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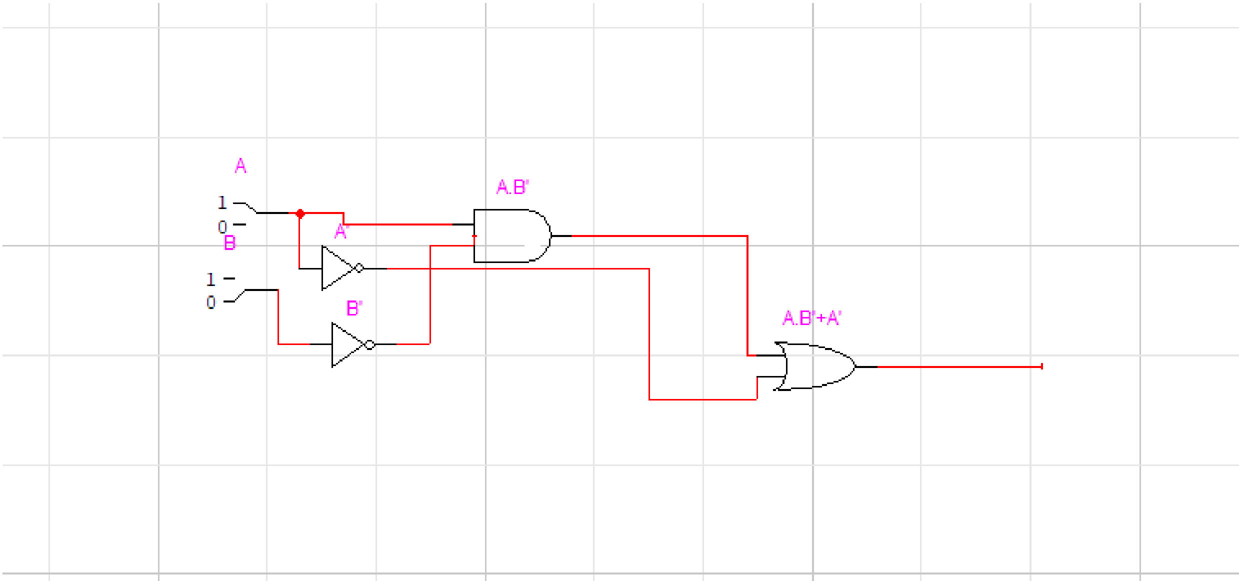
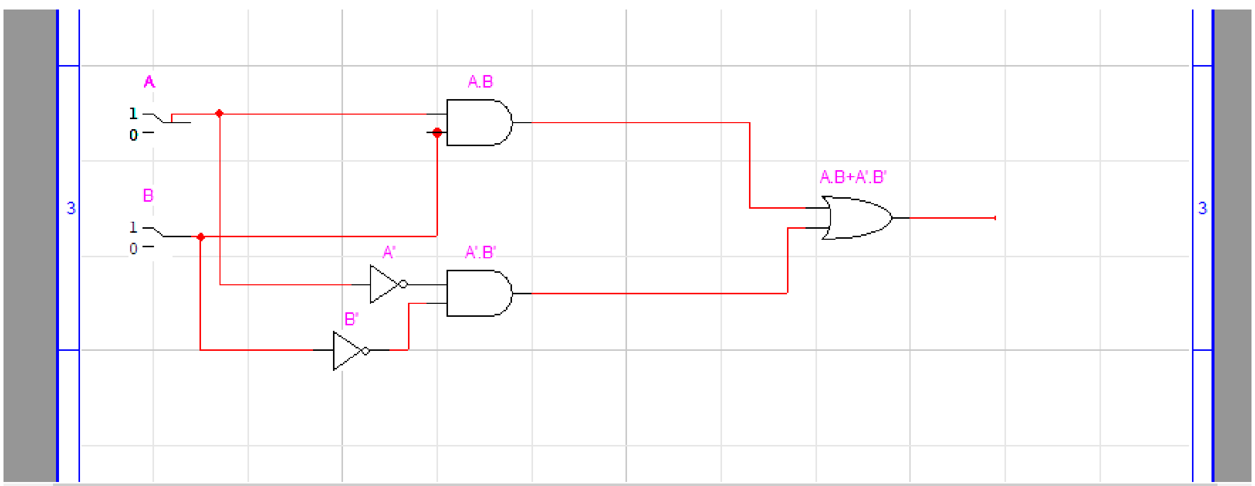
Q1 (a).



Q1(b).



Q1(c).

