1.

a. $= xyz + x'y + xyz'$

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

$= xy + x'y$

$= y(x + x')$

$\boxed{= y}$

b. $= (x+y)' \cdot (x'+y')$

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

$= x'x'y' + x'y'y'$

$= x'y' + x'y'$

$\boxed{= x'y'}$

1. $= A'C' + ABC + AC'$

$= C'(A' + A) + ABC$

$= C' + ABC$

$\boxed{= C' + AB}$

d. $= (A+B)' \cdot (A'+B')'$

$= A'B' \cdot AB$

$= A'B'AB$

$\boxed{= F}$

2.

a.

A	B	C	D	F(A,B,C,D)
0	0	0	0	1
0	0	0	1	0
0	0	1	0	1
0	0	1	1	0
0	1	0	0	0
0	1	1	0	0
0	1	0	1	1
0	1	1	1	1
1	0	0	0	1
1	0	0	1	0
1	0	1	0	1
1	0	1	1	0
1	1	0	0	1
1	1	1	0	0
1	1	1	1	0

ab\cd	00	01	11	10
00	1	0	0	1
01	0	1	1	0
11	1	1	0	0
10	1	0	0	1

$$\boxed{F = A'BD + ABC' + B'D'}$$

b. $F(A,B,C) = (A+B+C)' + (ABC') + B'C$

A	B	C	F(A,B,C)
0	0	0	1
0	0	1	1
0	1	0	0
0	1	1	0
1	0	0	0
1	0	1	1
1	1	0	1
1	1	1	0

A \ BC	00	01	11	10
0	1	1	0	0
1	0	1	0	1

$$\boxed{F = A'B' + B'C + ABC'}$$

c. $F(A, B, C, D, E) = A'BCE' + A'CE' + AC'D + AE + DE$

A	B	C	D	E	F(A, B, C, D, E)
0	0	0	0	0	0
0	0	0	0	1	0
0	0	0	1	0	0
0	0	0	1	1	1
0	0	1	0	0	1
0	0	1	0	1	0
0	0	1	1	0	1
0	0	1	1	1	1
0	1	0	0	0	0
0	1	0	0	1	0
0	1	0	1	0	0
0	1	0	1	1	1
0	1	1	0	0	1
0	1	1	0	1	0
0	1	1	1	0	1
0	1	1	1	1	1

Continued...

A	B	C	D	E	F(A,B,C,D,E)
1	0	0	0	0	0
1	0	0	0	1	1
1	0	0	1	0	1
1	0	0	1	1	1
1	0	1	0	0	0
1	0	1	0	1	1
1	0	1	1	0	0
1	0	1	1	1	1
1	1	0	0	0	0
1	1	0	0	1	1
1	1	0	1	0	1
1	1	0	1	1	1
1	1	1	0	0	0
1	1	1	0	1	1
1	1	1	1	0	0
1	1	1	1	1	1

ABC\DE	00	01	11	10
000	0	0	1	0
001	1	0	1	1
011	1	0	1	1
010	0	0	1	0
100	0	1	1	1
101	0	1	1	0
111	0	1	1	0
110	0	1	1	1

$F = DE + AE + A'CE' + AC'D$

3.

In ABC \ DEFGHI Output	O1	O2	O3	O4	O5	O6
000	0	0	0	0	0	0
001	0	0	0	0	0	1
010	0	0	0	1	0	0
011	0	0	1	0	0	1
100	0	1	0	0	0	0
101	0	1	1	0	0	1
111	1	1	0	0	0	1
110	1	0	0	1	0	0

3. Bit 6:

In AB \ C	0	1
00	0	0
01	0	0
11	1	1
10	0	0

$F = AB$

Bit 5:

In AB \ C	0	1
00	0	0
01	0	0
11	0	1
10	1	1

$F = AB' + AC$

Bit 4:

AB \ C	0	1
00	0	0
01	0	1
11	0	0
10	0	1

$F = A'BC + AB'C$

Bit 3:

AB \ C	0	1
00	0	0
01	1	0
11	1	0
10	0	0

$F = BC'$

Bit 2:

