Azmari Sultana
Id : 23301949
CSE260
Section: 02

Ans no 1

$$(A+B)(A+B)(A+C)$$

$$= (A+B)(A+C)$$

$$= AA + AB + AC + BC$$

$$= A + AB + AC + BC$$

$$= A(1+C) + AB + BC$$

$$= A + AB + BC$$

$$= A(1+B) + BC$$

$$= A + BC$$

Ans no 2

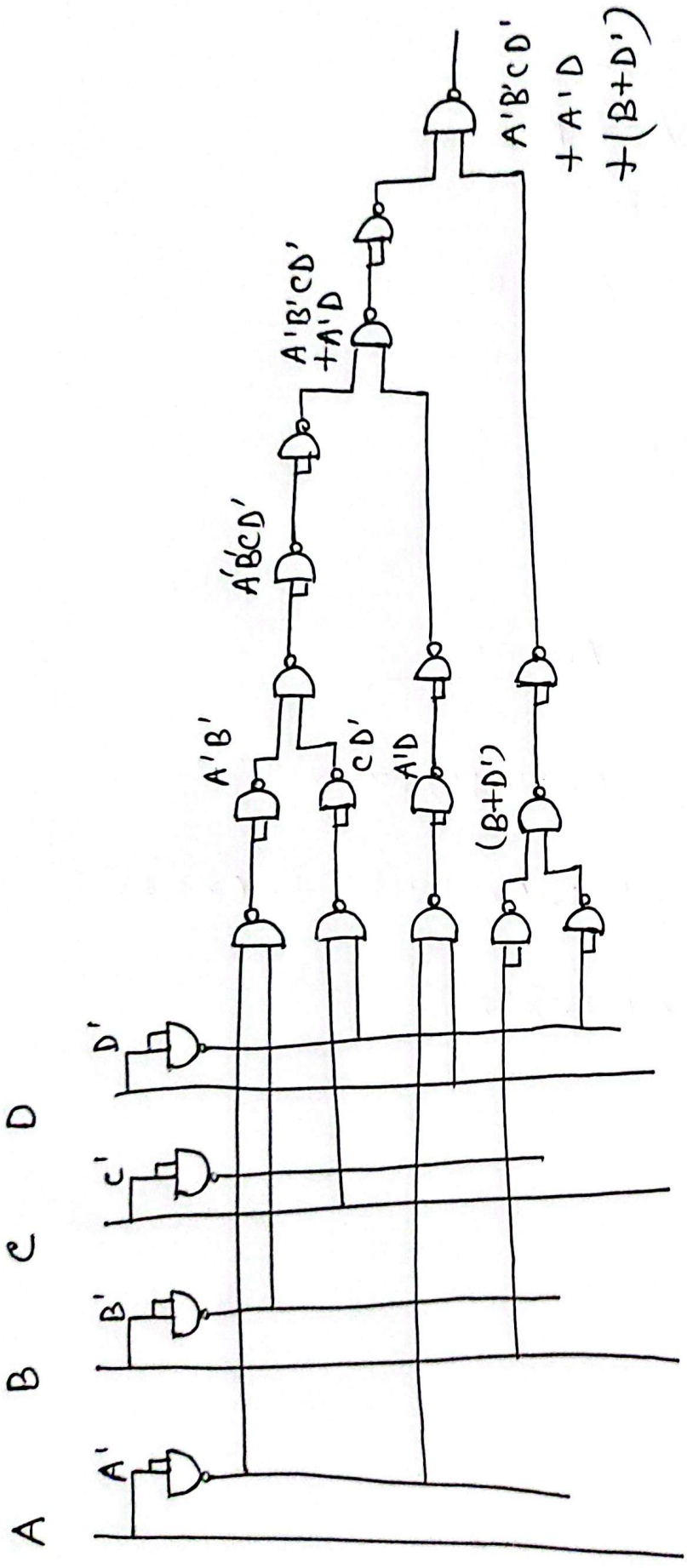
$$((x' + y + z')(x' + y')(x + z'))'$$

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

$$= xy'z + xy + x'z$$

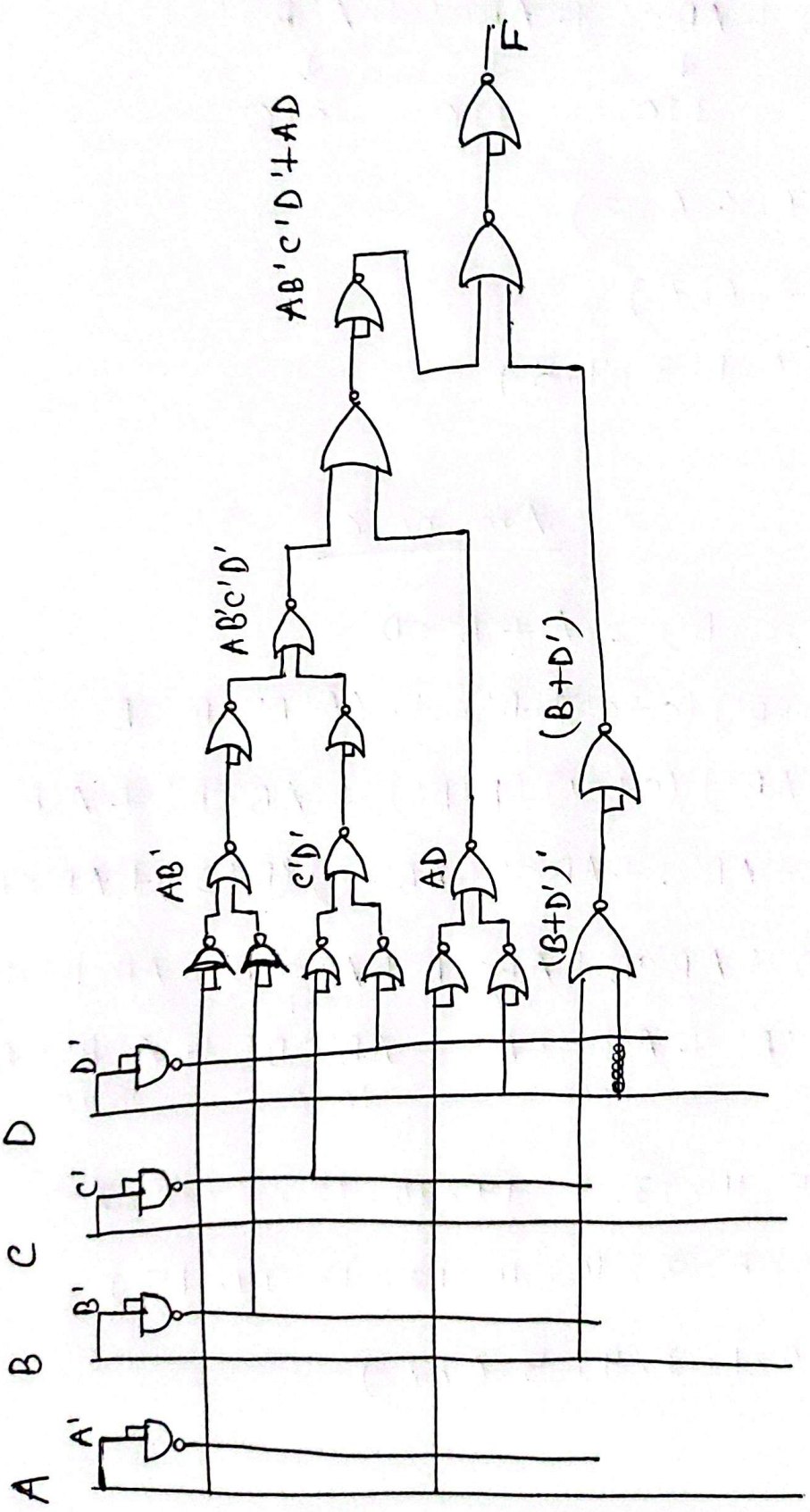
Ans no 3 (NAND)

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



Ans no 1 (NOR)

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



Ans no 5

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

$= AB(C+C') + (A+A')BC'$

$= ABC + ABC' + ABC' + A'BC'$

$\downarrow \quad \downarrow \quad \downarrow \quad \downarrow$

$111 \quad 110 \quad 110 \quad 010$

$= \Sigma(7, 6, 6, 2)$