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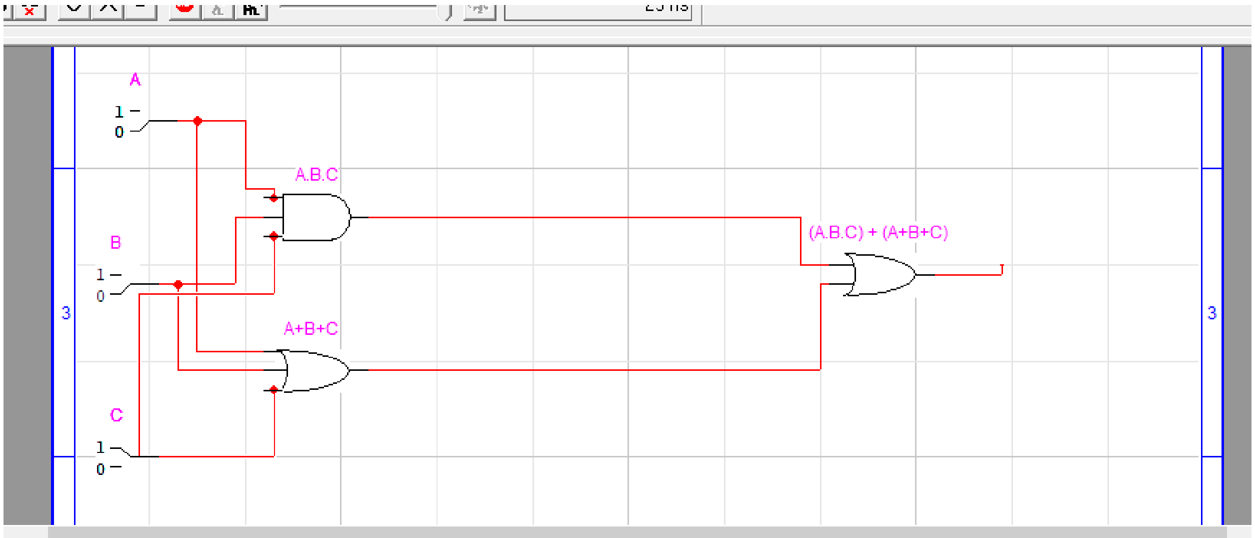
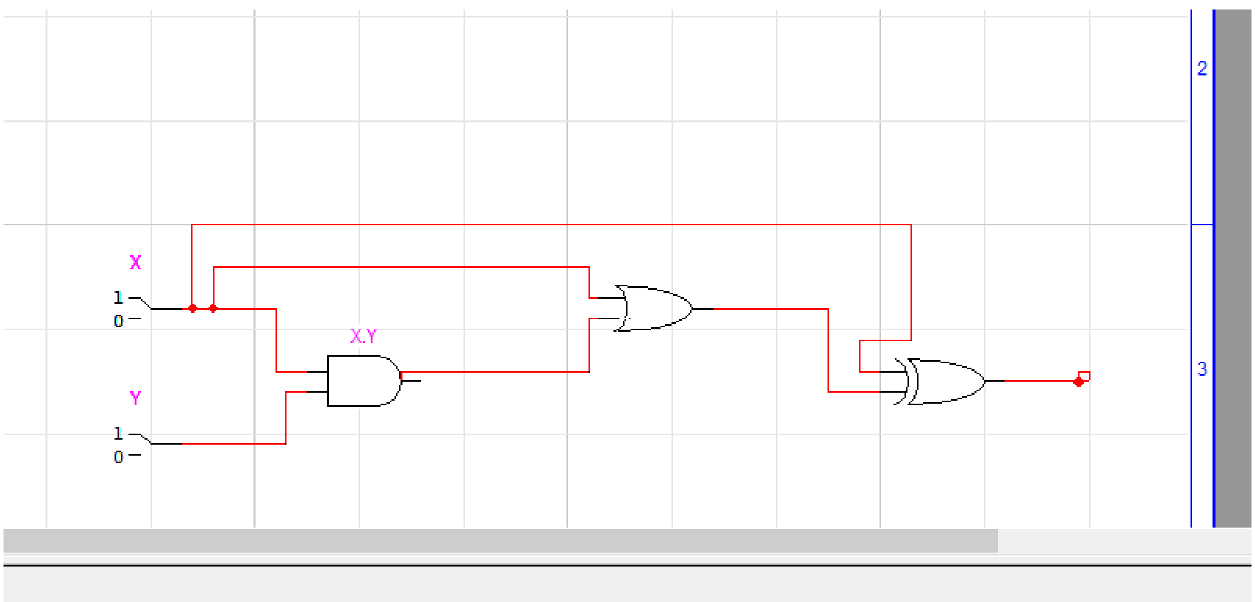


Q3(a).



Q3(b)

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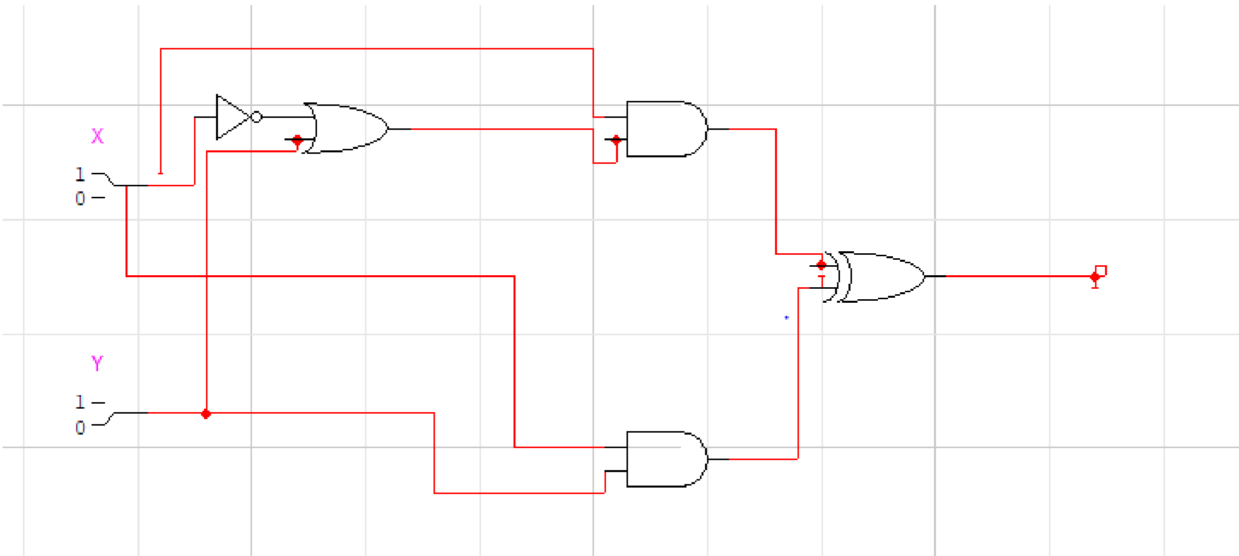
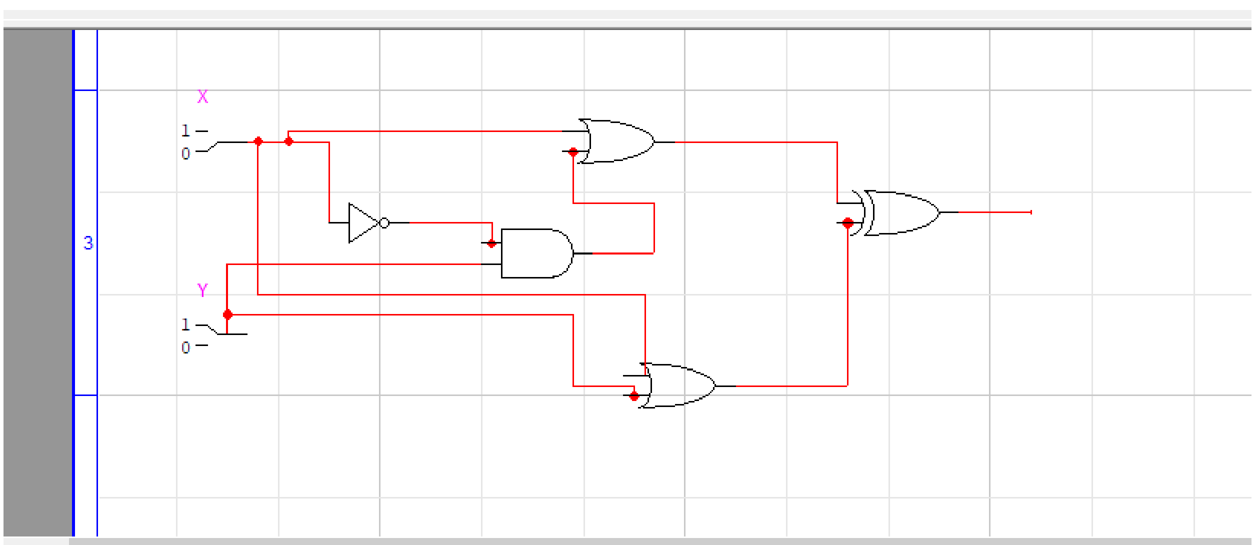


