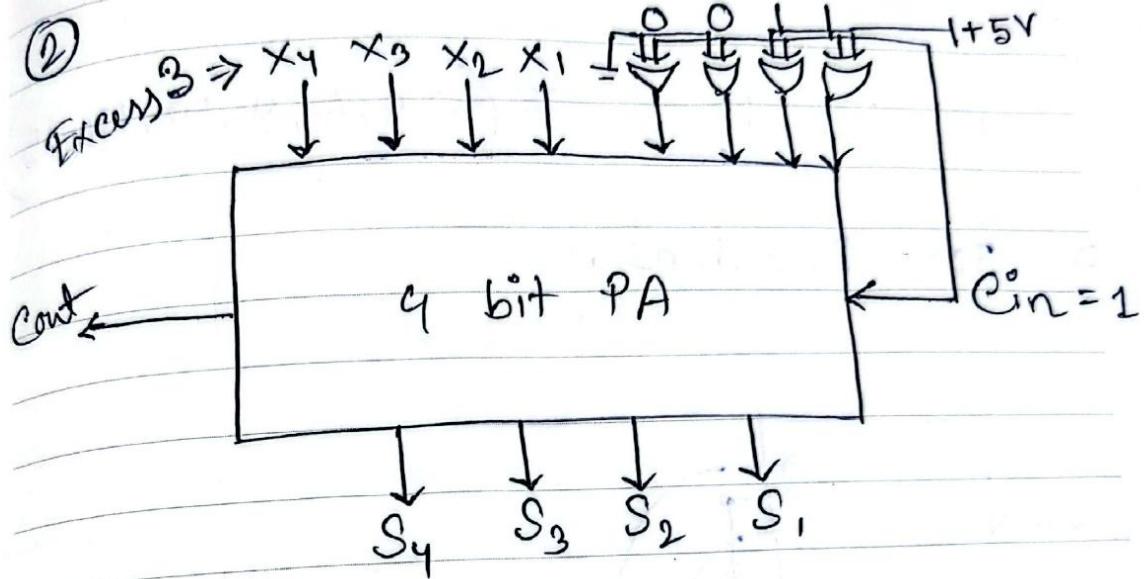
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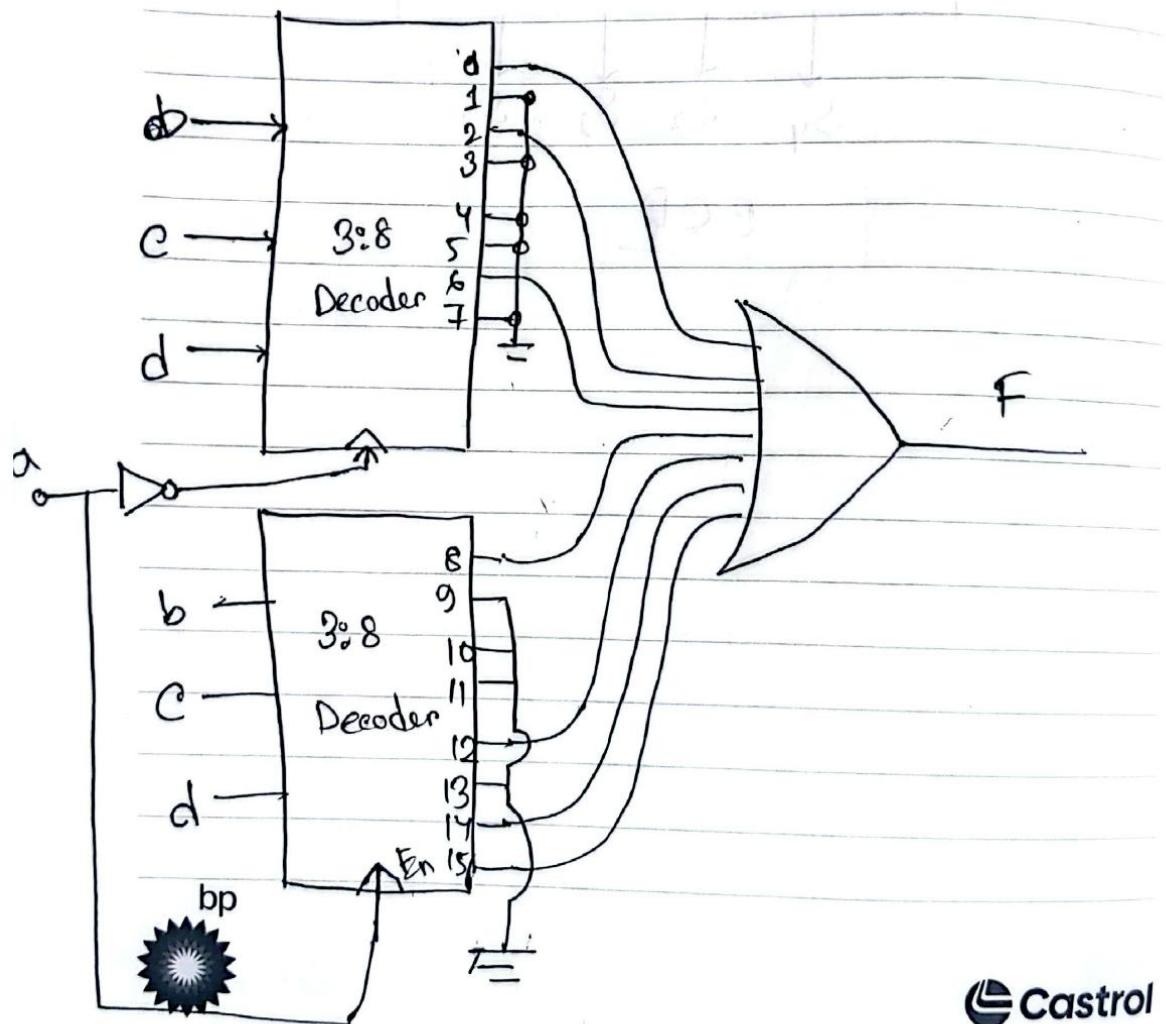
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⑤

$$F(a,b,c,d) = \Sigma(0,2,6,8,12,14,15)$$

ⓐ 3:8 Decoders .