$= \Sigma(2, 6, 7)$

$= \Pi(0, 1, 3, 4, 5)$

Ans no 6

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

$= A(B+B')(C+C')(D+D') + (A+A')B'CD'$

$= (AB + AB')(C+C')(D+D') + AB'CD' + A'B'CD'$

$= (ABC + AB'C + ABC' + AB'C')(D+D') + AB'CD' + A'B'CD'$

$= ABCD + AB'CD + ABC'D + AB'C'D + ABCD' + AB'CD'$

$\quad 1111 \quad 1011 \quad 1101 \quad 1001 \quad 1110 \quad 1010$

$+ ABC'D' + AB'C'D' + AB'CD' + A'B'CD'$

$\quad 1100 \quad 1000 \quad 1010 \quad 0010$

$= \Sigma(15, 11, 13, 9, 14, 10, 12, 8, 10, 2)$

$= \Sigma(2, 8, 9, 10, 11, 12, 13, 14, 15)$

$= \Pi(0, 1, 3, 4, 5, 6, 7)$

Am no 7

$F(A,B,C,D,E) = AB + CDE$

$= AB(C+C')(D+D')(E+E') + (A+A')(B+B')CDE$

$= (ABC + ABC')(DE + D'E + DE' + D'E') + (AB + A'B + AB' + A'B')CDE$

$= ABCDE + ABC'DE + ABCD'E + ABC'D'E + ABCDE'$
$\quad 11111 \quad 11011 \quad 11101 \quad 11001 \quad 11110$