Q3(c).



Q4)

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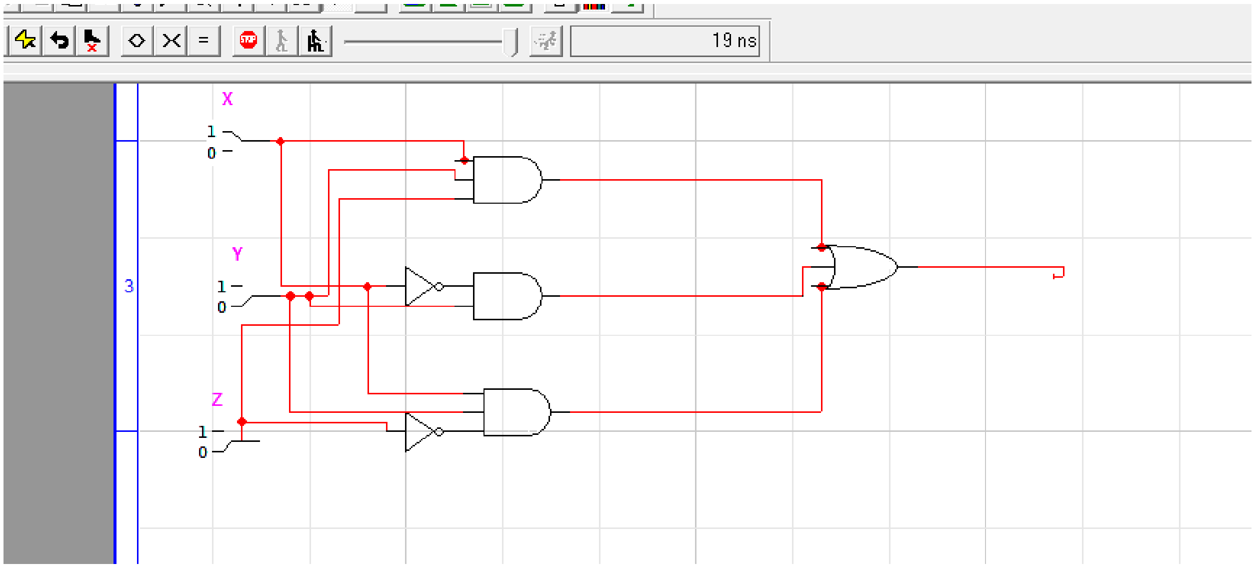
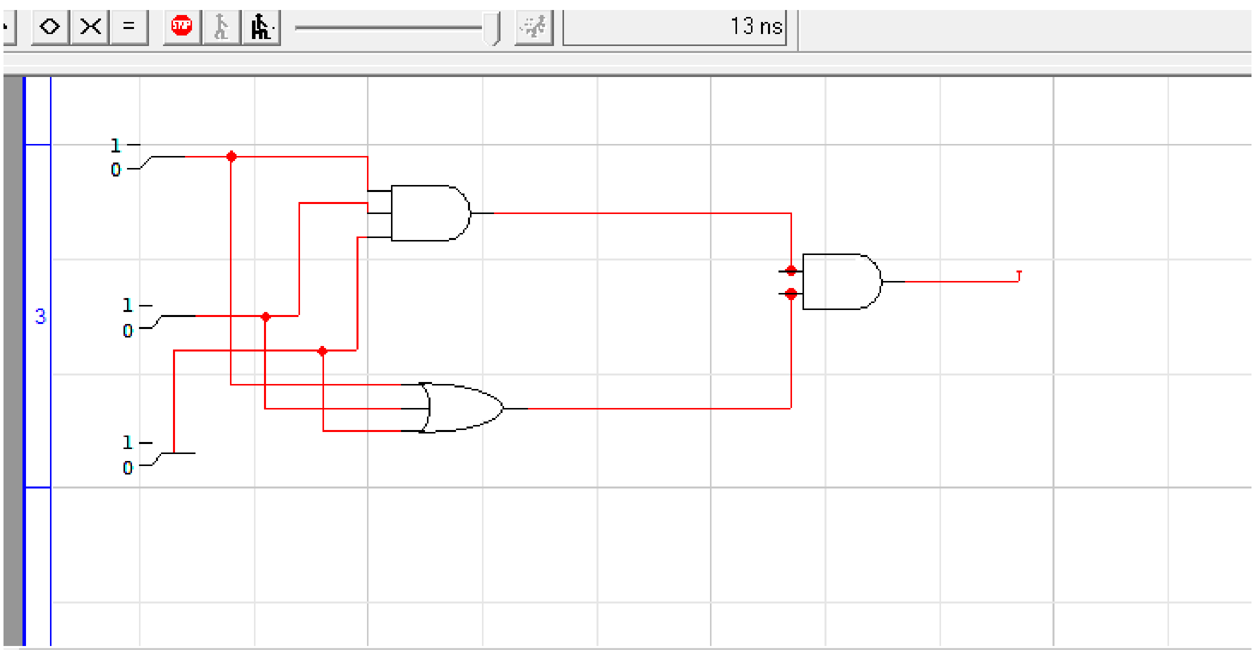


