Ve270 HW1 夏陶悦 518370910087.

$11011101.001 = 2^7+2^6+2^4+2^3+2^2+2^0+2^{-3} = 221.125_{10}$

$= DD.2_{16}$

(1) $\Rightarrow 11011101.001_2 = 221.125_{10} = DD.2_{16}$

(2)

$0.89\times2 = 1.780$
$0.78\times2 = 1.560$
$0.56\times2 = 1.120$
$0.12\times2 = 0.240$
$0.24\times2 = 0.480$
$0.48\times2 = 0.960$
$0.96\times2 = 1.920$
$0.92\times2 = 1.86$

1
1
1
0
0
0
1
1

$\Rightarrow 0.89_{10} \approx 0.11100011_2$, As $63_{10} = (64-1)_{10} = 111111_2$.

~~$\Rightarrow 63.89_{10}$~~ $\Rightarrow 63.89_{10} = 111111.11100011_2 = 3F.E3_{16}$.

$0.89\times3 = 2.670$
$0.67\times3 = 2.010$
$0.10\times3 = 0.300$
$0.3\times3 = 0.900$
$0.9\times3 = 2.700$
$0.700\times3 = 2.100$

2
2
0
0
2
2

$\Rightarrow 0.89_{10} \approx 0.220022_3$.

$63_{10} = 2\times3^3+3^2 = 2100_3$. $\Rightarrow 63.89_{10} = 2100.220022_3$.

So $63.89_{10} = 111111.11100011_2 = 3F.E3_{16} = 2100.220022_3$.

2.(1) $71_{10} = 01000111_2$

so let $01000111 - 1$ and reverse it we got -71_{10}.

$\Rightarrow -71_{10} = 10111001_2 = B9_{16}$

(2) $71_{10} = 01000111_2 = 47_{16}$

(3) 10110101101_2, As the starting bit is 1, meaning it's a negative number

we first reverse all the bits to 01001010010_2 then add 1

$\Rightarrow 01001010011_2 = 2^0 + 2^1 + 2^4 + 2^6 + 2^9 = 595_{10}$

so $10110101101_2 = -595_{10}$

(4) $FBA9_{16} = 1111101110101001_2$

The starting bit is 1, negative number, reverse all bit and add 1

we get $0000010001010111_2 = 2^0 + 2^1 + 2^2 + 2^4 + 2^6 + 2^{10} = 1111_{10}$.

so $FBA9_{16} = 1111101110101001_2 = -1111_{10}$.

3.(1)

```
  1 0110
   6FA49D
+    73BD
---------
   70185A
```

so $(6FA49D + 73BD)_{16} = 70185A_{16}$.

(2) As 10100 is negative.

then $10100_2 = 11110100_2$

```
   0001 0110
   1111 0100
 - 10101001
 -----------
   01001011
```

$\Rightarrow (10100 - 10101001)_2 = 01001011_2$

(3) $534_8 = 101011100_2$, it's negative

$-265_8 = 010110101_2$, it's positive.

and

```
   101001110
   101011100
 - 010110101
 -----------
   010100111
```

where 010100111_2 is positive.

so it overflows.

$010100111_2 = 247_8$.

so $(534 - 265)_8 = 247_8$, overflow.

4. (a) a=1, b=1, c=0, d=1.

⇒ c and d = 0.

⇒ b OR (c And d) = 1.

⇒ a and (b OR (c and d)) = 1.

⇒ F = 1

(b) a=0, b=0, c=0, d=1.

~~similarly~~ As a=0, F=0.

(c) a=1, b=0, c=0, c=0.