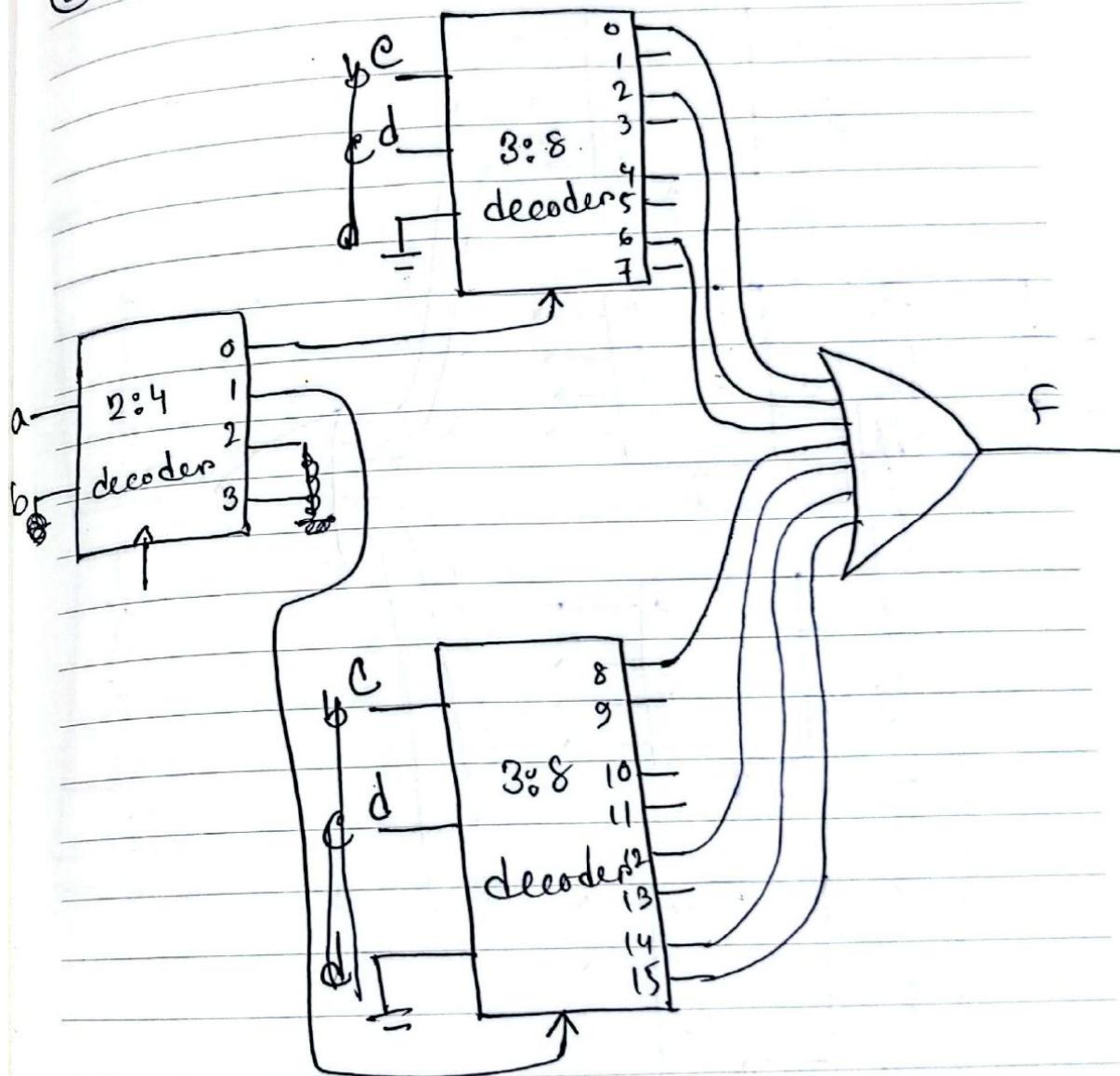


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$$\textcircled{b} \quad F = (a, b, c, d) = \sum (0, 2, 6, 8, 12, 14, 15)$$

