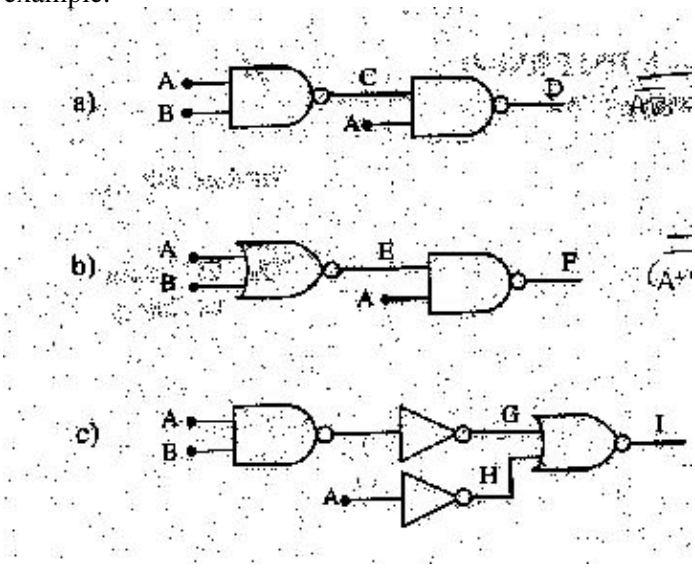
<!--course, exam #, semester/year (e.g., CS 150, Midterm #2, Fall 1994)-->

EE40 Fall 1999
Mid Term 1
Profeessor

Problem #1

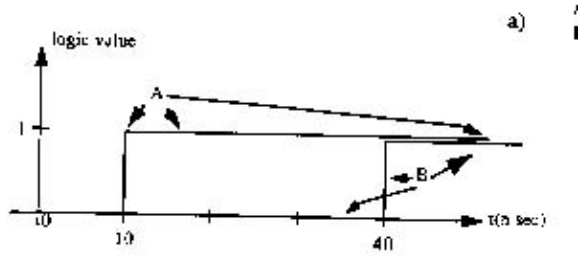
Fill in the logic values in the table below for input values given. Note that the value for "C" is given as an example.



write the Intermediate Values and Outputs for A=1, B=0 :

	C	D	E	F	G	H	I
Value							

e. All logic blocks in the above figures havea unit gate delay of 10n sec.



Show the logic values versus time(for t=0 to 70n sec) for outputs C and D of example a, given logic input values (A and B) shown below.

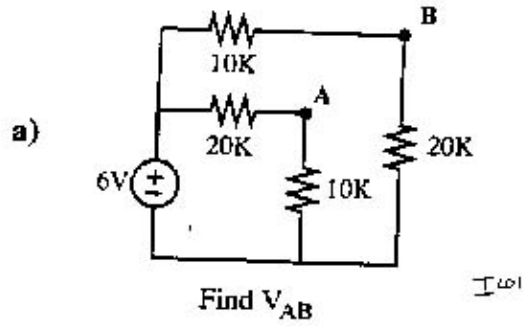
Problem #2

"circuit solution by inspection"

<!--course, exam #, semester/year (e.g., CS 150, Midterm #2, Fall 1994)-->

Each of these problems should take no more than 1-2 minutes. WRITE ANSWER IN PLACE PROVIDED. there is no partial credit on these problems

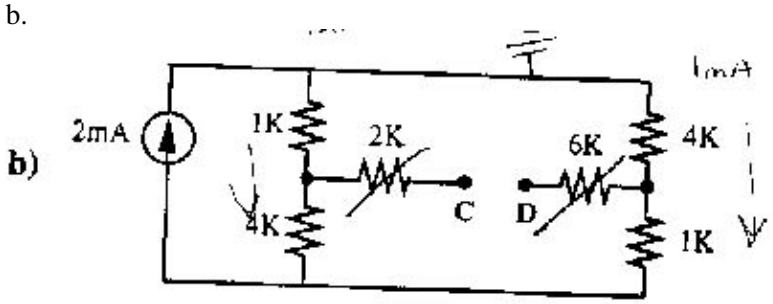
a.