As, b, c, d = 0, b OR (c and d) = 0

⇒ F = 0

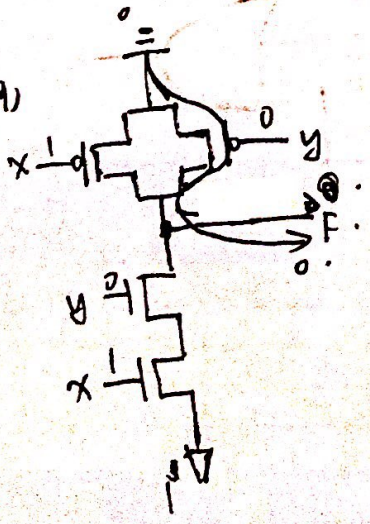
(d) a=1, b=0, c=1, d=1.

⇒ b OR (c and d) = 1

⇒ F = 1

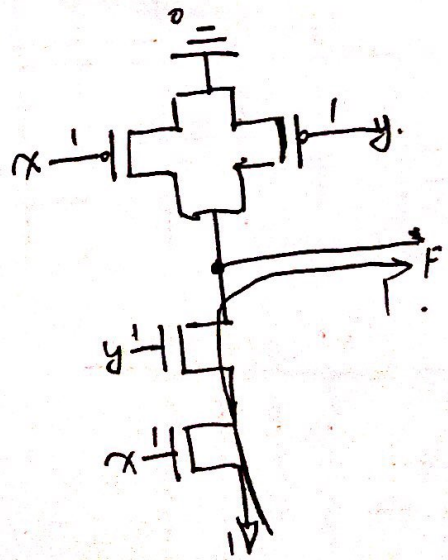
5:

(a)



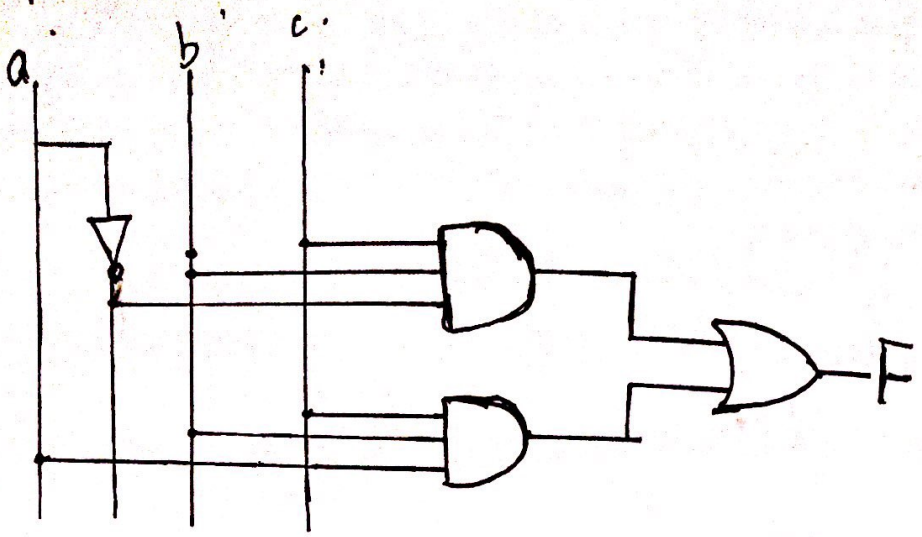
As x=1 and y=0.

(b)