AB\C	0	1
00	0	0
01	0	0
11	0	0
10	0	0

$F = 0$

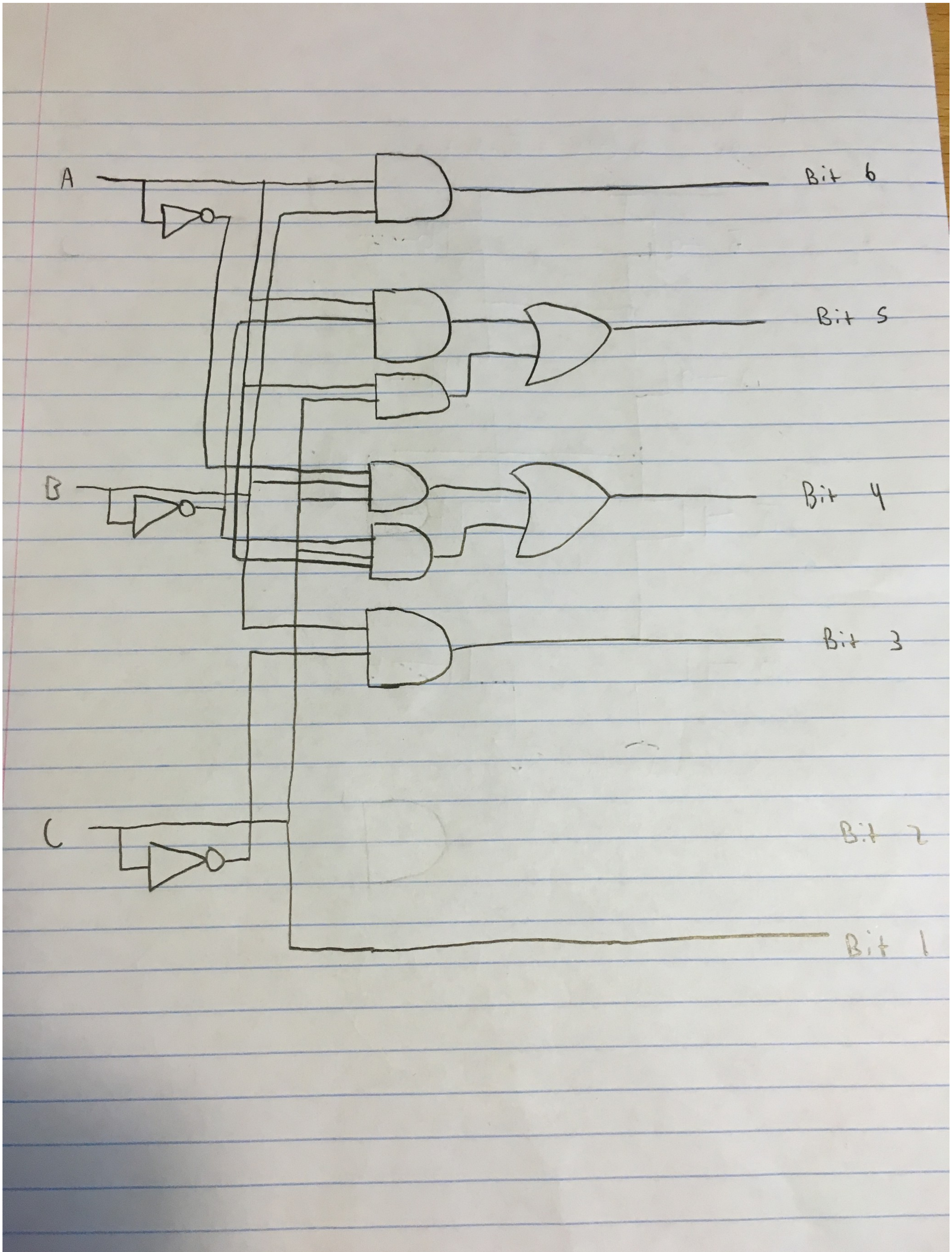
Bit 1:

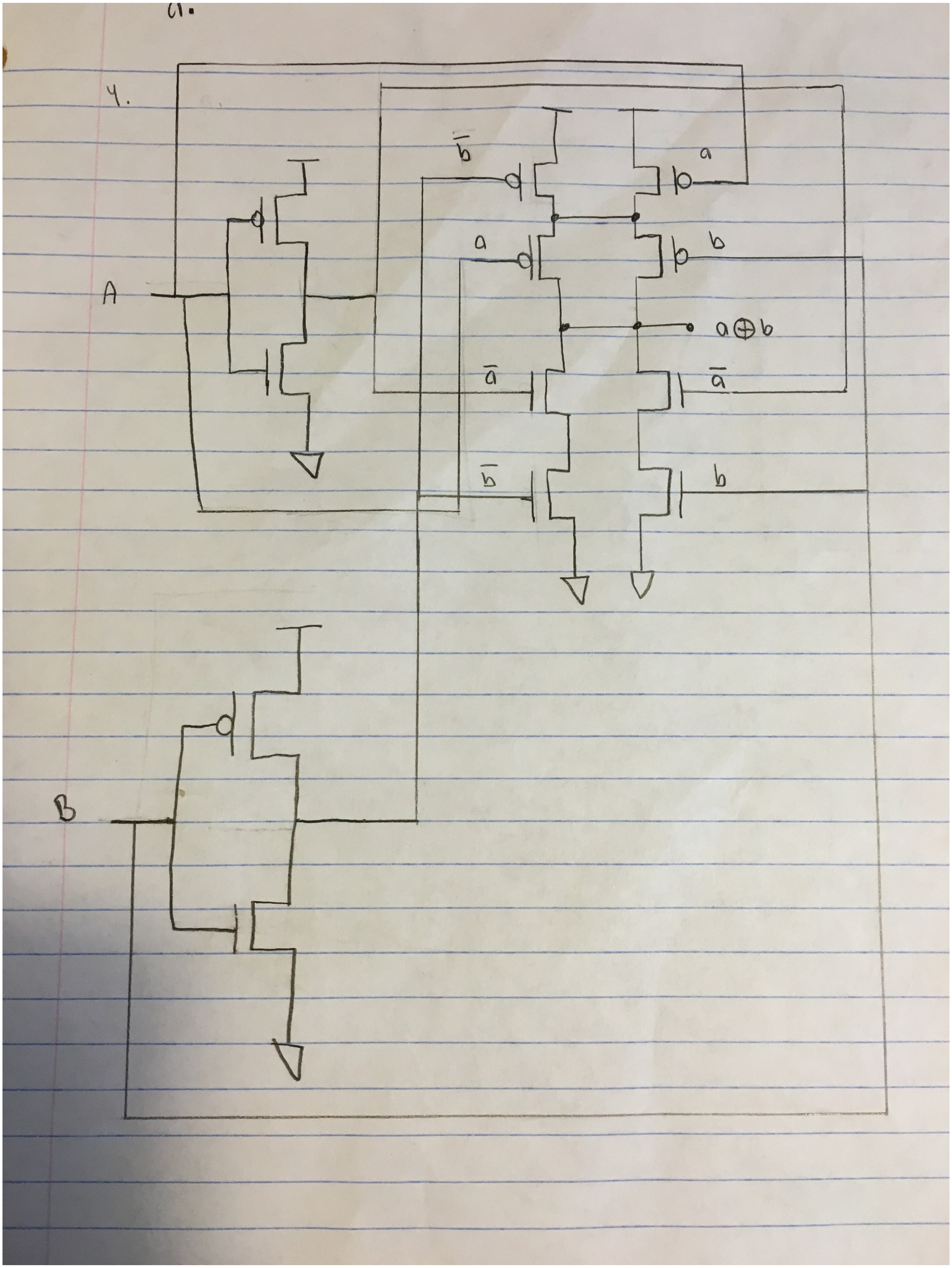
AB\C	0	1
00	0	1
01	0	1
11	0	1
10	0	1

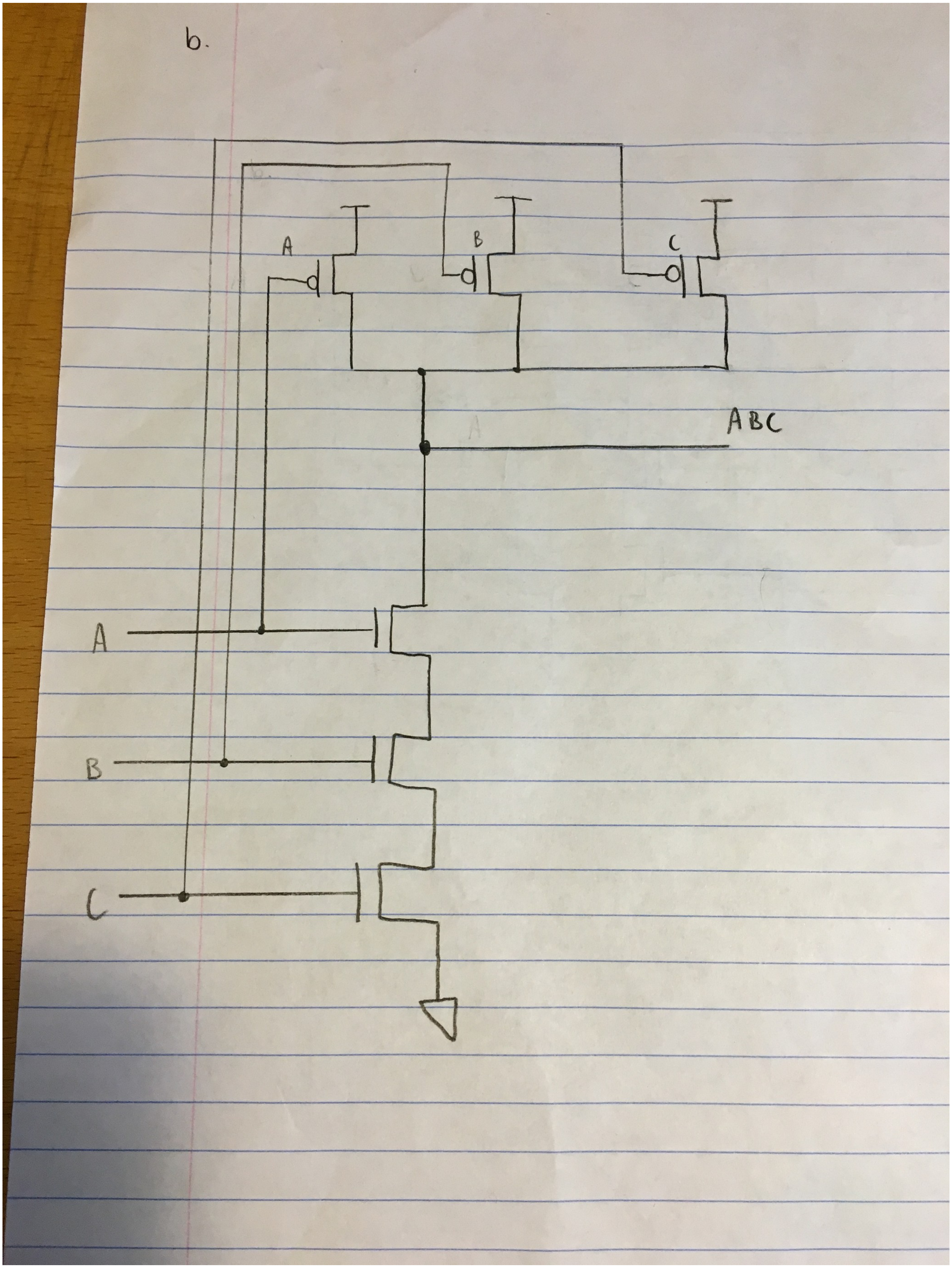