Q1 (postlab) (a)



Q1(b)

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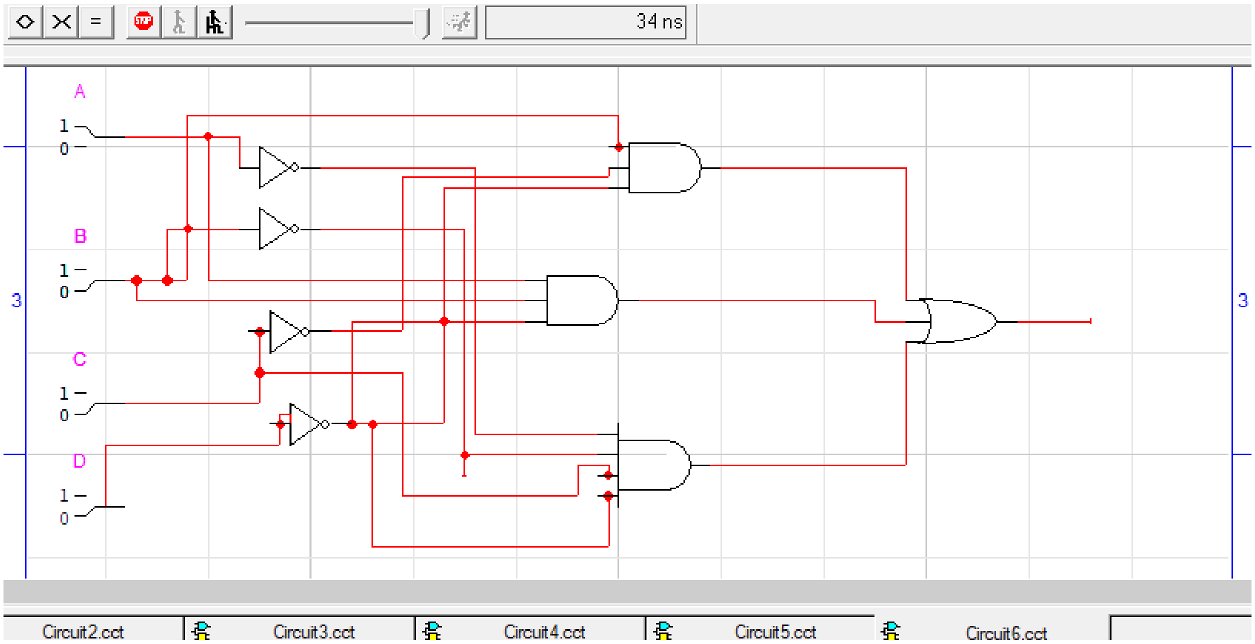
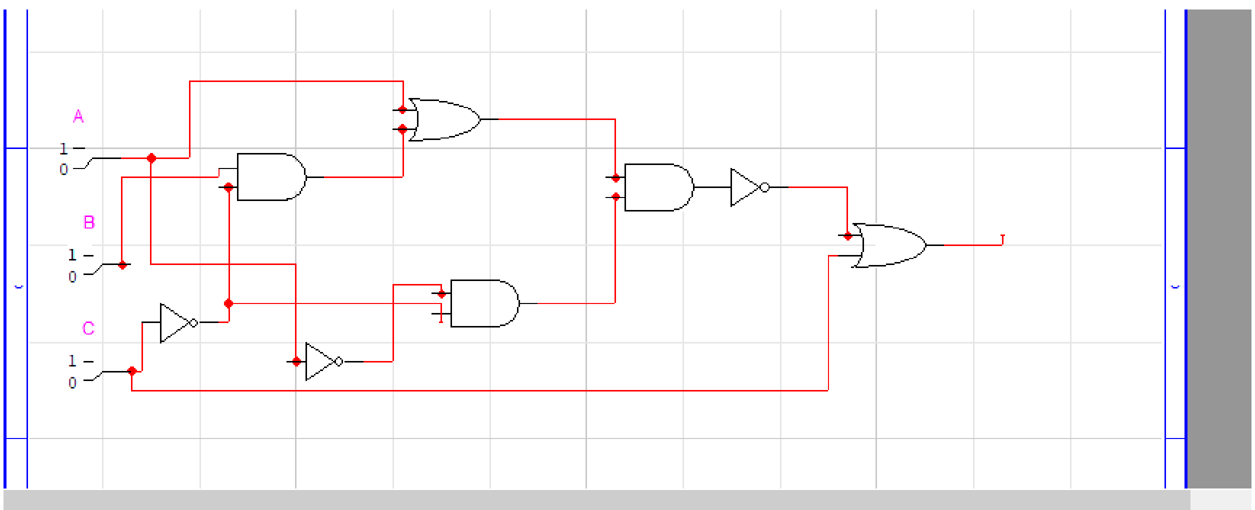


Q3



Q1)