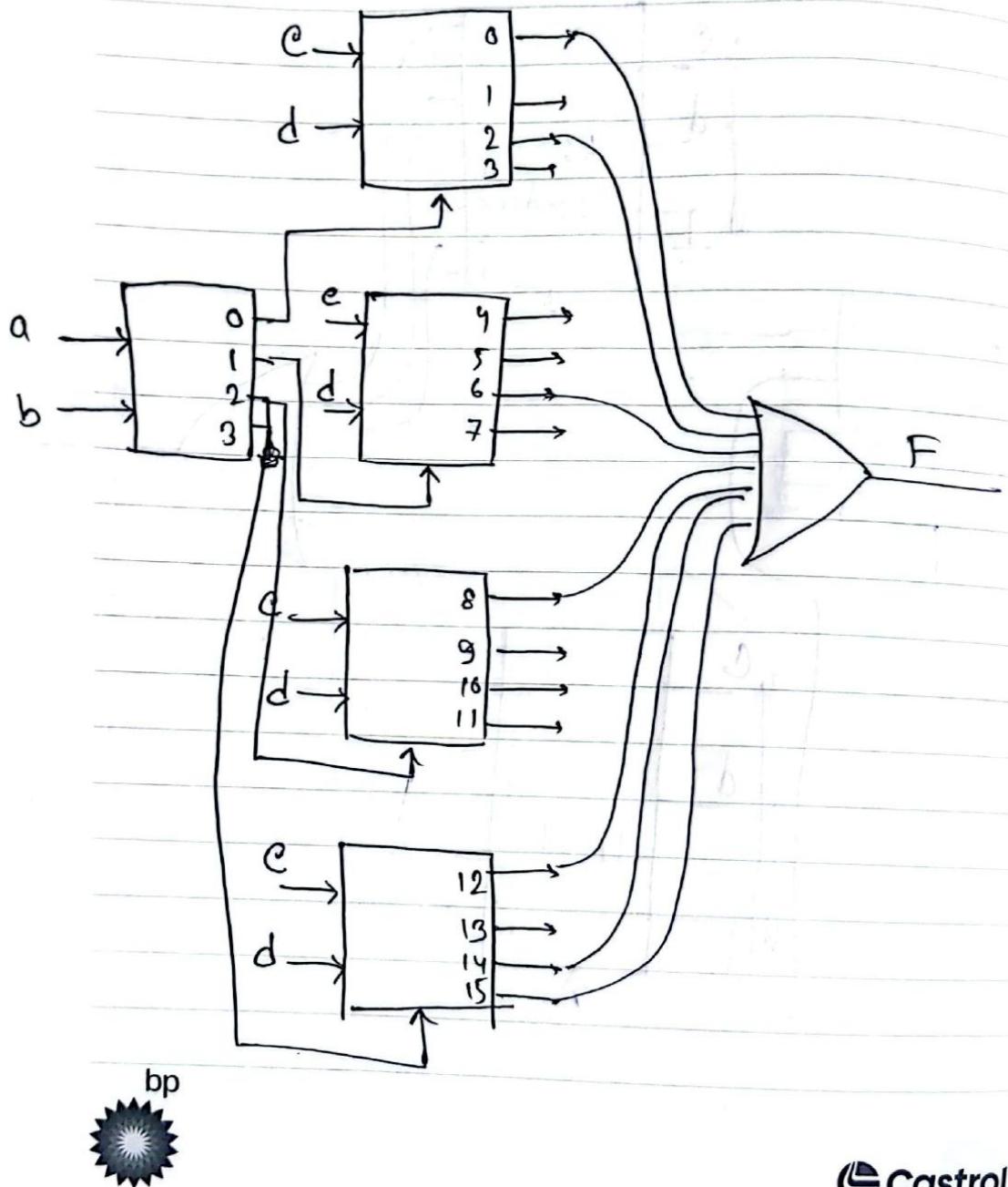


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③ $F = (a, b, c, d) = \Sigma(0, 2, 6, 8, 12, 14, 15)$



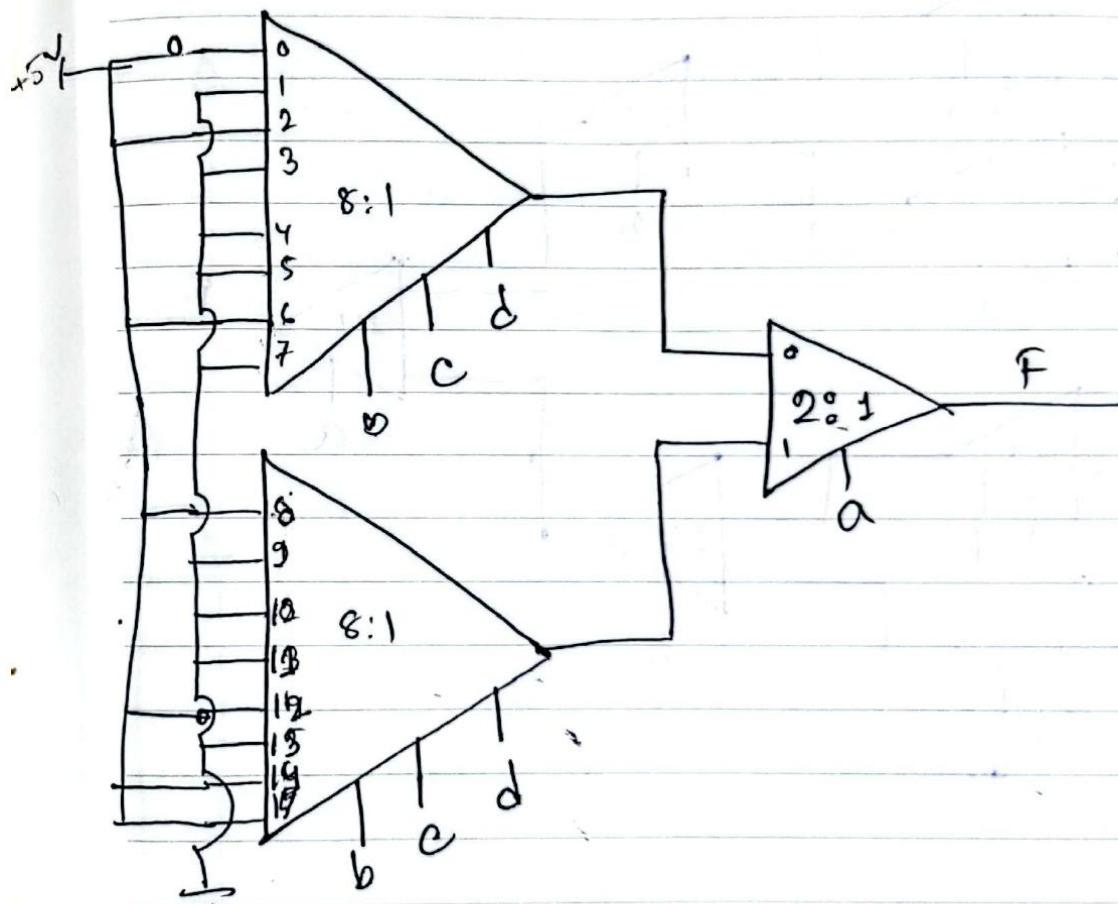
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8:1 , 2:1