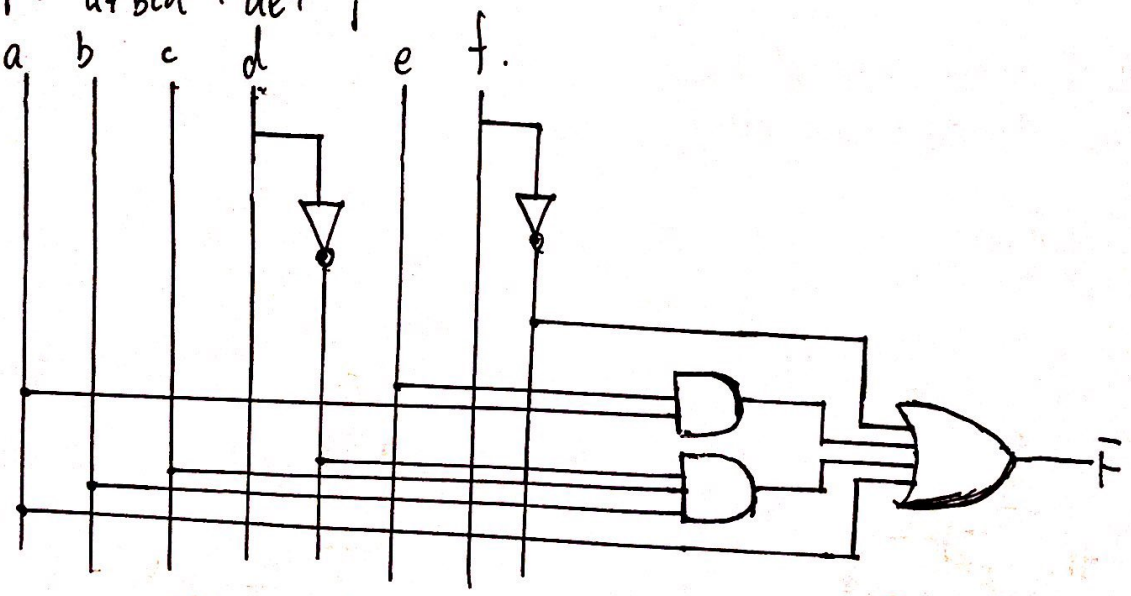


6.