(a). $A \cdot B' + A'$

A	B	$F = A \cdot B' + A'$
0	0	1
0	1	1
1	0	1
1	1	0

working

$0 \cdot 1 + 1$ $\quad$ $\cancel{0 + 1 \cdot 1} = 1$

$\cancel{0 \cdot 1 + 1 \cdot 0}$

$0 \cdot 0 + 1$ $\quad$ $1 \cdot 0 + 0 \cdot 1$

$\cancel{1 \cdot 1 + 0}$ $\quad$ $\cancel{1 \cdot 1} + 0 \cdot 0$

$1 \cdot 0 + 0$

(b). $\cancel{A \cdot B + A' \cdot B'}$

A	B	$F = A \cdot B + A' \cdot B'$
0	0	1
0	1	0
1	0	0
1	1	1

(c). $\cancel{(A \cdot B \cdot C) + (A + B + C)}$

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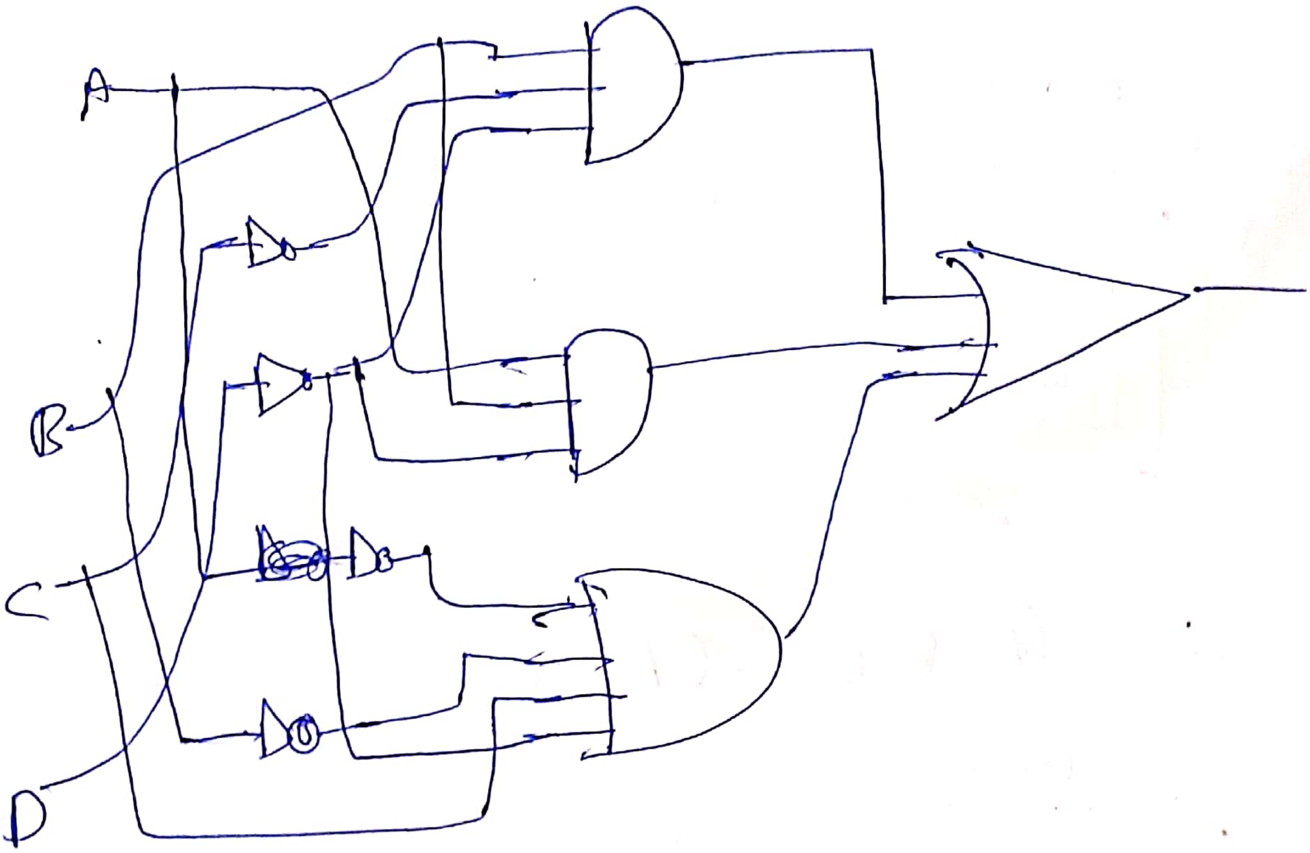
Q2(c)- $BC'D' + A'B'CD' + ABD'$