⑥ $F(a,b,c,d) = \sum (0, 2, 6, 8, 12, 14, 15)$



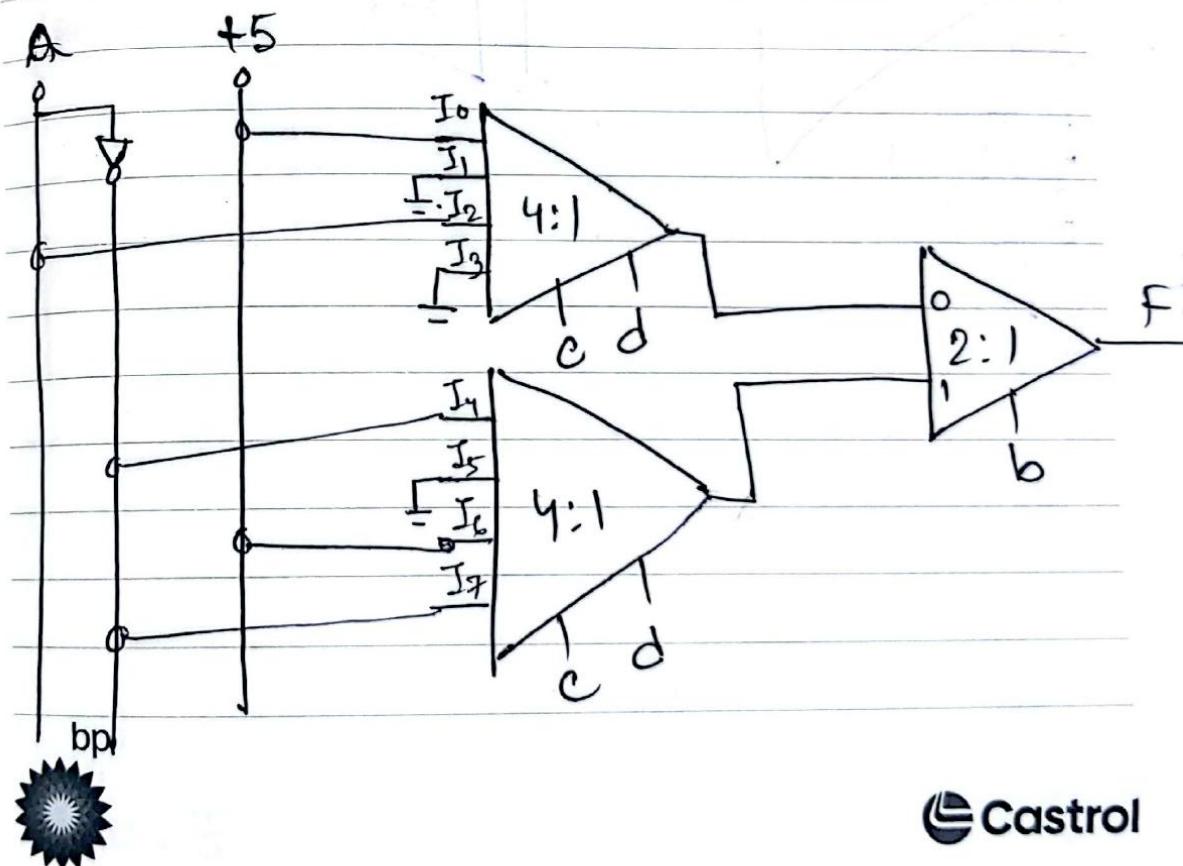
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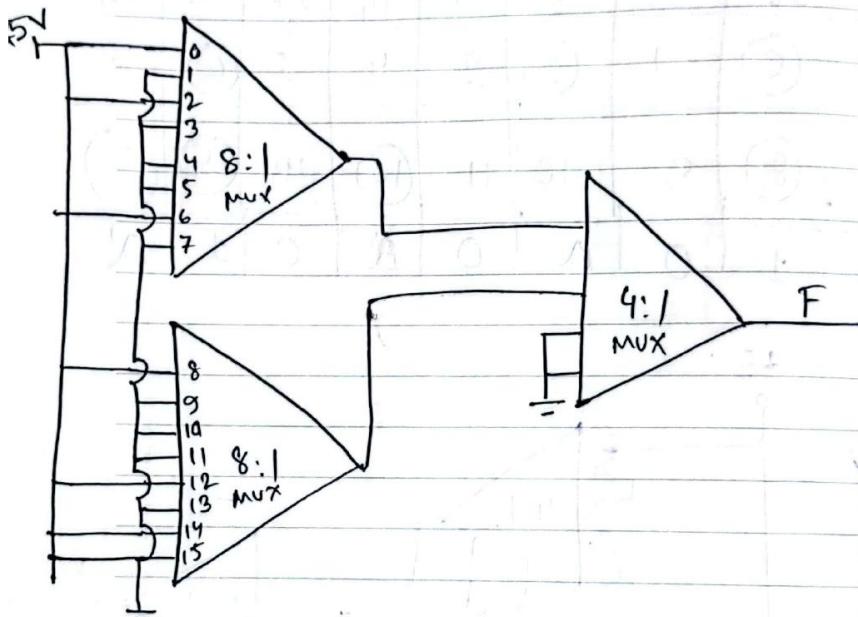
⑥ $F(a,b,c,d) = \sum(0, 2, 6, 8, 12, 14, 15)$

| | I_0 | I_1 | I_2 | I_3 | I_4 | I_5 | I_6 | I_7 |
|------|-------|-------|-------|-------|-------|-------|-------|-------|
| a | (0) | 1 | (2) | 3 | 4 | 5 | (6) | 7 |
| a' | (8) | 9 | 10 | 11 | (12) | 13 | (14) | (15) |
| | 1 | 0 | a | 0 | a' | 0 | 1 | a' |



(8x1), (4x1)

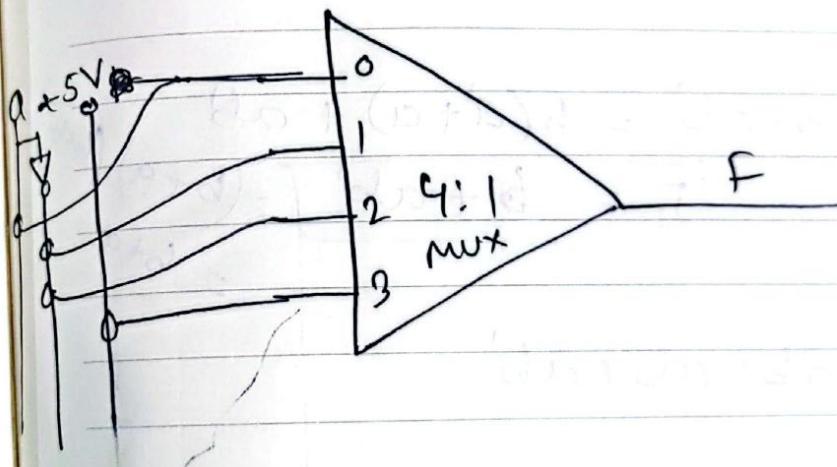
(c) $F(a, b, c, d) = \Sigma(0, 2, 6, 8, 12, 14, 15)$



