Aisha Muhammad Nawaz
20L-0921
DLD LAB MANUAL 04
Section 2E2
08-04-21

Question 01

Convert to POS form using distributive law

$xy' + yz'$

$(xy' + y)(xy' + z')$

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

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

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

Question 02

convert to POS form using De Morgan's laws

$b'd + ac'd'$

$= (b' + d) \cdot (a + c' + d')$

$= (b + d') \cdot (a' + c + d)$

Q3 (a). $(x'+y)(y'+z)$ b. $(x+y')(y'+z)$

(a).

$$x'y' + x'z + yy' + yz$$

$$x'y' + x'z + yz$$

$$x'y'(z+z') + x'z(y'+y) + yz(x+\bar{x})$$

$$= x'y'z + x'y'z' + x'zy' + x'zy + yzx + yz\bar{x}$$

$$= x'y'z + x'y'z' + x'zy + xyz$$

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

$$xy' + xz + y'y' + y'z$$

$$xy' + xz + y' + y'z$$

$$= xy'(z+z') + xz(y+y') + y'(x+\bar{x})(z+\bar{z}) + \bar{y}z(x+\bar{x})$$

$$= xy'z + xy'z' + xzy + xzy' + y'xz + y'\bar{x}\bar{z} + \bar{y}\bar{x}z + \bar{y}\bar{x}\bar{z} + \bar{y}zx + \bar{y}z\bar{x}$$

$$= xy'z + xy'z' + xyz + \bar{x}\bar{y}z + \bar{x}\bar{y}\bar{z}$$

)4 → (i). ~~(ii)~~

• Minterm of E :-

$E = \Sigma_m$? $E = m_1 + m_2 + m_4 + m_6$

$E = \Sigma_m$? $E = \bar{x}\bar{y}z + \bar{x}y\bar{z} + x\bar{y}\bar{z} + xy\bar{z}$

• Minterm of F :-

$F = \Sigma_m$? $F = \bar{x}\bar{y}\bar{z} + \bar{x}y\bar{z} + x\bar{y}\bar{z} + xyz$

$F = \Sigma_m$? $F = m_0 + m_2 + m_4 + m_7$

• Maxterm of E :-

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

$E = m_0 \cdot m_3 \cdot m_5 \cdot m_7$

• Maxterm of F :-

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

$F = \Pi_M$? ~~(ii).~~ (ii).

$F = m_1 \cdot m_3 \cdot m_5 \cdot m_6$

$E = \bar{x}\bar{y}z + \bar{x}y\bar{z} + x\bar{y}\bar{z} + xy\bar{z}$

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

$E = \Sigma_m$? $= \bar{x}\bar{y}z + \bar{x}y\bar{z} + x\bar{z}$

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

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

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

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

$F = \bar{x}\bar{y}\bar{z} + \bar{x}y\bar{z} + x\bar{y}\bar{z} + xyz$

~~$= \bar{x}\bar{y}\bar{z}$~~

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

$\Sigma_m = F = \bar{x}\bar{z} + x\bar{y}\bar{z} + xyz$

Q5 → Find max terms ~~max terms~~ terms from the following min terms and write its expression. Also, implement the resultant expression on logic works.

