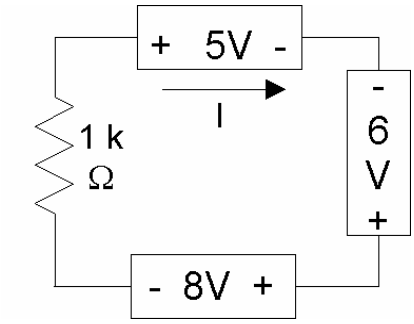
Practice Exam Problems

Medium Difficulty

Problem 1:

For the circuit below, find the current I, and determine which batteries are being charged up.



Problem 2: (Problem 1.11 from Oldham & Schwartz)

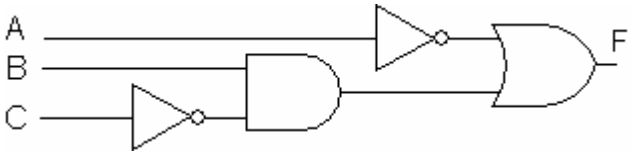
The power output (as light) of a certain automobile headlight is 10 W, and the lamp is known to be 28% efficient as a converter of electric power to light. The voltage applied to the lamp is 12 V.

a) Construct a diagram showing the lamp, and the direction that positive current will flow.

b) What is the value of the current?

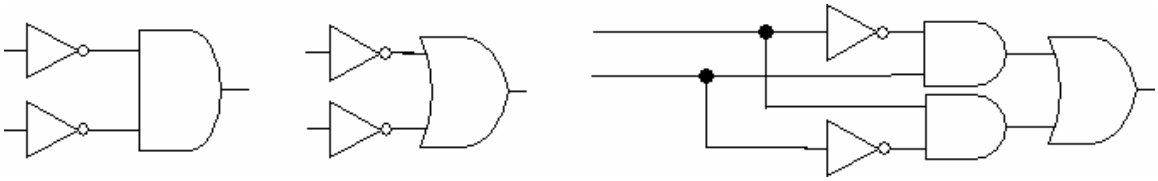
Problem 3:

Assume that A, B, C have been at logic zero for a long time, and simultaneously change to logic 1 at time t=0. Draw a timing diagram for the circuit below, assuming that each circuit has a time delay T.



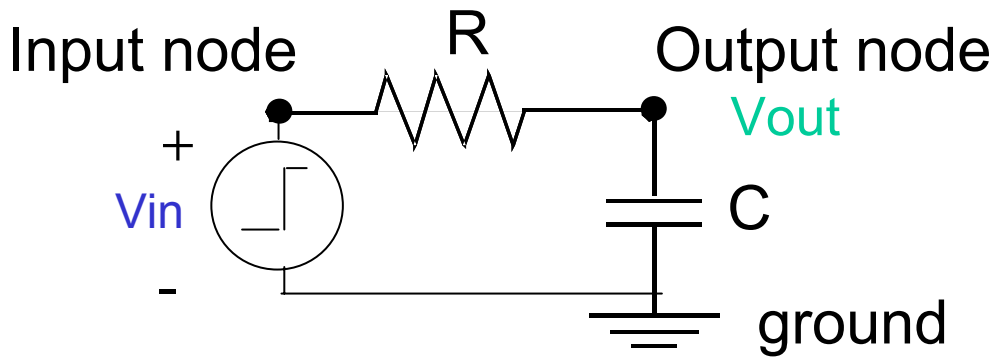
Problem 4:

Find a one-gate equivalent for each of the following circuits:



Problem 5:

Consider our usual model for gate delay, with R = 10 kΩ and C = 50pF.



Suppose Vin has been at 3 V for a long time, and goes to zero at t=0.

a) Plot Vout(t) over a range of five time constants.

b) Write the equation for Vout(t).

c) Write the equation for I(t), the current flowing in the circuit, associated with the capacitor voltage Vout.

d) Determine the energy dissipated in the resistor over the time interval t=0 to $t \rightarrow \infty$.

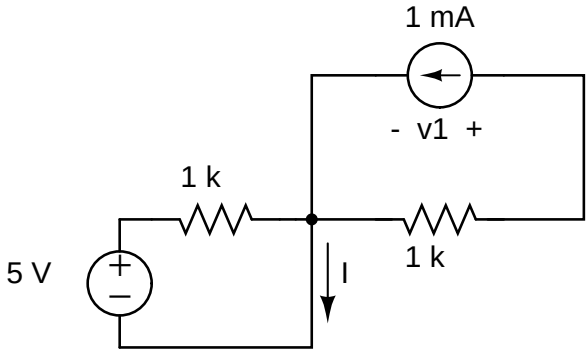
e) Since the voltage source was at zero volts, it did not deliver any energy to the circuit during the time period t=0 to $t \rightarrow \infty$. Where did the resistor get its energy to dissipate?

f) Does the energy produced = energy dissipated over this time period?