(7) $F(a, b, c) = \Sigma(0, 3, 5, 6, 7)$

(a)

| | J_0 | J_1 | J_2 | J_3 |
|------|-------|-------|-------|-------|
| a | 0 | 1 | 2 | 3 |
| a' | 4 | 5 | 6 | 7 |
| | a | a' | a' | 1 |



(4x1)

⑥ $f(a,b,c,d) = \sum (0, 3, 5, 6, 7, 9, 11, 13, 15)$

| | I_0 | I_1 | I_2 | I_3 | I_4 | I_5 | I_6 | I_7 |
|--------|-------|-------|-------|-------|-------|-------|-------|-------|
| $a'b'$ | 0 | 1 | 2 | 3 | | | | |
| $a'b$ | 4 | 5 | 6 | 7 | | | | |
| ab | 8 | 9 | 10 | 11 | | | | |
| ab' | 12 | 13 | 14 | 15 | | | | |

$I_0 = a'b'$

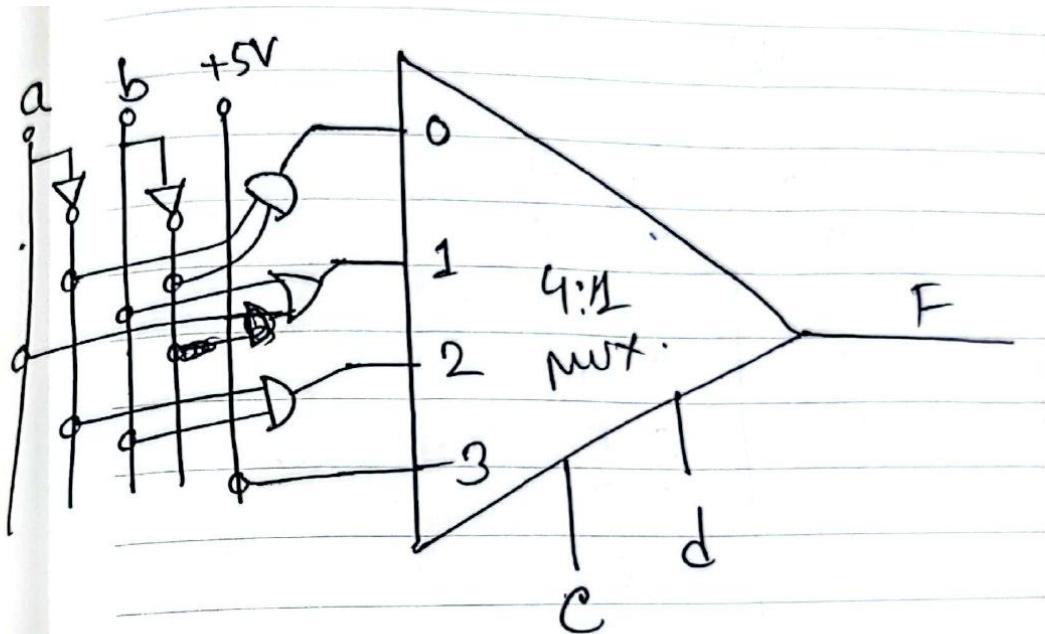
$$I_1 = a'b + ab + ab' = b(a' + a) + ab$$

$I_1 = b + ab' = b + a$

$I_2 = a'b$

$$I_3 = a'b' + a'b + ab + ab' \\ = a' + a$$

$I_3 = 1$



(8)

① Truth table:-

| | I ₃ | I ₂ | I ₁ | I ₀ | A ₁ | A ₀ |
|----|----------------|----------------|----------------|----------------|----------------|----------------|
| 0 | 0 | 0 | 0 | 0 | x | x |
| 1 | 0 | 0 | 0 | 1 | 0 | 0 |
| 2 | 0 | 0 | 1 | 0 | 0 | 1 |
| 3 | 0 | 0 | 1 | 1 | 0 | 1 |
| 4 | 0 | 1 | 0 | 0 | 1 | 0 |
| 5 | 0 | 1 | 0 | 1 | 1 | 0 |
| 6 | 0 | 1 | 1 | 0 | 1 | 0 |
| 7 | 0 | 1 | 1 | 1 | 0 | 0 |
| 8 | 1 | 0 | 0 | 0 | 1 | 1 |
| 9 | 1 | 0 | 0 | 1 | 1 | 1 |
| 10 | 1 | 0 | 1 | 0 | 1 | 1 |
| 11 | 1 | 0 | 1 | 1 | 0 | 0 |
| 12 | 1 | 1 | 0 | 0 | 1 | 1 |
| 13 | 1 | 1 | 0 | 1 | 0 | 0 |
| 14 | 1 | 1 | 1 | 0 | 0 | 1 |
| 15 | 1 | 1 | 1 | 1 | 1 | 1 |