$$F(X, Y, Z) = \Sigma m(1, 3, 6, 7).$$

$$\bar{F}(X, Y, Z) = \Sigma m(0, 2, 4, 5)$$

$$F(X, Y, Z) = \Pi M(0, 2, 4, 5) = (M_0)(M_2)(M_4)(M_5)$$

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

$$F(X, Y, Z) = (X+Y+Z)(X+\bar{Y}+Z)(\bar{X}+Y+Z)(\bar{X}+\bar{Y}+\bar{Z})$$

Q6,

$$F(A, B, C) = \Pi M(0, 3, 4, 5, 7)$$

$$\bar{F}(A, B, C) = \Pi M(1, 2, 6)$$

$$F(A, B, C) = \Sigma m(1, 2, 6) = m_1 + m_2 + m_6$$

$$F(A, B, C) = \bar{X}\bar{Y}Z + \bar{X}Y\bar{Z} + X\bar{Y}\bar{Z}$$

Q7 → max terms

$$F(X, Y, Z) = \Sigma m(0, 1, 2, 4, 6)$$

$$\bar{F}(X, Y, Z) = \Sigma m(3, 5, 7)$$

$$F(X, Y, Z) = \Pi M(3, 5, 7) = (M_3)(M_5)(M_7)$$

$$\Pi_m(3,5,7) = (X+\bar{Y}+\bar{Z})(\bar{X}+Y+\bar{Z})(\bar{X}+\bar{Y}+\bar{Z})$$

↳ Expression for max terms.

$$F(X, Y, Z) = \Sigma m(0, 1, 2, 4, 6) = m_0 + m_1 + m_2 + m_4 + m_6$$

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

↳ Expression for min terms.