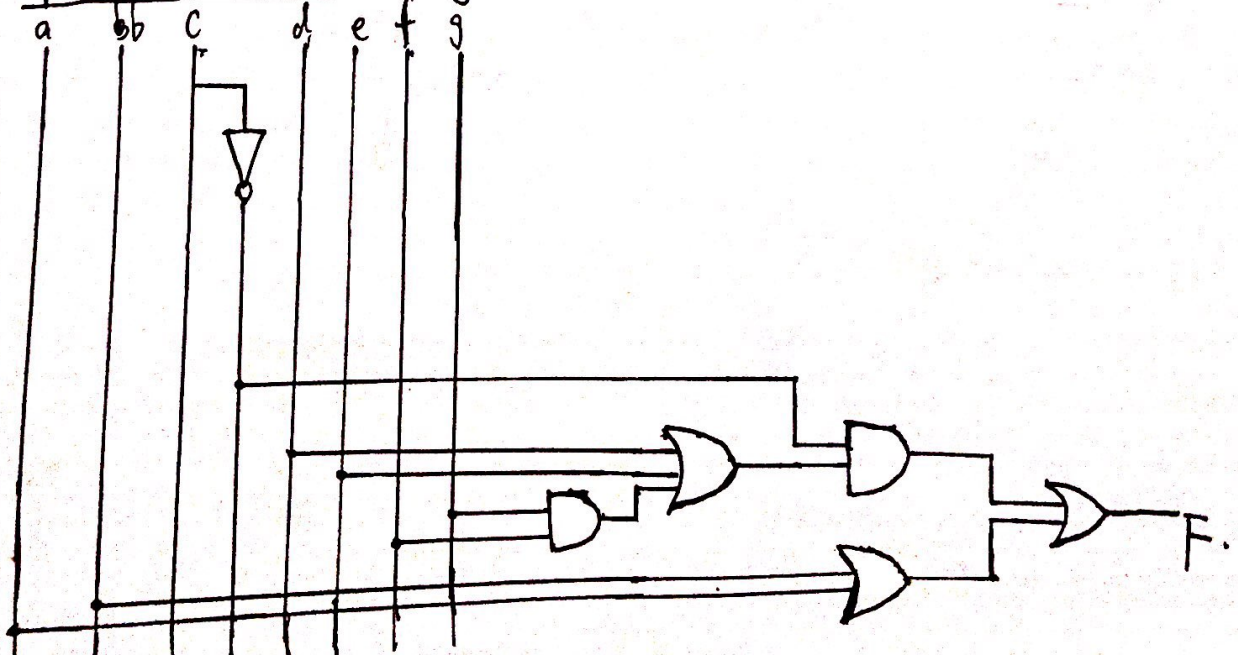
(a) $F = abc + a'bc$



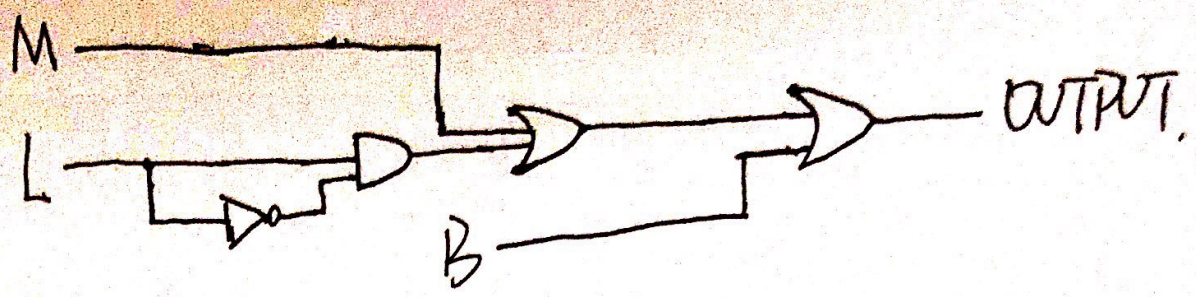
(b) $F = a + bcd' + ae + f'$



(c) $F = (a+b) + (c' * * (d+e+fg))$.



7.



8. (a) $F(a,b,c) = a' + bc'$.

a	b	c	a'	bc'	F
0	0	0	1	0	1
0	0	1	1	0	1
0	1	0	1	1	1
0	1	1	1	0	1
1	0	0	0	0	0
1	0	1	0	0	0
1	1	0	0	1	1
1	1	1	0	0	0

(b) $F(a,b,c) = ab + (ab)' + ac' + bc$.

a	b	c	(ab)'	ac'	bc	F
0	0	0	1	0	0	1
0	0	1	1	0	0	1
0	1	0	1	0	0	1
0	1	1	1	0	1	1
1	0	0	1	1	0	1
1	0	1	1	0	0	1
1	1	0	0	0	0	0
1	1	1	0	0	1	1

(c) $F(a,b,c) = ab + ac + ab'c' + c'$.

a	b	c	ab	ac	ab'c'	c'	F
0	0	0	0	0	0	1	1
0	0	1	0	0	0	0	0
0	1	0	0	0	0	1	1
0	1	1	0	0	0	0	0
1	0	0	0	0	1	1	1
1	0	1	0	1	0	0	1
1	1	0	1	0	0	1	1
1	1	1	1	1	0	0	1

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

a	b	c	d	a'bc	d'	F
0	0	0	0	0	1	1
0	0	0	1	0	0	0
0	0	1	0	0	1	1
0	0	1	1	0	0	0
0	1	0	0	0	1	1
0	1	0	1	0	0	0
0	1	1	0	1	1	1
0	1	1	1	1	0	1
1	0	0	0	0	1	1
1	0	0	1	0	0	0
1	0	1	0	0	1	1
1	0	1	1	0	0	0
1	1	0	0	0	1	1
1	1	0	1	0	0	0
1	1	1	0	0	1	1
1	1	1	1	0	0	0

9.

A	B	C	D	OUT.
0	0	0	0	Vdd
0	0	0	1	0
0	0	1	0	Vdd
0	0	1	1	0
0	1	0	0	Vdd
0	1	0	1	0
0	1	1	0	Vdd
0	1	1	1	0
1	0	0	0	Vdd
1	0	0	1	0
1	0	1	0	0
1	0	1	1	0
1	1	0	0	0
1	1	0	1	0
1	1	1	0	0
1	1	1	1	0

10. F: $a'bc' + b'c + abc$.