$$A_1 = \Sigma(4, 5, 6, 8, 9, 10) + d(0)$$

$$A_0 = \Sigma(2, 3, 8, 9, 10, 12, 14, 15) + d(0)$$



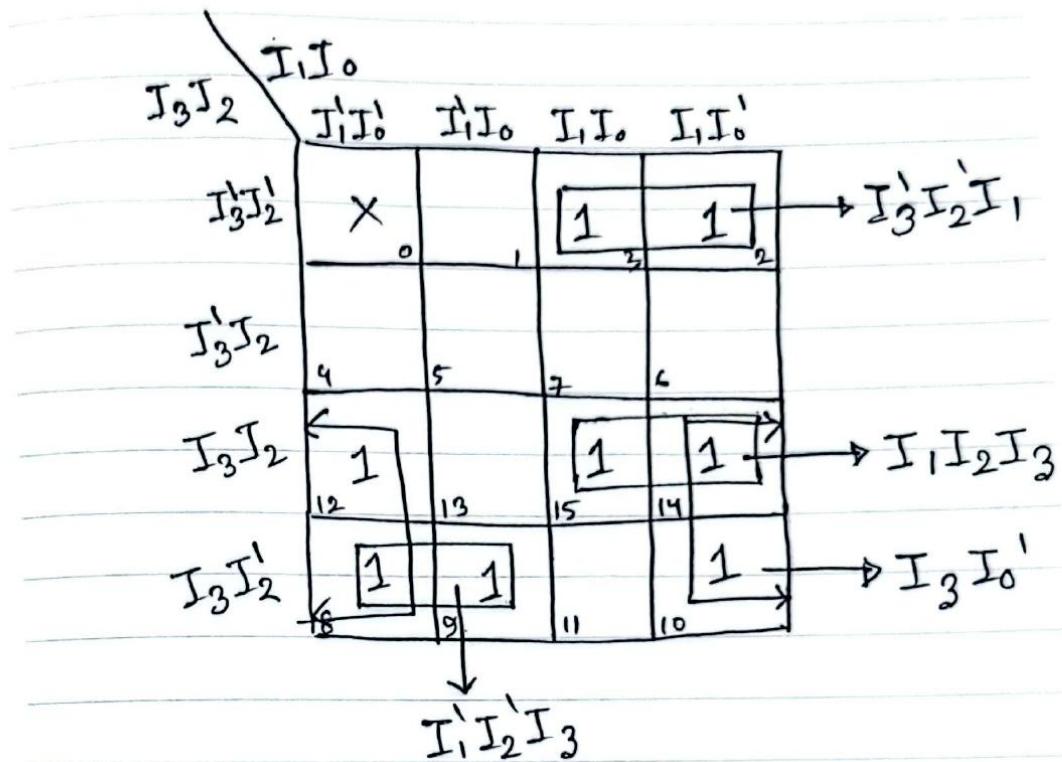
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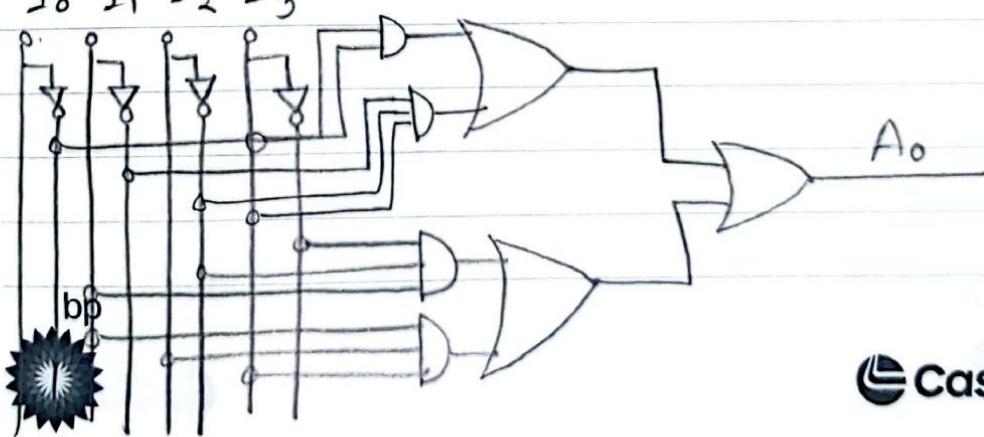


