1.CO2	Convert the following function to its corresponding canonical **POS** form using boolean algebraic formulas: F(a,b,c,d) = (a+b+c'd')(b+d)
2.CO2	Simplify the following function: ((A.B)'+(C'+D')')'.((A.B')+(C.(D+A'.D)))+A'C

Question 1 Solution

F(a,b,c,d)
= (a+b+c'd')(b+d)
= (a+b+c')(a+b+d')(b+d)
= (a+b+c'+d')(a+b+c'+d)(a+b+d'+c')(a+b+d'+c)(b+d+a')(b+d+a)
= (a+b+c'+d')(a+b+c'+d)(a+b+d'+c')(a+b+d'+c)(b+d+a'+c')(b+d+a'+c)(b+d+a+c')(b+d+a+c)
= (a+b+c'+d')(a+b+c'+d)(a+b+c'+d')(a+b+c+d')(a'+b+c'+d)(a'+b+c+d)(a+b+c'+d)(a+b+c+d)
= (a+b+c'+d')(a+b+c'+d)(a+b+c+d')(a'+b+c'+d)(a'+b+c+d)(a+b+c+d)
= ∏ (3, 2, 1, 10, 8, 0)
= ∏ (0, 1, 2, 3, 8, 10)

Question 2 Solution

((A.B)'+(C'+D')')'.((A.B')+(C.(D+A'.D)))+A'C
= ((AB)')' ((C'+D')')' (AB'+CD+A'CD)+A'C
= AB (C'+D') (AB'+CD (1+D'))+A'C
= (ABC'+ABD') (AB'+CD)+A'C
= ABC'AB' + ABC'CD + ABD'AB' + ABD'CD+A'C
= 0 + 0 + 0 + 0+A'C
= A'C

1.CO2	Convert the following function to its corresponding canonical **POS** form using boolean algebraic formulas: F(w,x,y,z) = (w+x+y'z')(x+z)
2.CO2	Simplify the following function: W'X+((W.X)'+(Y'+Z')')')'.((W.X')+(Y.(Z+W'.Z)))

Question 1 Solution

F(w,x, y, z)
= (w+y'z'+x)(z+x)
= (w+x+y')(w+x+z')(x+z)
= (w+x+y'+z')(w+x+y'+z)(w+x+z'+y')(w+x+z'+y)(x+z+w')(x+z+w)
= (w+x+y'+z')(w+x+y'+z)(w+x+z'+y')(w+x+z'+y)(x+z+w'+y')(x+z+w'+y)(x+z+w+y')(x+z+w+y)
= (w+x+y'+z')(w+x+y'+z)(w+x+y'+z')(w+x+y+z')(w'+x+y'+z)(w'+x+y+z)(w+x+y'+z)(w+x+y+z)
= (w+x+y'+z')(w+x+y'+z)(w+x+y+z')(w'+x+y'+z)(w'+x+y+z)(w+x+y+z)
= ∏ (3, 2, 1, 10, 8, 0)
= ∏ (0, 1, 2, 3, 8, 10)

Question 2 Solution

W'X+((W.X)'+(Y'+Z')')')'.((W.X')+(Y.(Z+W'.Z)))
= W'X+((WX)')' ((Y'+Z')')' (WX'+YZ+W'YZ)
= W'X+WX (Y'+Z') (WX'+YZ (1+Z'))
= W'X+(WXY'+WXZ') (WX'+YZ)
= W'X+WXY'WX' + WXY'YZ + WXZ'WX' + WXZ'YZ
= W'X+0 + 0 + 0 + 0
= W'X

1.CO2	Convert the following function to its corresponding canonical **POS** form using boolean algebraic formulas: F(a,b, c, d) = (a'+b+c'd)(b'+d)
2.CO2	Simplify the following function: A'B+(A'+B'(A(B.B'))+(A'(C.C')))(C'+1)+AB'C'+B'C(B'+B)

Question 1 Solution

F(a,b, c, d) = (a'+b+c'd)(b'+d)
= (a'+b+c')(a'+b+d)(b'+d)
= (a'+b+c'+dd')(a'+b+cc'+d)(aa'+b'+d)
= (a'+b+c'+d)(a'+b+c'+d')(a'+b+c+d)(a'+b+c'+d)(a+b'+d)(a'+b'+d)
=(a'+b+c'+d)(a'+b+c'+d')(a'+b+c+d)(a'+b+c'+d)(a+b'+cc'+d)(a'+b'+cc'+d)
=(a'+b+c'+d)(a'+b+c'+d')(a'+b+c+d)(a'+b+c'+d)(a+b'+c+d)(a+b'+c'+d)(a'+b'+c+d)(a'+b'+c'+d)
= (1010)(1011)(1000)(1010)(0100)(0110)(1100)(1110)
= ∏ (10,11,8,10,4,6,12,14)
= ∏ (4,6,8,10,11,12,14)

Question 2 Solution

A'B+(A'+B'(A(B.B'))+(A'(C.C')))(C'+1)+AB'C'+B'C(B'+B)
= A'B + (A'+0) + (0) (1) + AB'C'+B'C(1)
= A'B + A' + AB'C' + B'C
=A' (B+1) + B' (AC'+C)
= A' + B' (A+C) (C'+C)
= A' + B' (A+C) (1)
= A' + B' (A+C)
= A'+ AB' + B'C
= (A'+A) (A'+B') + B'C
= A'+B'+B'C
= A'+B'(1+C)
= A'+B'

1.CO2	Convert the following function to its corresponding canonical **POS** form using boolean algebraic formulas: F(w,x, y, z) = (w'+x+y'z)(x'+z)
2.CO2	Simplify the following function: P'Q+(P'+Q'(P(Q.Q'))+(P'(R.R')))(R'+1)+PQ'R'+Q'R(Q'+Q)

Question 1 Solution

F(w,x, y, z) = (w'+x+y'z)(x'+z)
= (w'+x+y')(w'+x+z)(x'+z)
= (w'+x+y'+zz')(w'+x+yy'+z)(ww'+x'+z)
= (w'+x+y'+z)(w'+x+y'+z')(w'+x+y+z)(w'+x+y'+z)(w+x'+z)(w'+x'+z)
=(w'+x+y'+z)(w'+x+y'+z')(w'+x+y+z)(w'+x+y'+z)(w+x'+yy'+z)(w'+x'+yy'+z)
=(w'+x+y'+z)(w'+x+y'+z')(w'+x+y+z)(w'+x+y'+z)(w+x'+y+z)(w+x'+y'+z)(w'+x'+y+z)(w'+x'+y'+z)
= (1010)(1011)(1000)(1010)(0100)(0110)(1100)(1110)
= ∏ (10,11,8,10,4,6,12,14)
= ∏ (4,6,8,10,11,12,14)

Question 2 Solution

P'Q+(P'+Q'(P(Q.Q'))+(P'(R.R')))(R'+1)+PQ'R'+Q'R(Q'+Q)
= P'Q+(P'+Q'(P(Q.Q'))+(P'(R.R')))(R'+1)+PQ'R'+Q'R(Q'+Q)
= P'Q + (P'+0) + (0) (1) + PQ'R'+Q'R(1)
= P'Q + P' + PQ'R' + Q'R
=P' (Q+1) + Q' (PR'+R)
= P' + Q' (P+R) (R'+R)
= P' + Q' (P+R) (1)
= P' + Q' (P+R)
= P'+ PQ' + Q'R
= (P'+P) (P'+Q') + Q'R
= P'+Q'+Q'R
= P'+Q'(1+R)
= P'+Q'