$+ ABC'DE' + ABCD'E' + ABC'D'E' + ABCDE + A'BCDE$
$\quad 11010 \quad 11100 \quad 11000 \quad 11111 \quad 01111$

$+ AB'CDE + A'B'CDE$
$\quad 10111 \quad 00111$

$= \Sigma(31, 27, 29, 25, 30, 26, 28, 24, 31, 15, 23, 7)$

$= \Sigma(7, 15, 23, 24, 25, 26, 27, 28, 29, 30, 31)$

$= \Pi(0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18, 19, 20, 21, 22)$

(8) $F(a,b,c,d) = \Sigma(8,9,10,11,13,15)$

1000 1001 1010 1011 1101 1111

$= AB'C'D' + AB'C'D + AB'CD' + AB'CD + ABC'D + ABCD$

$= AB'C'(D+D') + AB'C(D+D') + ABD(C+C')$

$= AB'C' + AB'C + ABD$

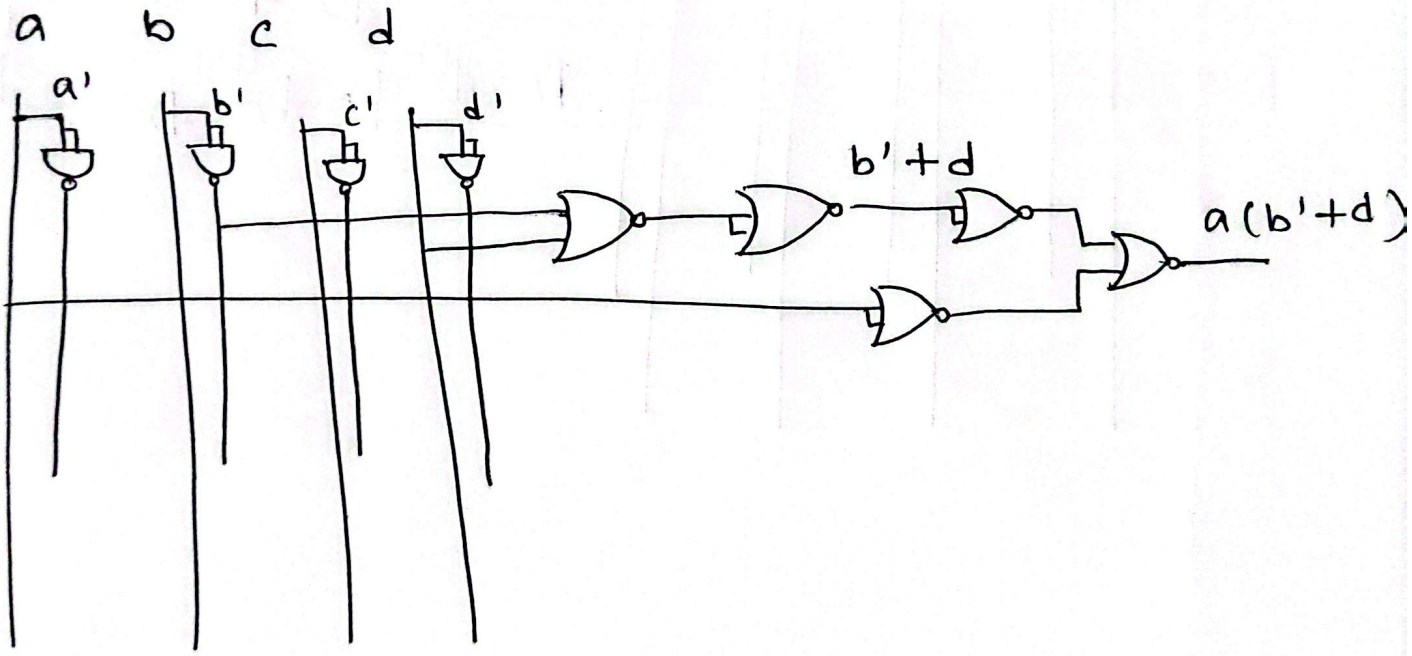
