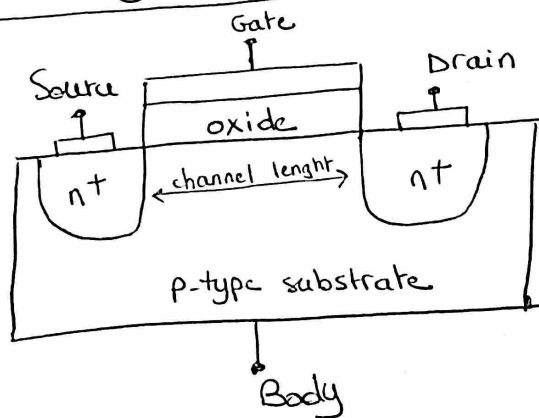


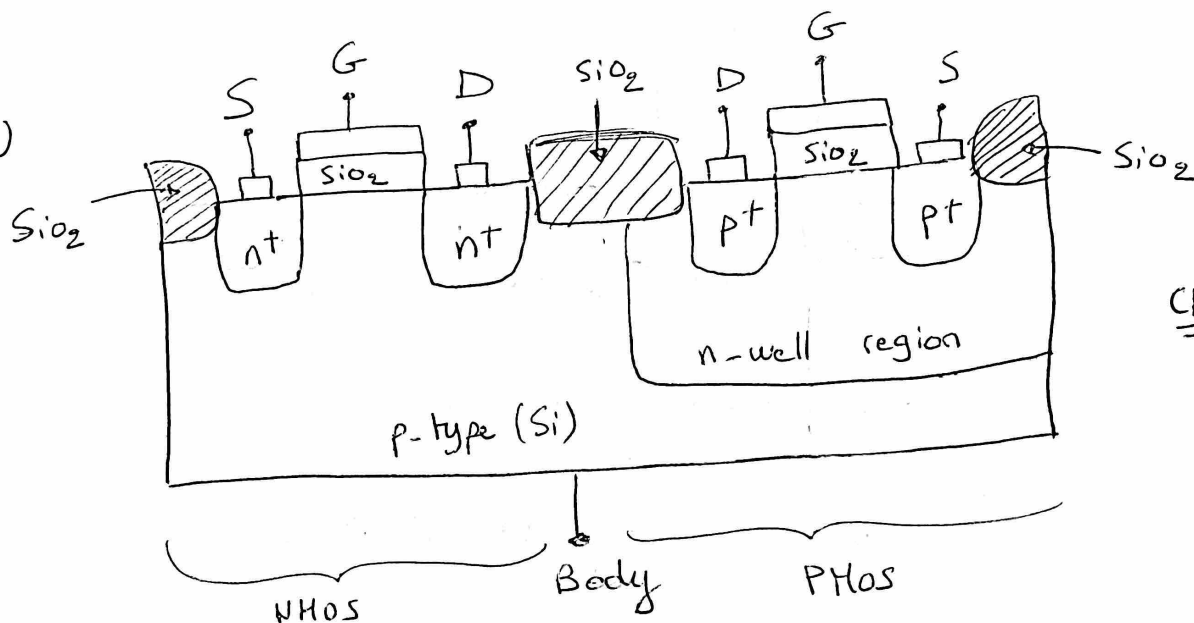
Homework 1 - ECE 1238
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①
 (a)



NMOS

(b)



CMOS

②

(a)

A	B	S	C
0	0	0	0
0	1	1	0
1	0	1	0
1	1	0	1

(b) $S = \bar{A}B + A\bar{B} = A \oplus B$

$C = AB$

③

(a)

A	B	C	F
0	0	0	0
0	0	1	1
0	1	0	1
0	1	1	0
1	0	0	1
1	0	1	0
1	1	0	0
1	1	1	1

$$F = \bar{A}\bar{B}C + \bar{A}B\bar{C} + A\bar{B}\bar{C} + ABC$$

$$= \bar{A}(\bar{B}C + B\bar{C}) + A(\bar{B}\bar{C} + BC)$$

$$= \bar{A}(B \oplus C) + A((B+C)(\bar{B}+\bar{C}))$$

$$= \bar{A}(B \oplus C) + A(\cancel{B\bar{B}} + B\bar{C} + \bar{B}C + \cancel{C\bar{C}})$$

$$= \bar{A}(B \oplus C) + A(B\bar{C} + \bar{B}C)$$

$$= \bar{A}(B \oplus C) + A(\overline{B \oplus C})$$

$$\boxed{F = A \oplus B \oplus C}$$