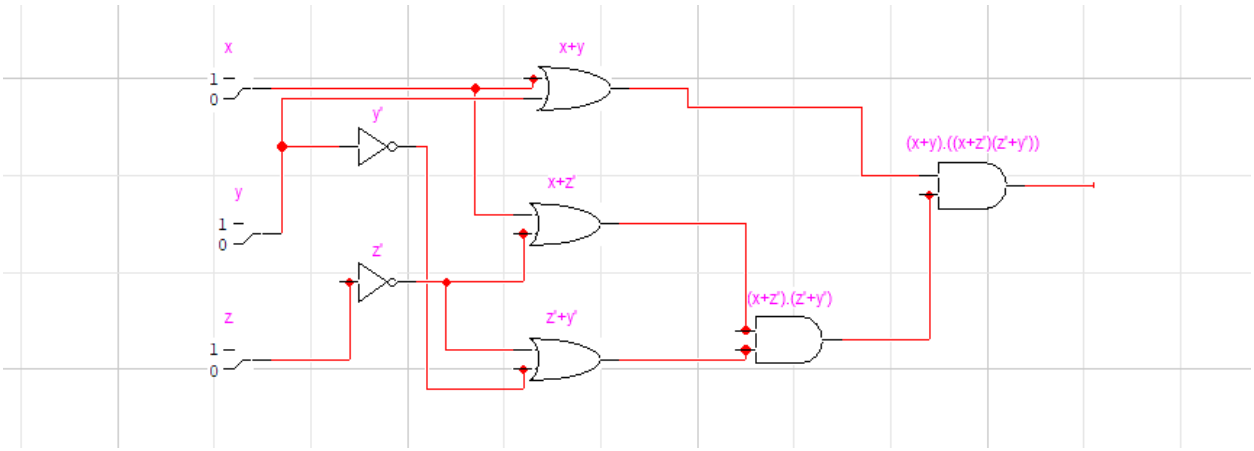
Q8 →

$F = \left((A'B)' + C \right) \cdot C'$

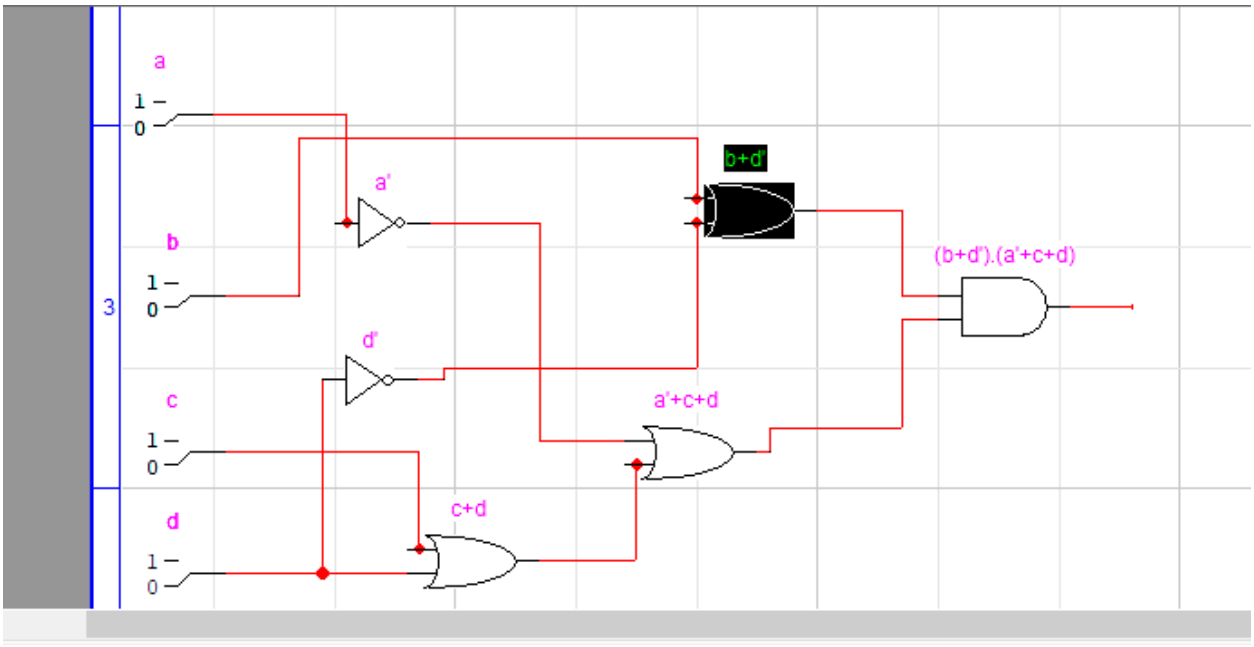
Truth table

A	B	C	A'	B'	C'	F
0	0	0	1	1	1	1
0	0	1	1	1	0	0
0	1	0	1	0	1	0
0	1	1	1	0	0	0
1	0	0	0	1	1	1
1	0	1	0	1	0	0
1	1	0	0	0	1	1
1	1	1	0	0	0	0

20L-0921
Aisha Muhammad Nawaz
Section 2E2 DLD LAB MANUAL 2
Q1.

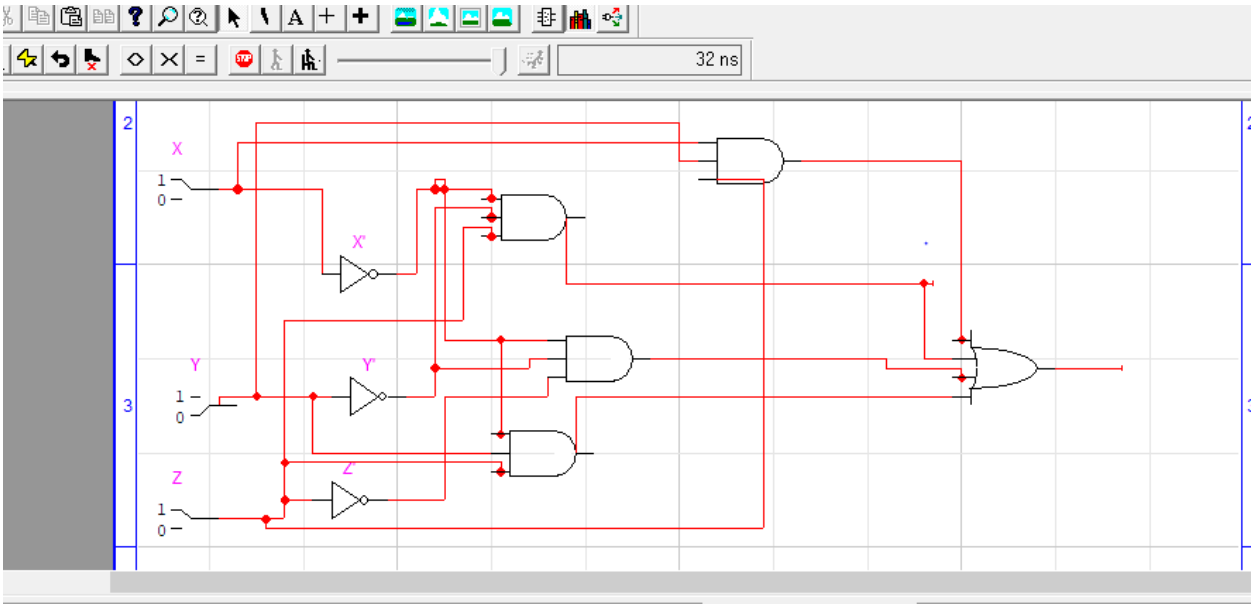


Q2.