$F = C$

$F = AB + AB' + AC + A'BC' + AB'C + B'C + C$

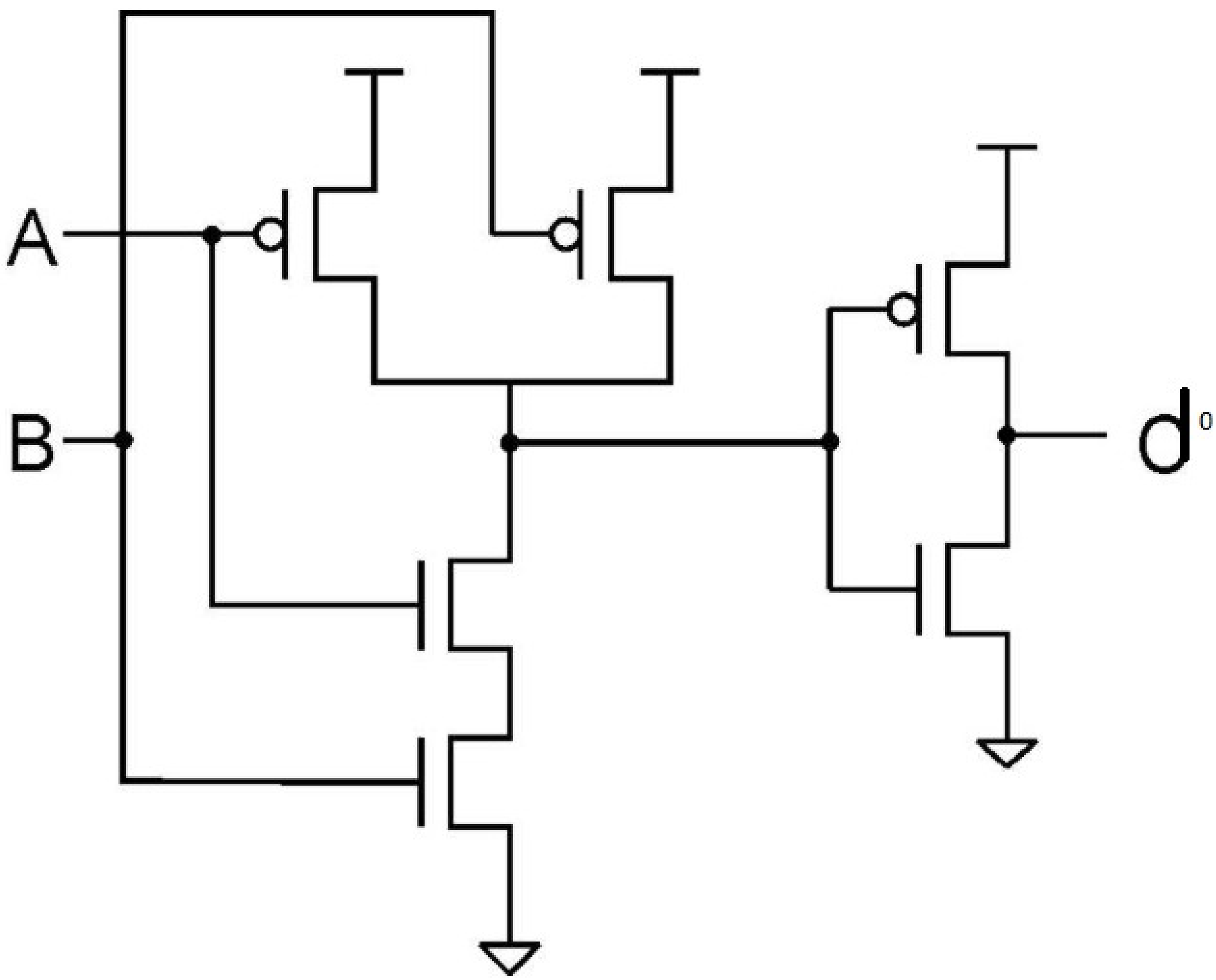
Anders Dahl Assignment 3 4/10/15