$= AB'(C+C') + ABD$

$= AB' + ABD$

$= A(B' + BD)$

$= A(B'+B)(B'+D)$

$= A(B'+D)$



⑨ $F(a,b,c,d) = \Sigma(8,9,0,11,7,15)$

$= \Sigma(0,7,8,9,11,15)$

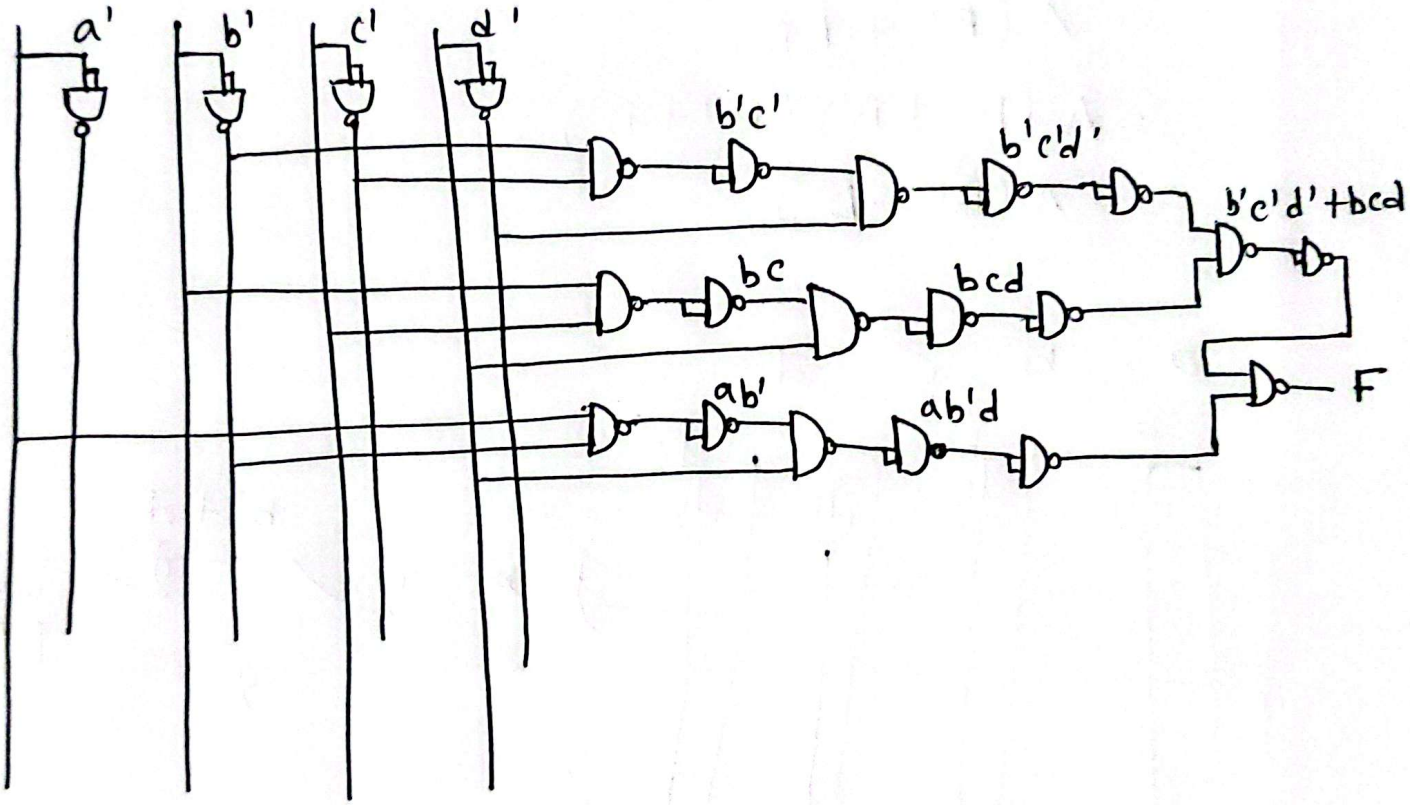
0000 0111 1000 1001 1011 1111

$= a'b'c'd' + a'bcd + ab'c'd' + ab'c'd + ab'cd + abcd$

$= b'c'd'(a+a') + bcd(a+a') + ab'd(c+c')$

$= b'c'd' + bcd + ab'd$

a b c d



(10) $F(a,b,c,d) = \Sigma(5,8,9,12,15)$

0101 1000 1001 1100 1111

$= a'bc'd + ab'c'd' + ab'c'd + abc'd' + abcd$

$= a'bc'd + ab'c'(d+d') + ab(cd+c'd')$

$= a'bc'd + ab'c' + ab$

$= a'bc'd + a(b+b'c')$

$= a'bc'd + a((b+b')(b+c'))$

$= a'bc'd + a(b+c')$