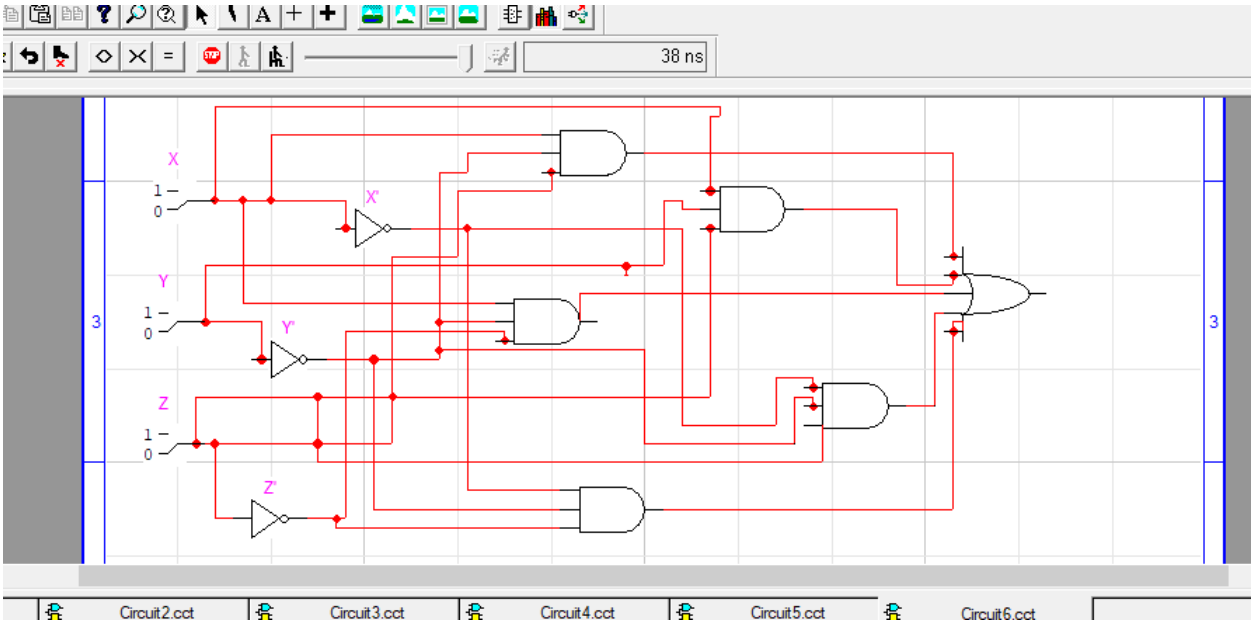


Q3(a).