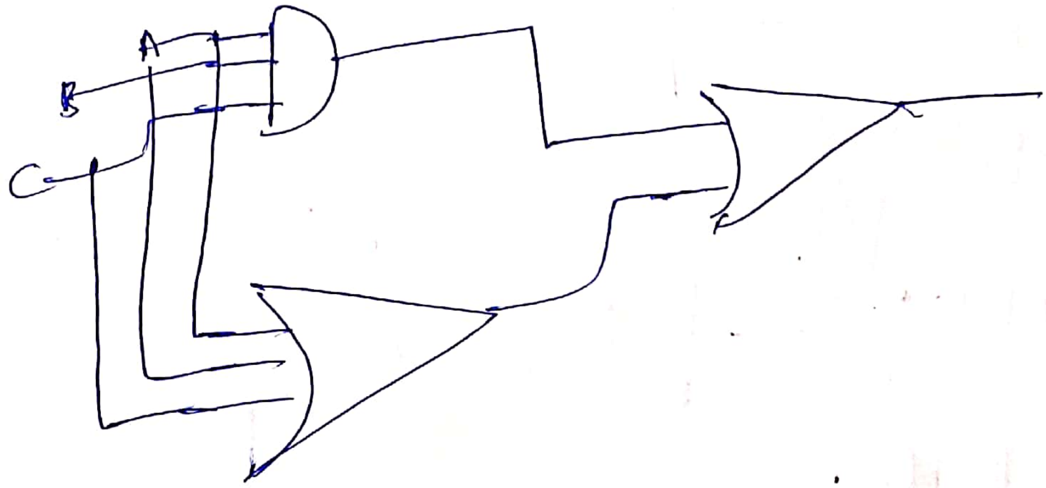


Q3) $F_2 = [(A + BC') \cdot (A'C')]' + C$

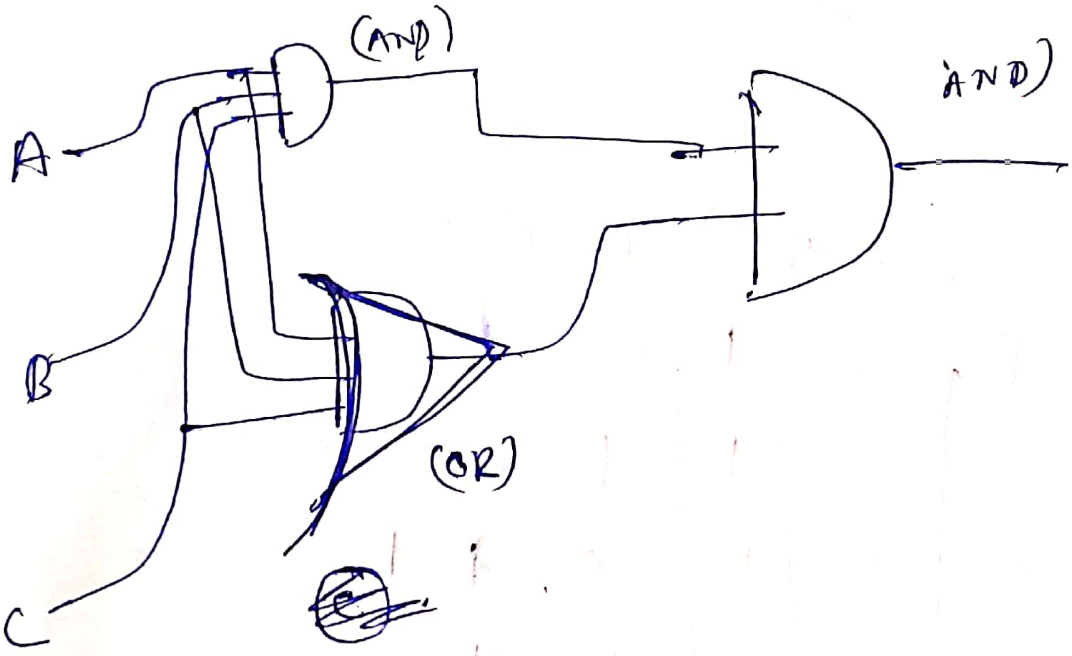
A	B	C	A'	C'	F_2
0	0	0	1	1	0
0	0	1	1	0	1
0	1	0	1	1	0
1	0	0	0	1	1
1	1	1	0	0	1
1	0	1	0	0	1
0	1	1	1	0	1
1	1	0	0	1	1

Q2 Post LAB

(a) - $(A \cdot B \cdot C) + (A + B + C)$



(b) $(A \cdot B \cdot C) \cdot (A + B + C)$



(c)

Q4 (B). ~~$F_2 = (A \cdot B \cdot C) \cdot (A+B+C)$~~ $F_2 = BC'D' + A'B'CD' + ABD'$

A	B	C	D	C'	D'	B'	A'	F_1
0	0	0	0	1	1	1	1	0
0	0	0	1	1	0	1	1	0
0	0	1	0	0	1	1	1	0
0	0	1	1	0	0	1	1	0
0	1	0	0	1	1	0	1	1
0	1	0	1	1	0	0	1	0
0	1	1	0	0	1	0	1	0
0	1	1	1	0	0	0	1	0
1	0	0	0	1	1	1	0	0
1	0	0	1	1	0	1	0	0
1	0	1	0	0	1	1	0	0
1	0	1	1	0	0	1	0	0
1	1	0	0	1	1	0	0	1
1	1	0	1	1	0	0	0	0
~~1~~	~~1~~	~~0~~	~~1~~					
1	1	1	0	0	1	0	0	1
1	1	1	1	0	0	0	0	0

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POST LAB

Q1) –

(a) $F_1 = (A \cdot B \cdot C) \cdot (A + B + C)$

A	B	C	F_1
0	0	0	0
0	0	1	0
0	1	0	0
1	0	0	0
1	1	1	1
0	1	1	0
1	0	1	0
1	1	0	0

(b) $BC'D' + A'B'CD' + ABD'$

A	B	C	D
0	0	0	0
0	0	0	1
0	0	1	0
0	1	0	0
1	0	0	0
1	1	1	1
1	0	0	1
1	1	0	0
0	0	1	1
0	1	1	0
0	1	0	1
1	0	1	0

Q6)

$$F_4 = (xy + yz + zx)$$

after dual

$$F_4' = (x+y)(y+z)(z+x)$$

x	y	z	F_4	F_4'
0	0	0	0	0
0	0	1	0	0
0	1	0	0	0
1	0	0	0	0
1	1	1	1	1
1	1	0	1	1
0	1	1	1	1
1	0	1	1	1

same truth table
hence proven
function is
self-dual!

Q4.

$$F1 = xyz + x'y + xyz'$$

x	y	z	x'	z'	F_1
0	0	0	1	1	0
0	0	1	1	0	0
0	1	0	1	1	1
1	0	0	0	1	0
1	1	1	0	0	1
1	1	0	0	1	1
1	0	1	0	0	0
0	1	1	1	0	1

Q5.

(a). $F2 = (x+y)\cdot(x+z')\cdot(y'+z')$

$= \overline{(x+y)\cdot(x+z')\cdot(y'+z')}$

$= (x\cdot y) + (x\cdot z') + (y'\cdot z')$

$= (\bar{x}\cdot\bar{y}) + (\bar{x}\cdot z) + (y\cdot z)$

(b). $F3 = x'y' + y'z' + (x'z')$

$= (x'+y')(y'+z')(x'+z')$

$= (x+y)(y+z)(x+z)$

Boolean Identities

Q3

(a). $X + XY = X$

$= X \cdot 1 + X \cdot Y$

$= x(1 + Y)$

$= x(1)$

$= x$ (shown).