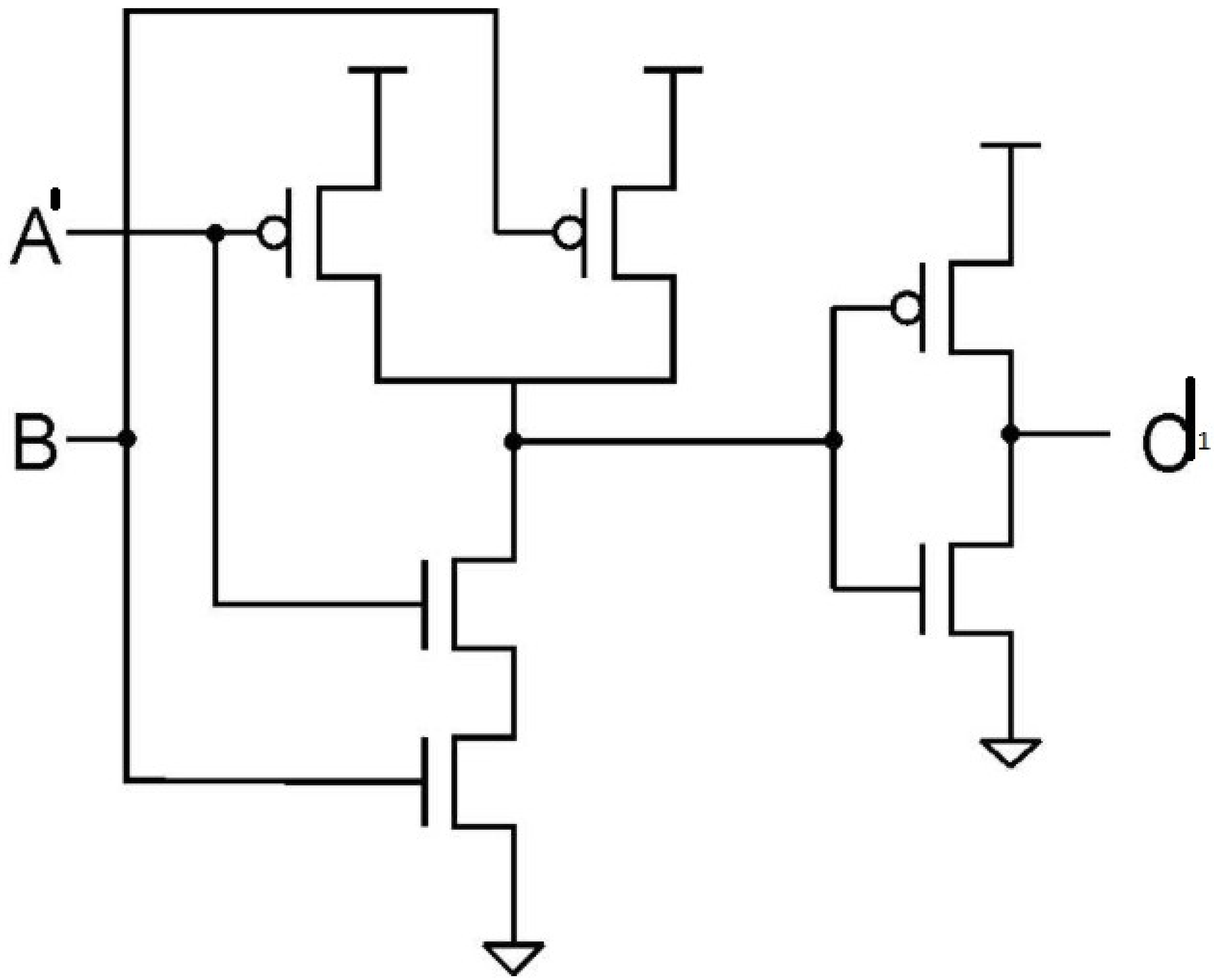


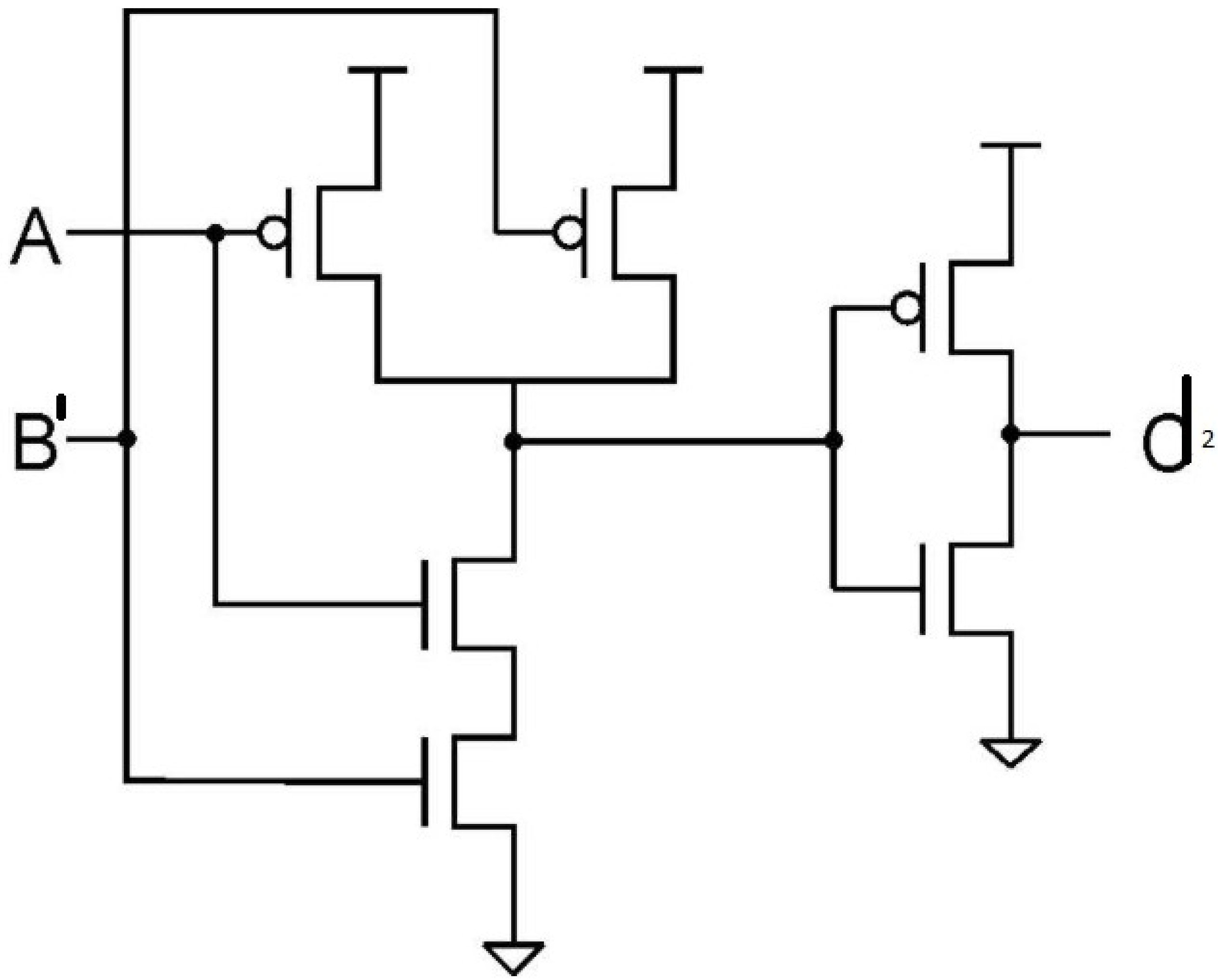

a.
4.
A
B
$\bar{b}$