20L-0921
Aisha Muhammad Nawaz
Section 2E2 DLD LAB MANUAL 2

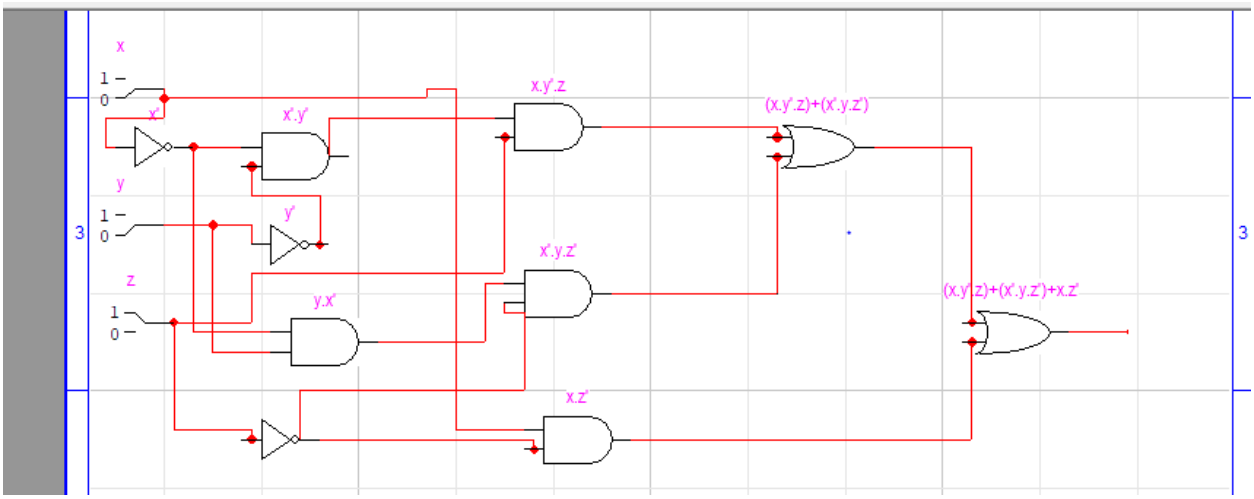


Q3(b).

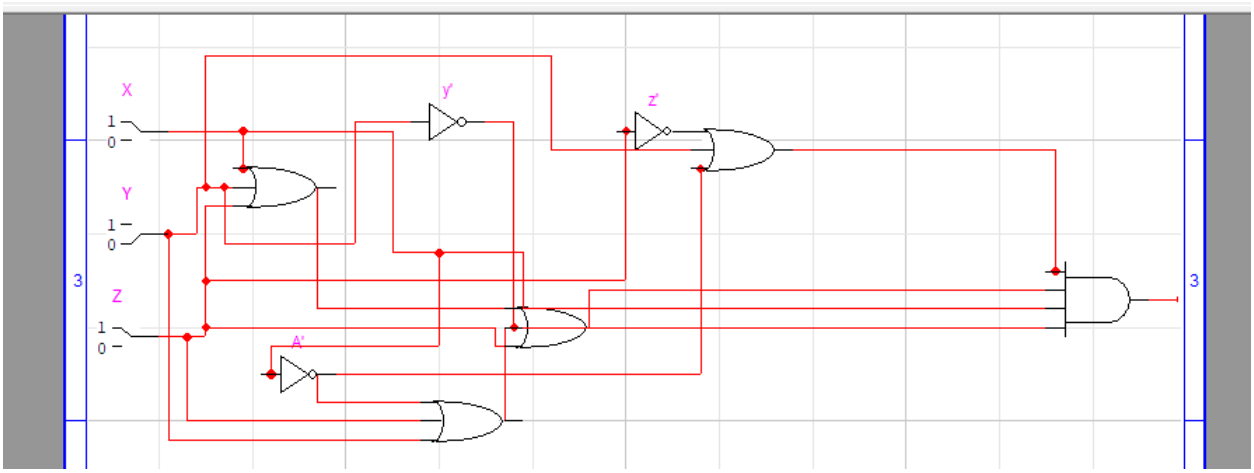


20L-0921
Aisha Muhammad Nawaz
Section 2E2 DLD LAB MANUAL 2

Q4.

