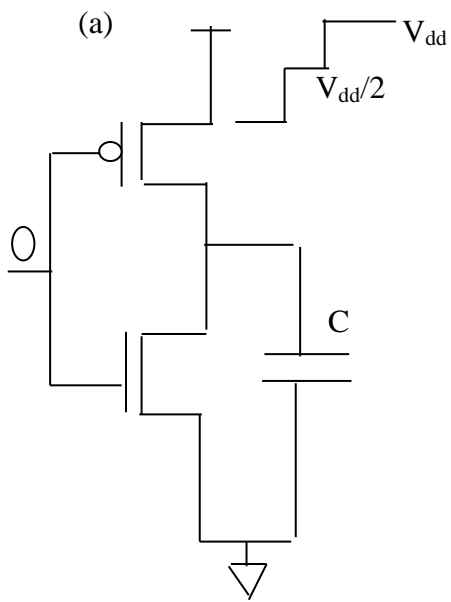


ECE 456
Mid-Term Examination 1
March 2, 2006

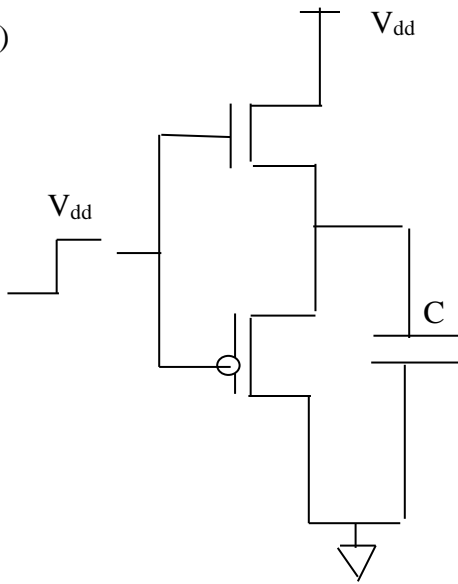
Name: _____
PUID: _____

1. Derive the power dissipated in each of the following inverters, with the given inputs. Assume that all the capacitors are initially discharged. Clearly state any assumptions that you make. (30 points)

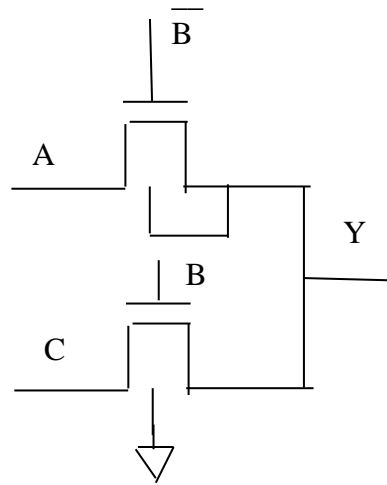


[Hint: Energy dissipated = Energy supplied by the source – Energy stored]

(b)



2. The following gate acts as a multiplexer.



(a) Write down an expression for Y. (5 points)

(b) Discuss qualitatively the two cases when B is high and B is low. What is the difference in terms of the output voltage (V_Y) between the two cases? (10 points)

3. (a) Draw a two-input dynamic NAND gate. Determine the activity at the output of this gate given that the probabilities at the two input nodes are p_A and p_B . (15points)

(b) How will you cascade the above gate with a two input dynamic NOR gate? Draw the circuit diagram. (10points)

4. Implement the following logic in CMOS style. (Assume that all the inputs and the inverted inputs are available to you). Draw the Euler paths of the NMOS and the PMOS networks. Size the transistors for equal rise and fall times. (30points)

$$Y = \overline{(A+BC).E + F}$$