a
a
b
$a \oplus b$
$\bar{a}$
$\bar{a}$
$\bar{b}$
b

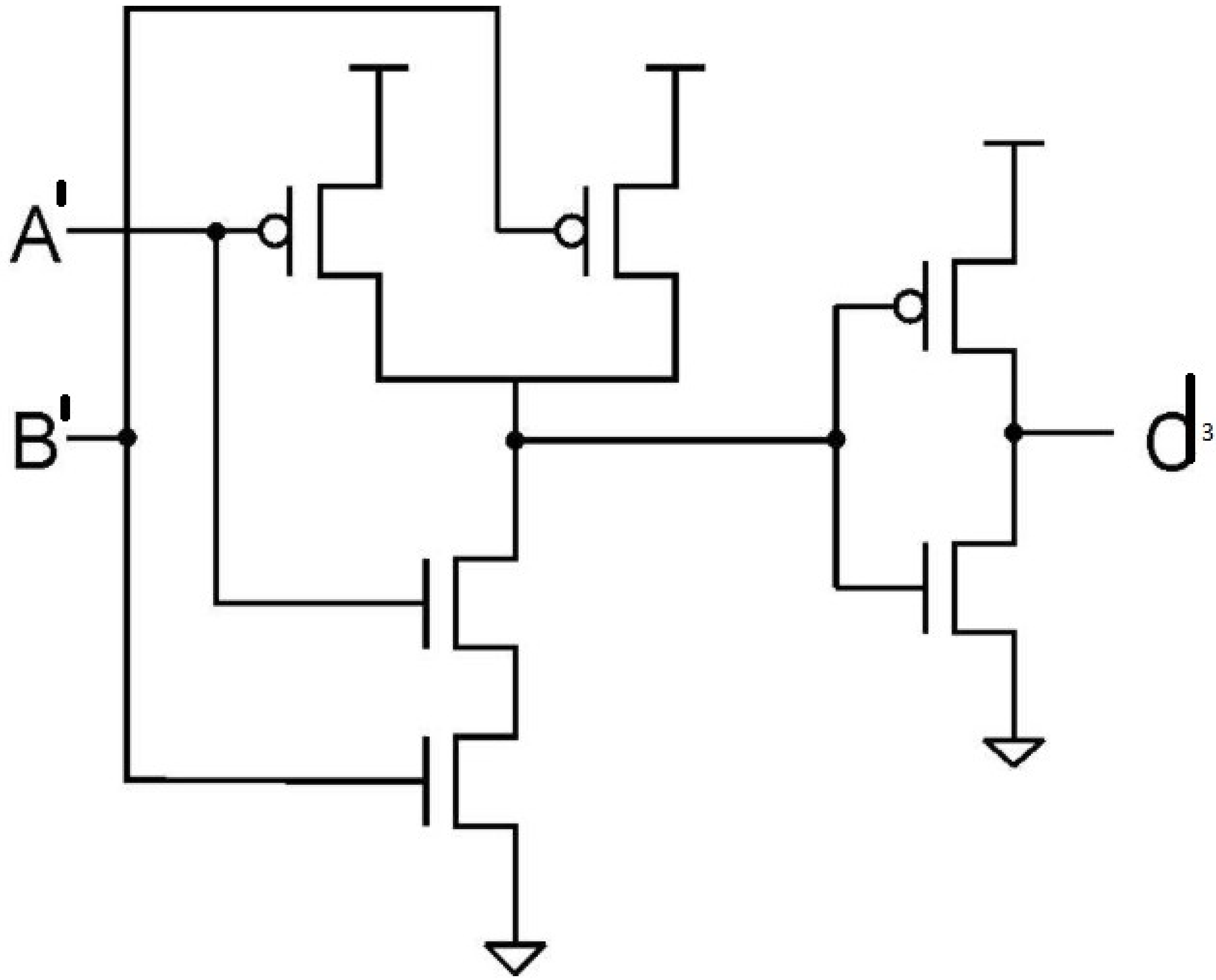

b.
A
B
C
ABC
A
B
C

c.

