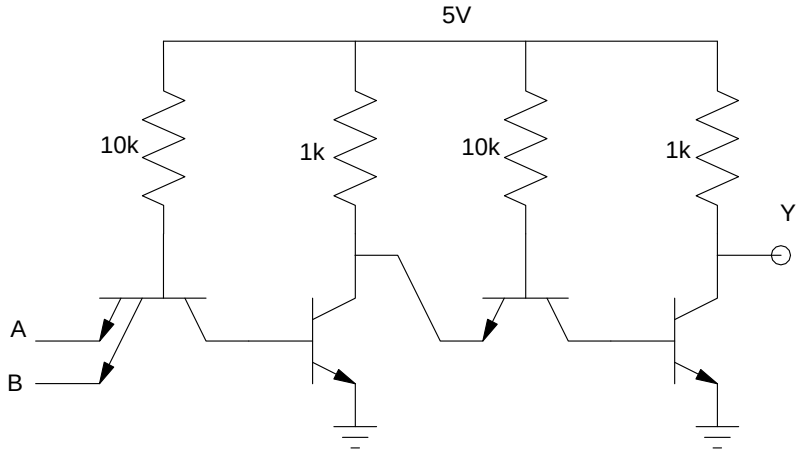
ECE 320 - Homework #8

TTL Logic, MOSFET theory, MOSFET switch. Due Monday, October 19th

The following circuit implements a function using TTL logic

Assume

- $\beta = 100$ (NPN used correctly)
- $\beta = 0.1$ (NPN used in reverse)



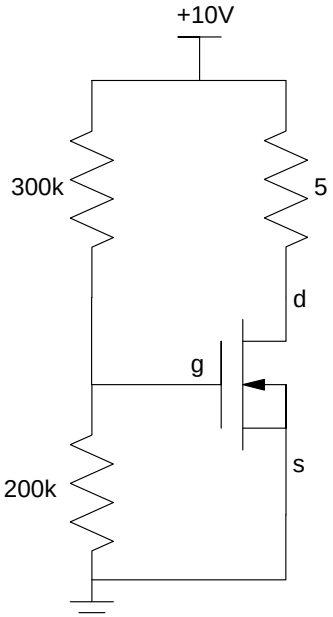
1) What is the logic for this circuit?
2) Determine the voltages and currents for

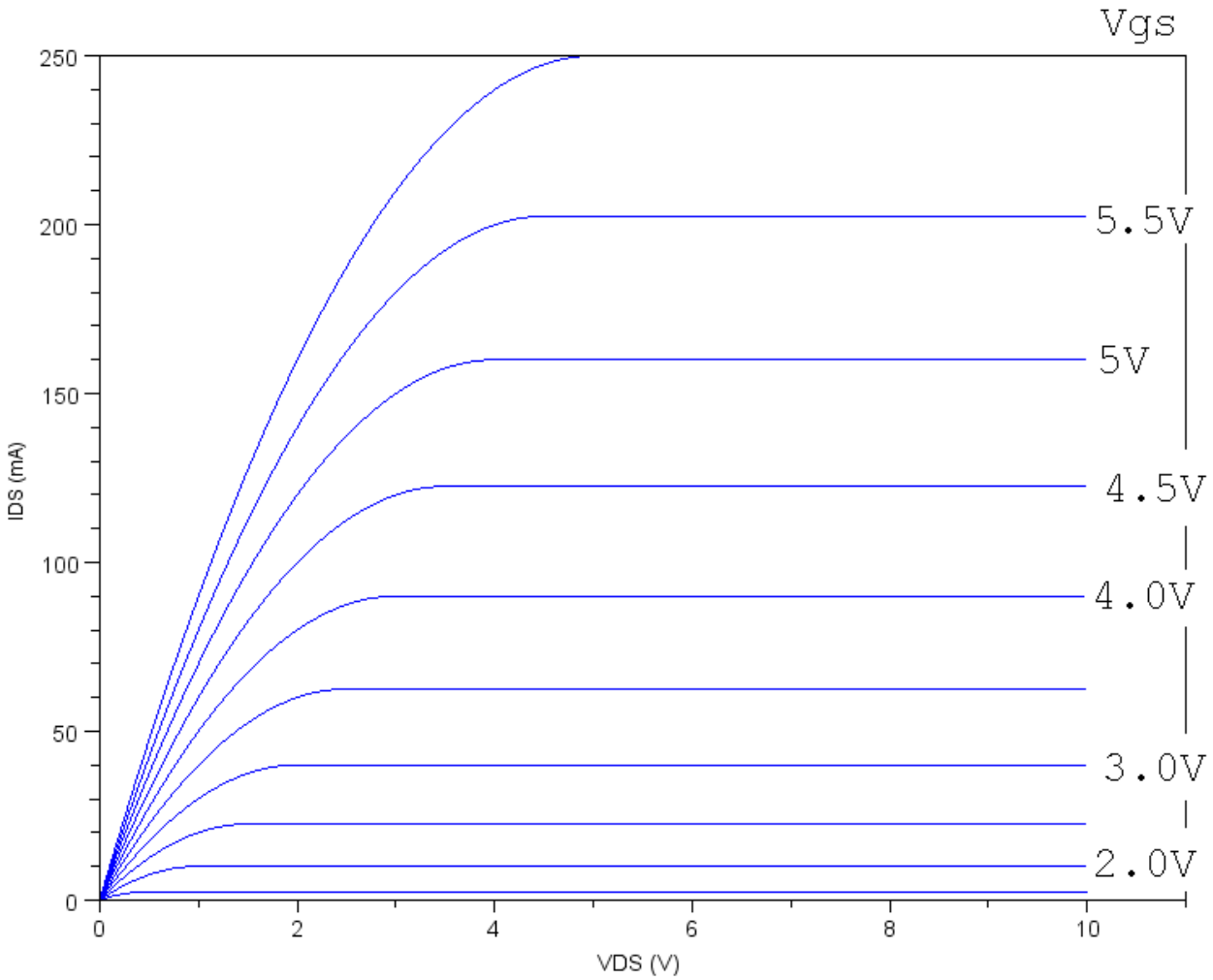
   A = B = 5V
3) Determine the voltages and currents for

   A = B = 0V

Assume the VI characteristics for a MOSFEt are as follows.

4) Label the Off / Saturated / Ohmic regions on this figure
5) Determine the constant kn for this MOSFET
6) Draw the load line and determine the operating point if connected as shown to the right:





Lab: (term project)

Take one section of your term project.

7) Requirements: Specify what your circuit is going to do
   - Inputs
   - Outputs
   - Relationship

8) Analysis. Calculations for votlages, currents, resistors, capacitors, etc

9) Test: Check you analysis in simulation.

10) Validation: Build your circuit and check that it meets the reqruiements.