(b). $X(X' + Y) = XY$

$= XX' + XY$

$= 0 + XY$

$= XY$

(c). $X + X'Y = X + Y$

$\cancel{X \cdot 1 + x'y}$

$\cancel{x(x+\bar{x}) + \bar{x}y}$

$\cancel{xx + x\bar{x} + \bar{x}y}$

$\cancel{x + \bar{x}(x+y)}$

$x + \bar{x}y = X(1+Y) + \bar{X}Y$

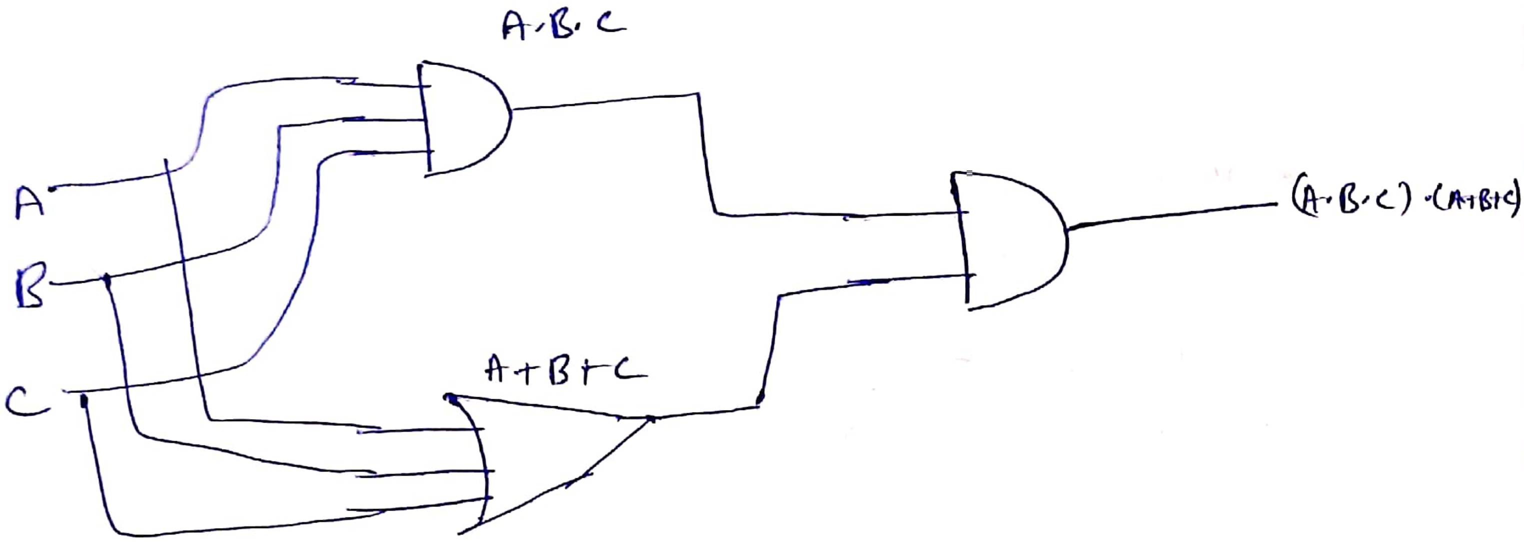
$= X + XY + \bar{X}Y$

$= X + Y(X+\bar{X})$

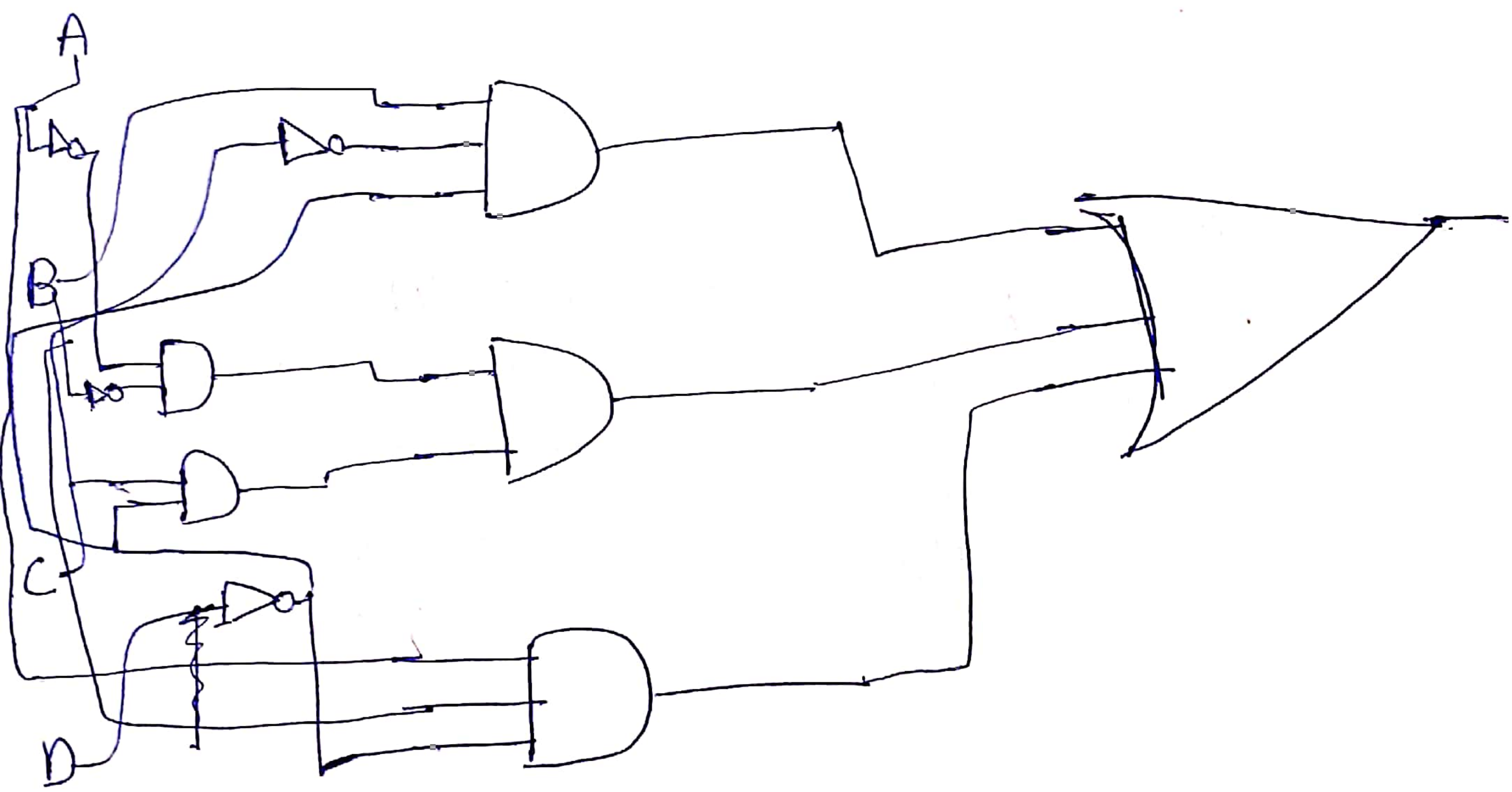
$= X + Y(1)$

$= X+Y$

Q2 (d). $(A \cdot B \cdot C) \cdot (A+B+C)$

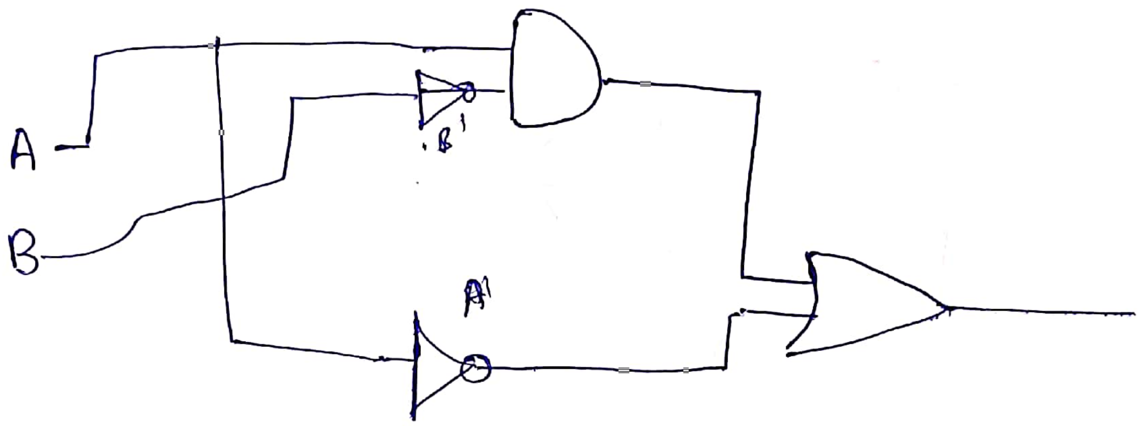


(e). $BC'D' + A'B'(CD') + ABD'$