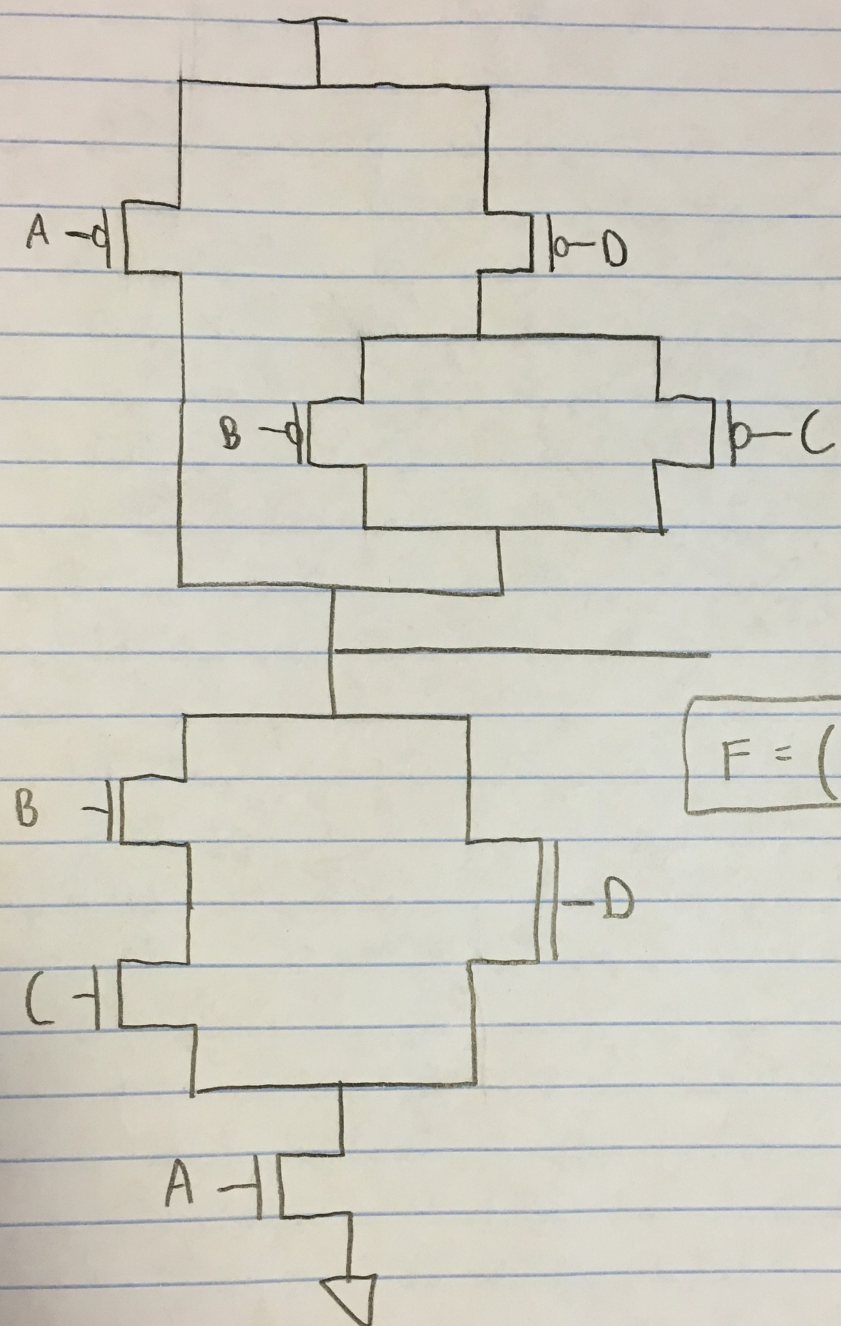



A'
B
d1


A
B'
d2

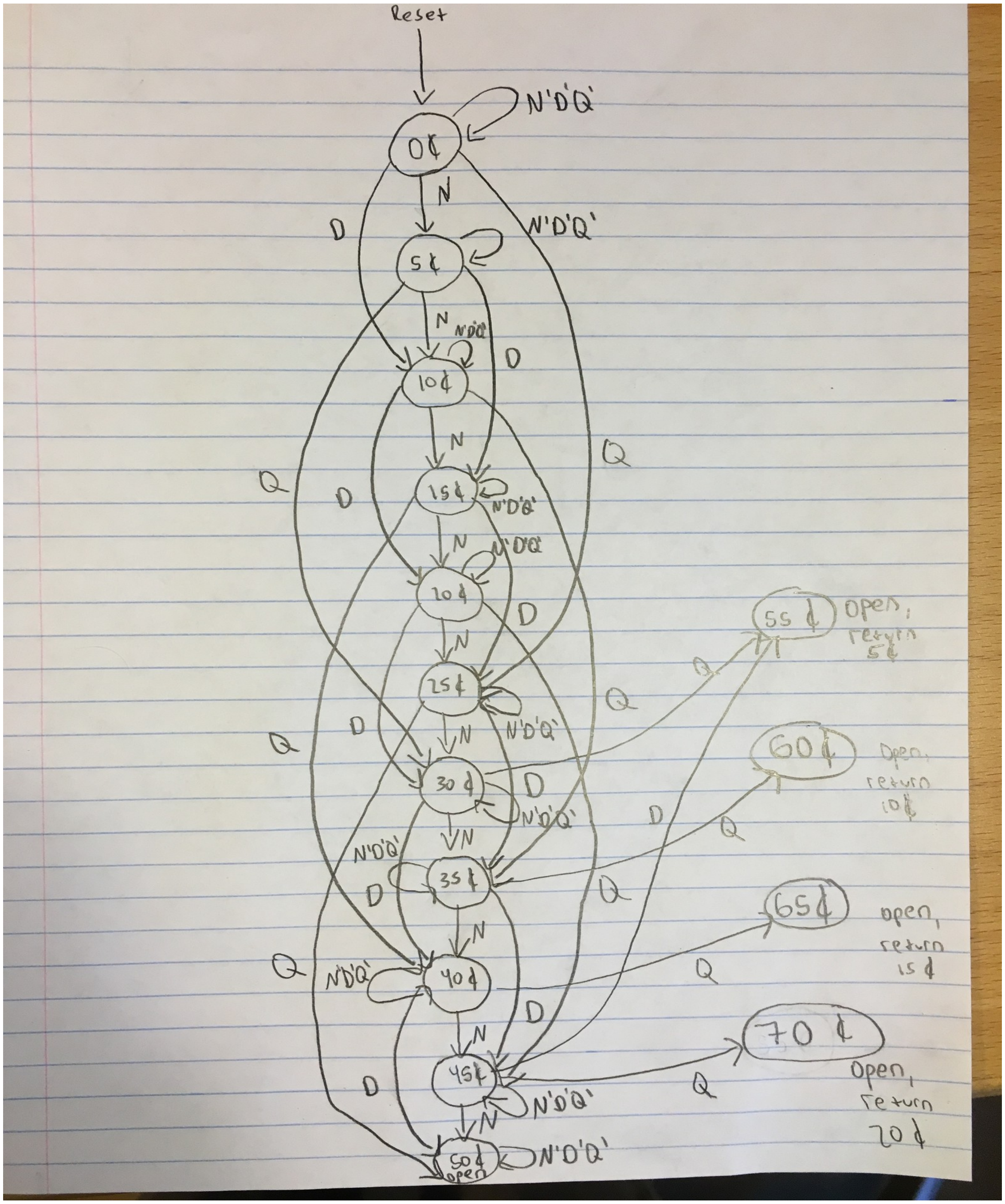

A'
B'
d3

d.