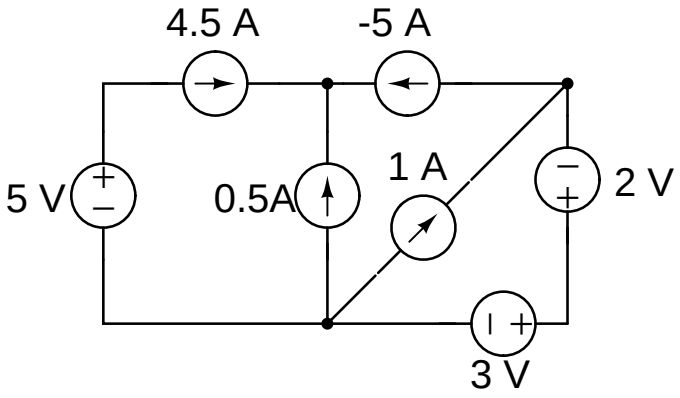
EECS 40 Midterm 1 Review Problems[1]

Designed by Bart

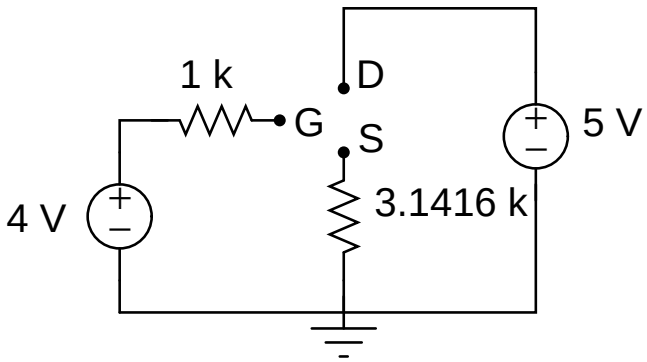
1. In the circuit below, find v1 and I.



2. What is wrong (if any) with the **IDEAL** circuit below?

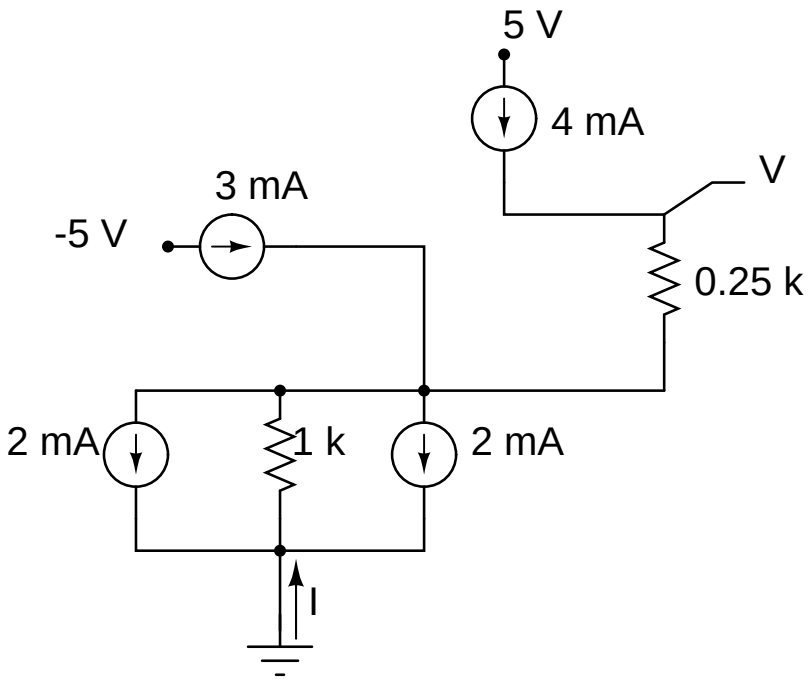


3. In the circuit below, find V_{GS}, V_{DS} and V_{DG}.



[1]These problems are difficult

4. In the circuit below, find V and I.



5. In the circuit below, switch S has been in position A for a long time. At t = 0, switch S **instantaneously** moves to position B. Find v at t = 0^+ and plot v1 as a function of time (for all t).