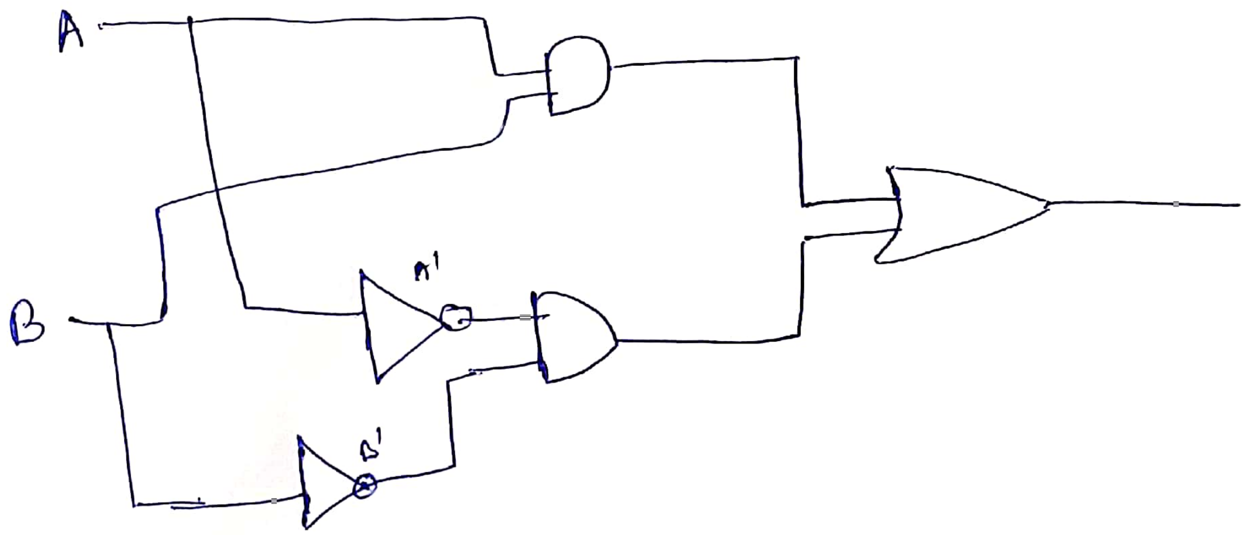
Q2, circuit diagram

ⓐ. $A \cdot B' + A'$

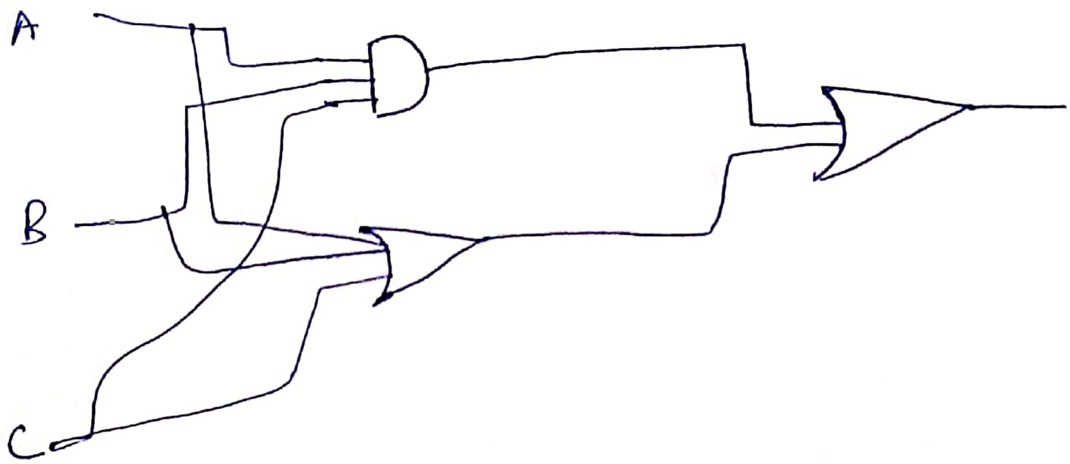


ⓑ.

$A \cdot B + A' \cdot B'$



ⓒ. $(A \cdot B \cdot C) + (A + B + C)$



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Q4 ©. $F = (A \cdot B \cdot C) + (A + B + C)$

A	B	C	$F = (A \cdot B \cdot C) + (A + B + C)$
0	0	0	0
0	0	1	1
0	1	0	1
1	0	0	1
1	1	1	1
1	1	0	1
0	1	1	1
1	0	1	1

$0 + 0$

$0 + 1$

$0 + 1$

$0 + 1$ $1 + 1$

$0 + 1$

$0 + 1$

$0 + 1$

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