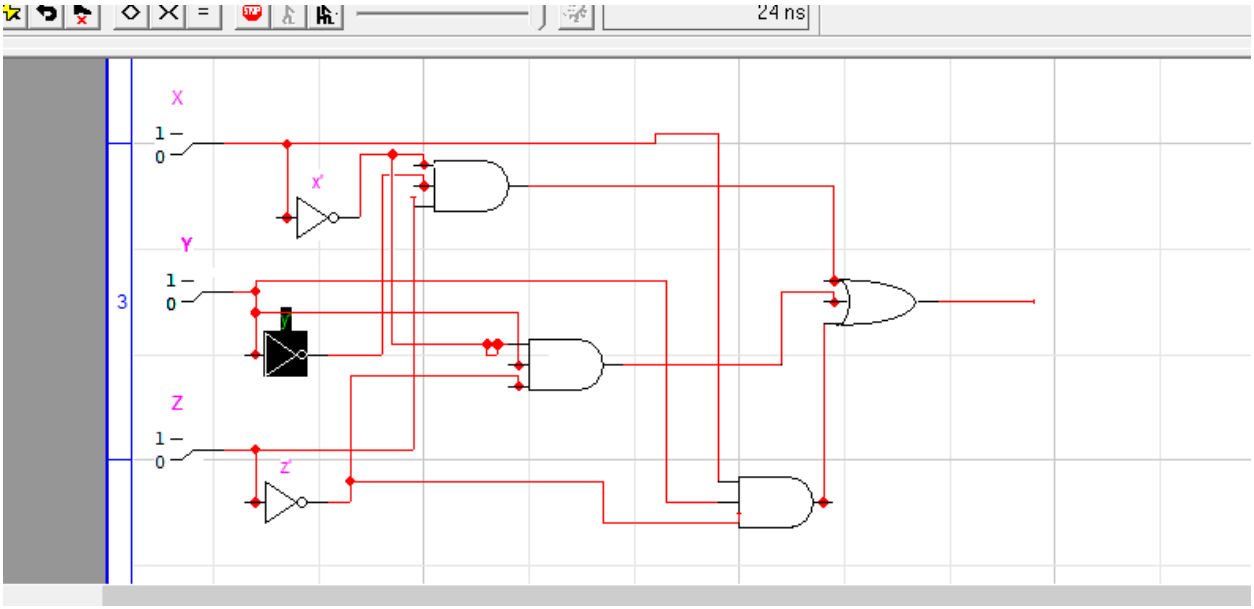


Q5



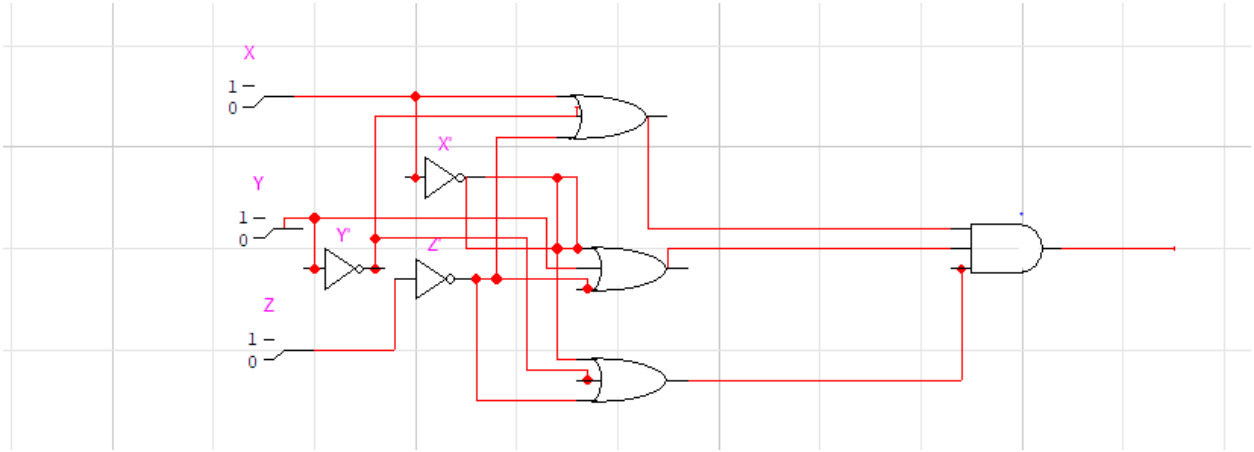
Q6

20L-0921
Aisha Muhammad Nawaz
Section 2E2 DLD LAB MANUAL 2



Q7.

Max terms



Min terms

20L-0921
Aisha Muhammad Nawaz
Section 2E2 DLD LAB MANUAL 2