CMP3020 VLSI Design   **Problem Set #2**

Review: sheet#1 problem 14

Problem #1
Determine the mode of operation (saturation, linear, or cutoff) and drain current Id for each of the following configurations given below.

Assume: Kn = 115uA/V^2 , V_{to}=0.43, lamda = 0.06 V^{-1}, W/L =1 V_{sb}=0

    a. NMOS: Vgs= 2.5, Vds=2.5
    b. NMOS: Vgs= 3.3, Vds=2.2
    c. NMOS: Vgs= 0.3, Vds=0.1
    d. NMOS: Vgs= 0.6, Vds=0.1

Problem #2: sheet#1 problem 17

Problem #3
Two Transistor M1 has Voh = 5 , Vlo=1 , Vih=3 , Vil=1.5 and another transistor M2 has Voh = 4.5 , Vlo=0.5 , Vih=4 , Vil=1 , which transistor is more noise immune and why ?

Problem #4

[E, None, 3.3.2]Below in Figure 0.8 is an I-V transfer curve for an NMOS transistor. In this problem, the objective is to use this I-V curve to obtain information about the transistor. The transistor has (W/L)=(1μ/1μ). It may also be assumed that velocity saturation does not play a role in this example. Also assume $-2\Phi_F = 0.6V$. Using Figure 0.8 determine the following parameters: device V_{TO}, γ, λ.
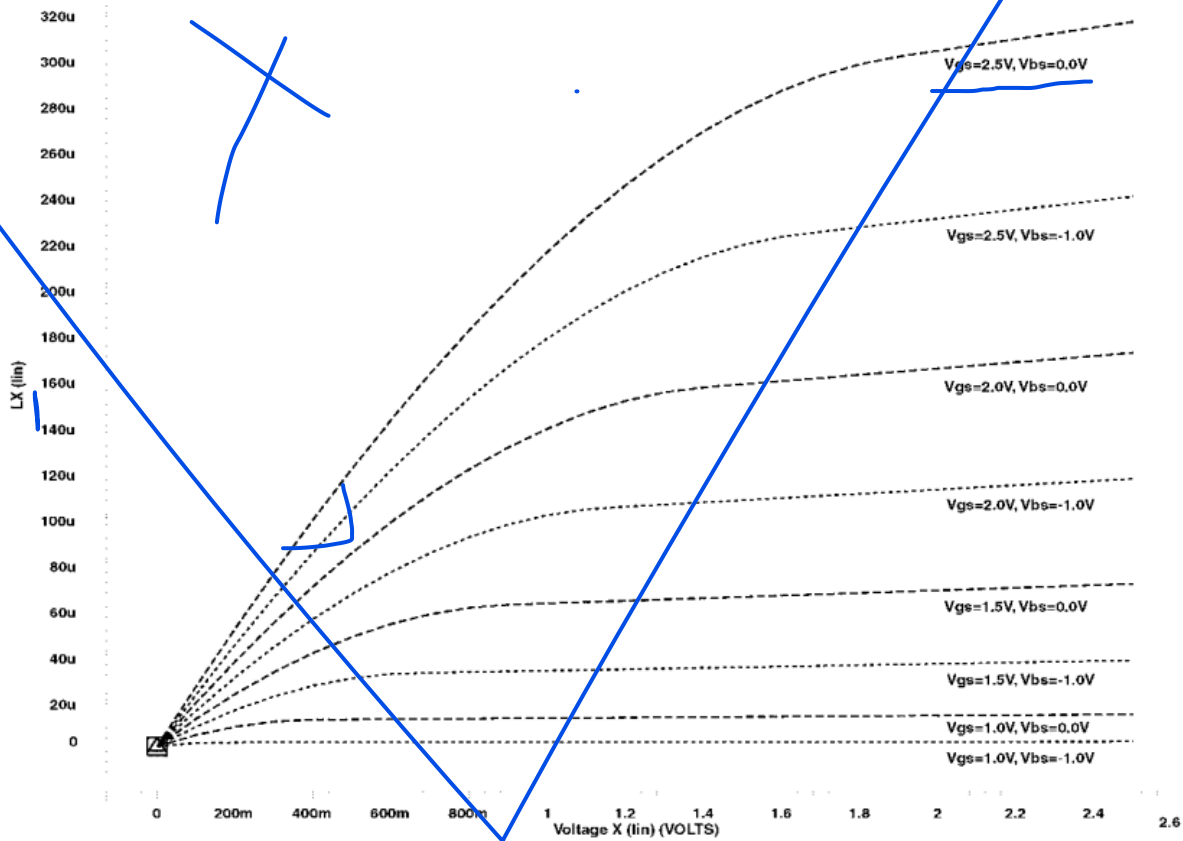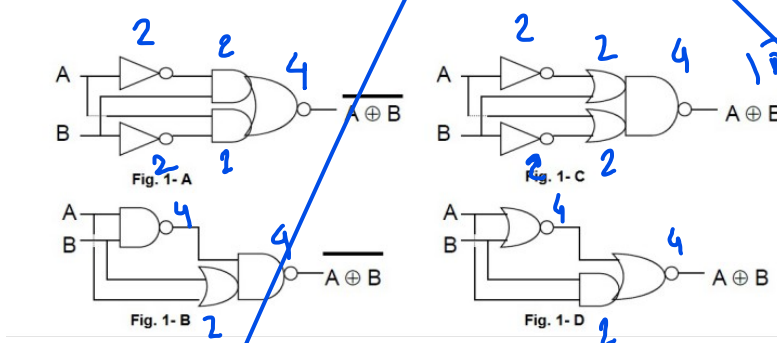

Figure 0.8   I-V curves

Problem #5

How Many Transistor in Each Fig?

ay haga d5la 3la not bndrb el inputs bto3ha fe 2