KMAP for $A_0 :-$



$$A_0 = I_1' I_2' I_1 + I_1 I_2' I_3 + I_1' I_2 I_1 + I_1 I_2 I_3$$

$I_0 \quad I_1 \quad I_2 \quad I_3$

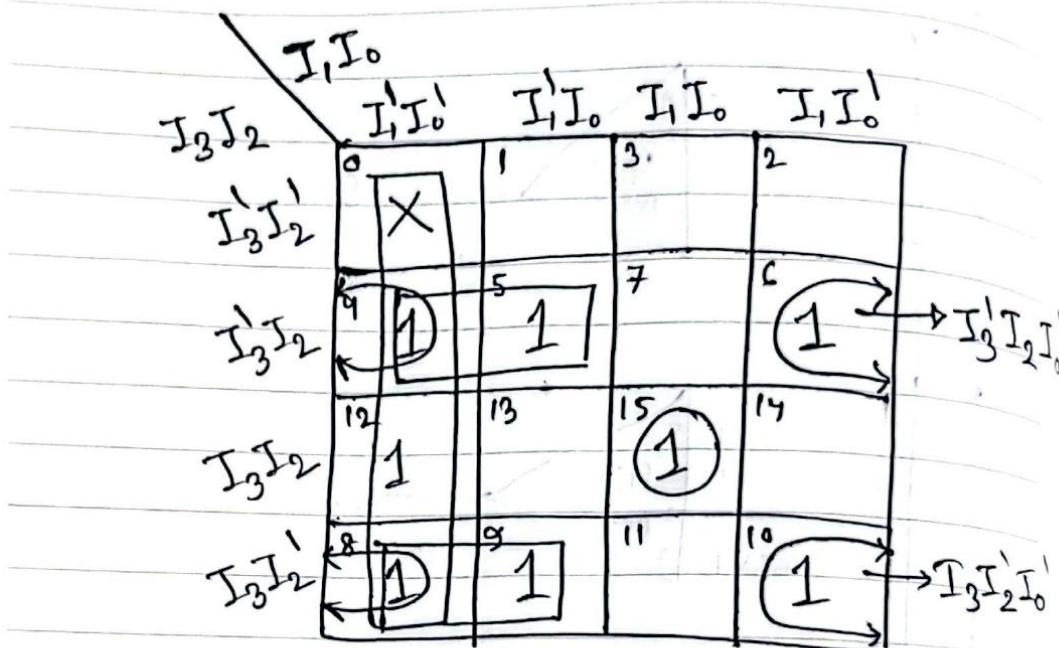


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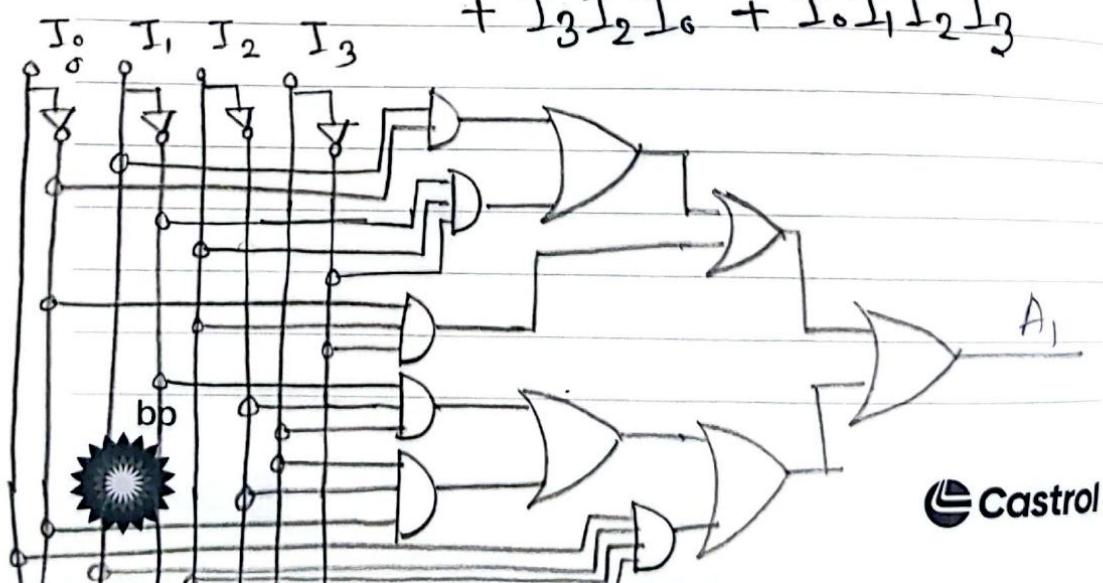
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KMAP For A_1 :-

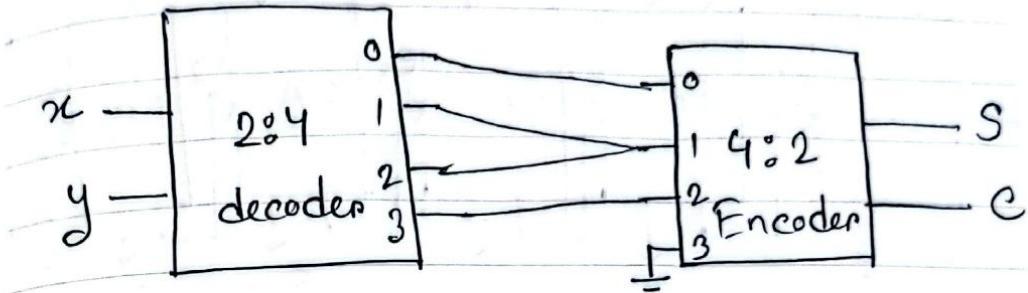


$$A_1 = I_1 I_0 + I_1' I_2 I_3 + I_0' I_2 I_3 + I_1' I_2 I_3' + I_3 I_2 I_0' + I_0 I_1 I_2 I_3$$



Castrol

⑨



| X | Y | C_S |
|-----|-----|---------------------|
| 0 | 0 | 0 0 $\rightarrow 0$ |
| 0 | 1 | 0 1 $\rightarrow 1$ |
| 1 | 0 | 0 1 $\rightarrow 1$ |
| 1 | 1 | 1 0 $\rightarrow 2$ |

Date:

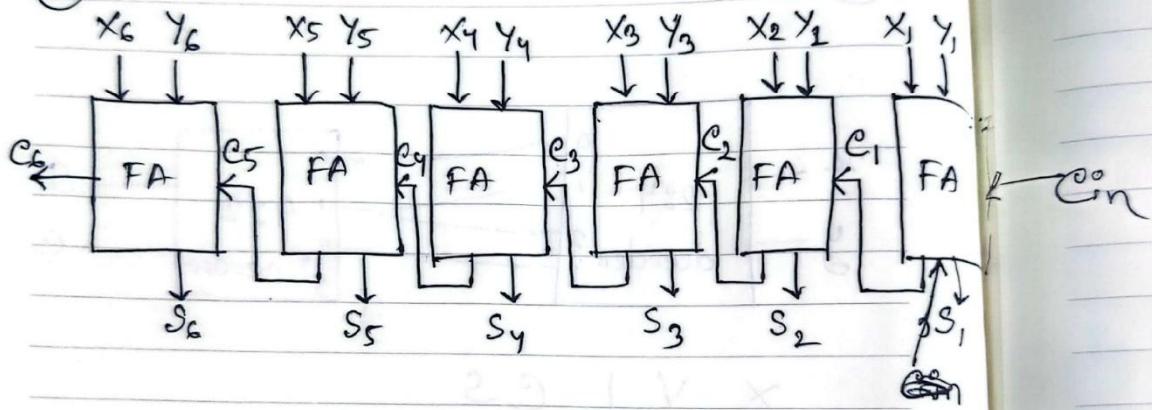
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Date:

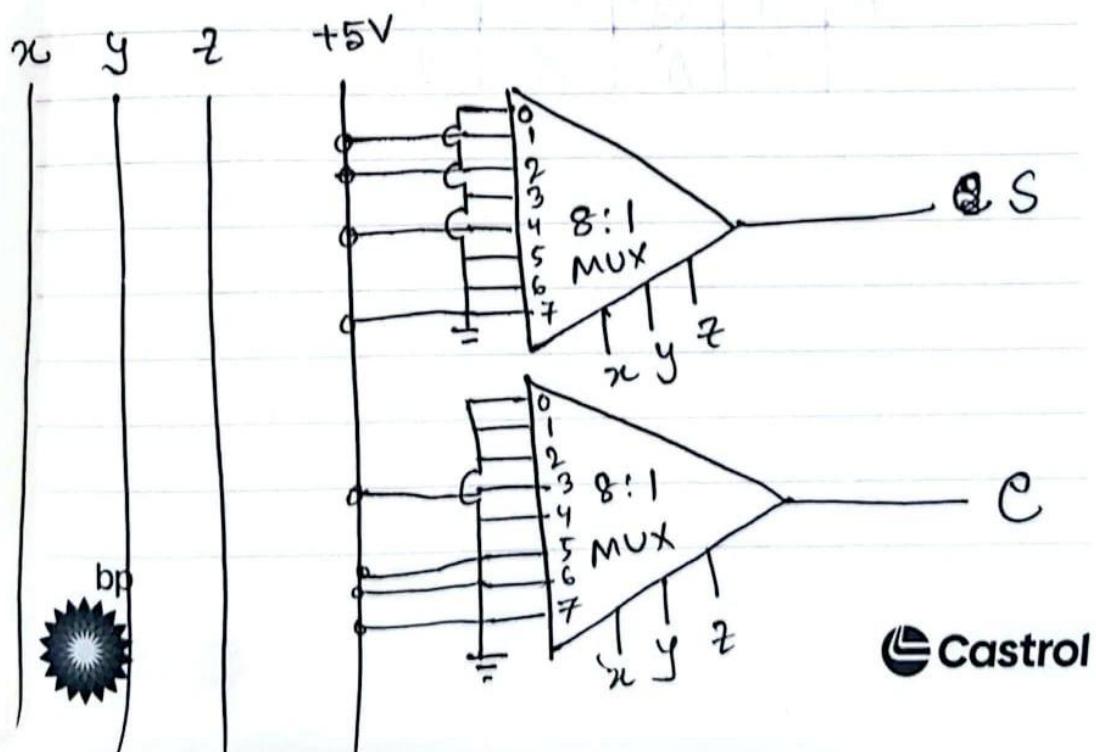
S M T W T

⑩



11

| X | Y | Z | C S |
|---|---|---|---------|
| 0 | 0 | 0 | 0 0 |
| 1 | 0 | 0 | 0 1 ✓ |
| 2 | 0 | 1 | 0 1 ✓ |
| 3 | 0 | 1 | ✓ 1 0 |
| 4 | 1 | 0 | 0 1 ✓ |
| 5 | 1 | 0 | ✓ 1 0 |
| 6 | 1 | 1 | ✓ 1 0 |
| 7 | 1 | 1 | ✓ 1 1 ✓ |



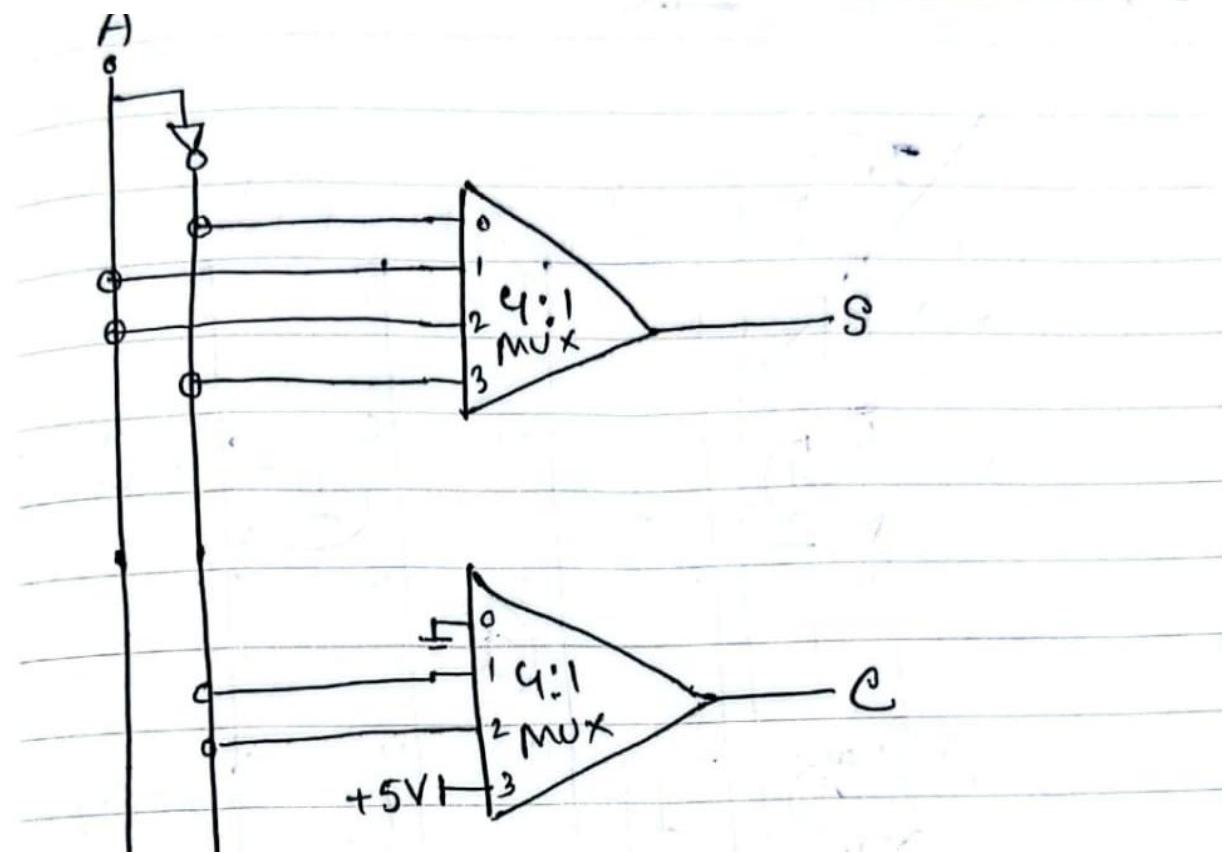
(12)

For Sum,

| | I_0 | I_1 | I_2 | I_3 |
|------|-------|-------|-------|-------|
| A | 0 | 1 | 2 | 3 |
| A' | 4 | 5 | 6 | 7 |
| | A' | A | A | A' |

For Carry,

| | I_0 | I_1 | I_2 | I_3 |
|------|-------|-------|-------|-------|
| A | 0 | 1 | 2 | 3 |
| A' | 4 | 5 | 6 | 7 |
| | 0 | A' | A' | 1 |



Date:

S M T W T F S



⑬

$A = 4$ bit binary number which
is divisible by 4.

$$0 = 0000$$

$$A \text{ can be } \rightarrow 4 = 0100 \checkmark$$

$$8 = 1000 \checkmark$$

$$12 = 1100 \checkmark$$

$$16 = 10000 \times$$

