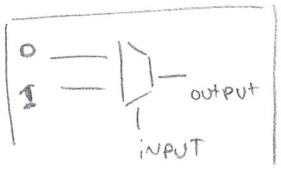
① a)



$= \text{INPUT} \cdot 0 + \overline{\text{INPUT}} \cdot 1$

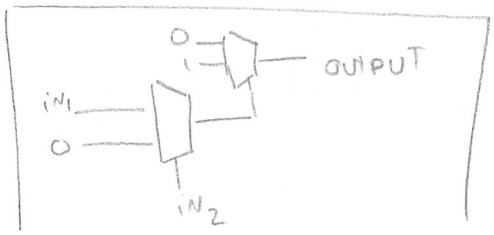
$= \overline{\text{INPUT}}$

b)

$= i_{N_1} \cdot i_{N_2} + 0 \cdot \overline{i_{N_2}}$

$= i_{N_1} \cdot i_{N_2}$

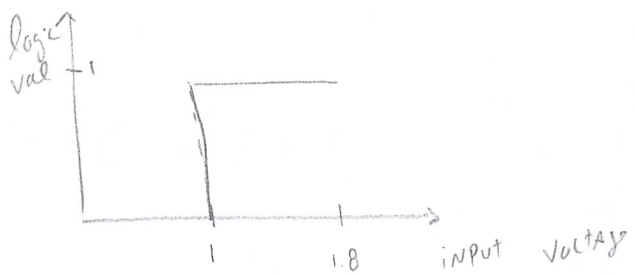
So



② IN A LATCH THE INPUT = OUTPUT ONLY WHEN CLOCK IS HIGH.

IN A FLIPFLOP THE INPUT IS ONLY PROPAGATED TO AN OUTPUT WHEN A EDGE SHOWS UP IN THE CLOCK SIGNAL (NORMALLY RISING EDGE).

③



④ a) 0
b) 1
c) 0
d) 1

(5) a) 1993448432_{10}

b) $76D19BF0_{16}$

(6) a) 610825521_{10}

b) $0010\ 0100\ 0110\ 1000\ 1110\ 1010\ 0011\ 0001_2$

(7) a) $178B3AB_{16}$

b) $0001\ 0111\ 1000\ 1011\ 0011\ 1010\ 1011_2$

(8) a) $10_{10} = 1 \times 10^1 + 0 \times 10^0$

base 10	base 7
0	0
1	1
2	2
3	3
4	4
5	5
6	6
7	10
8	11
9	12
10	13

$1 \times 7^1 + 3 \times 7^0 = 7 + 3 = 10$

b) $32_4 = 3 \times 4^1 + 2 \times 4^0 = 14_{10}$

$14_{10} = 24_5 = 32_4$

base 10	base 5	base 11
0	0	0
1	1	1
2	2	2
3	3	3
4	4	4
5	10	5
6	11	6
7	12	7
8	13	8
9	14	9
10	20	A
11	21	10
12	22	12
13	23	13
14	24	14

c) $1010_2 = 1 \times 2^3 + 1 \times 2^1 = 10_{10}$

$= A_{11}$

d) $15_6 = 1 \times 6^1 + 5 \times 6^0 = 11_{10}$

(9)

	123_{10}		-123_{10}
a)	01111011	———	N/A
b)	01111011	———	10000101
c)	0001 0010 0011	———	N/A

d)

31_{16}	32_{16}	33_{16}	———	$2D_{16}$	31_{16}	32_{16}	33_{16}
1	2	3		-	1	2	3

(10)

$$\begin{array}{r} {\scriptstyle (1)\ (1)\ \ \ } \\ 0.1 \\ +\ 11.1 \\ \hline 100.0 \end{array} \qquad \begin{array}{r} 0.5 \\ +\ 3.5 \\ \hline 4.0 \end{array}$$