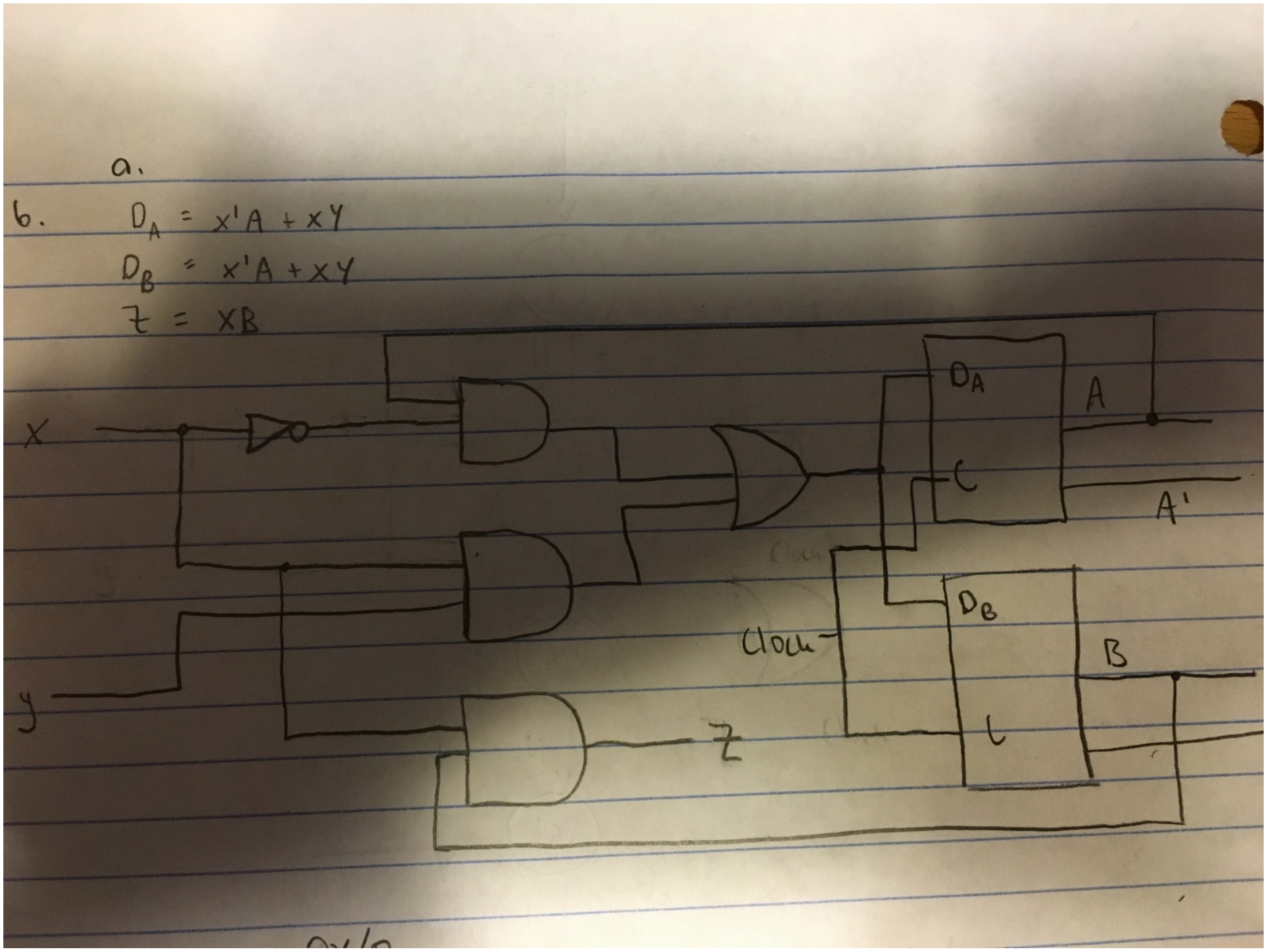
$$\boxed{F = (A(B+CD))'}$$

5.



I designed it to be a Moore state diagram. The output is associated with the state. In this case, it is not associated with transitions or the inputs. One could have made the decision to express it in such a way, however. If it is in the state 50, 55, 60, 65, or 70C then the signal OPEN is set.

6.



Present State		Inputs		Next State		Output
A	B	X	Y	A	B	z
0	0	0	0	0	0	0
0	0	0	1	0	0	0
0	0	1	0	0	0	0
0	0	1	1	1	1	0
0	1	0	0	0	0	0
0	1	0	1	0	0	0
0	1	1	0	0	0	1
0	1	1	1	1	1	1

1	0	0	0	1	1	0
1	0	0	1	1	1	0
1	0	1	0	0	0	0
1	0	1	1	1	1	0
1	1	0	0	1	1	0
1	1	0	1	1	1	0
1	1	1	0	0	0	1
1	1	1	1	1	1	1