Find V_{AB}

Vab = ____v

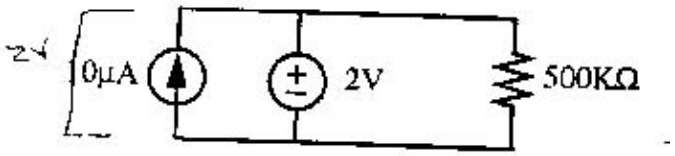
b.



Find V_{CD}

Vcd = _____v

c.



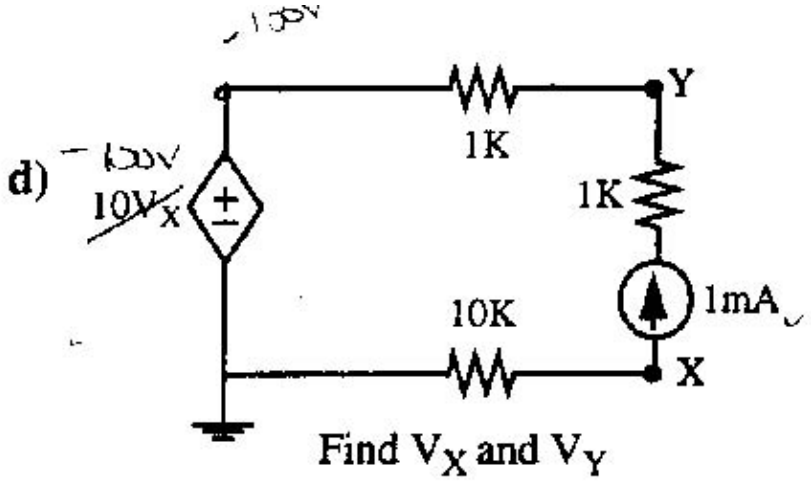
Find power dissipated in 500K resistor

P = ____w

d.

<!--course, exam #, semester/year (e.g., CS 150, Midterm #2, Fall 1994)-->

d)

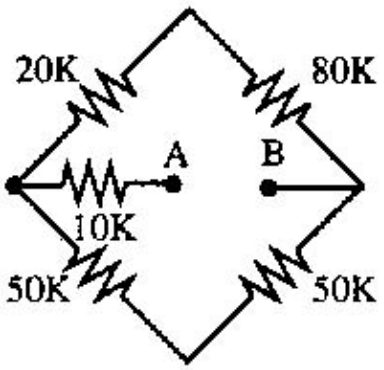


Find V_X and V_Y

Vx =____v
Vy =___v

e.

e)



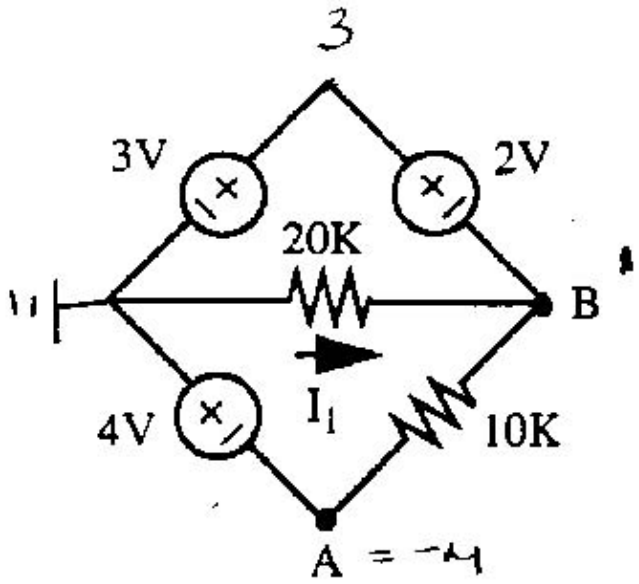
Find R_{AB}

Rab = ____Kohms

f..

<!--course, exam #, semester/year (e.g., CS 150, Midterm #2, Fall 1994)-->

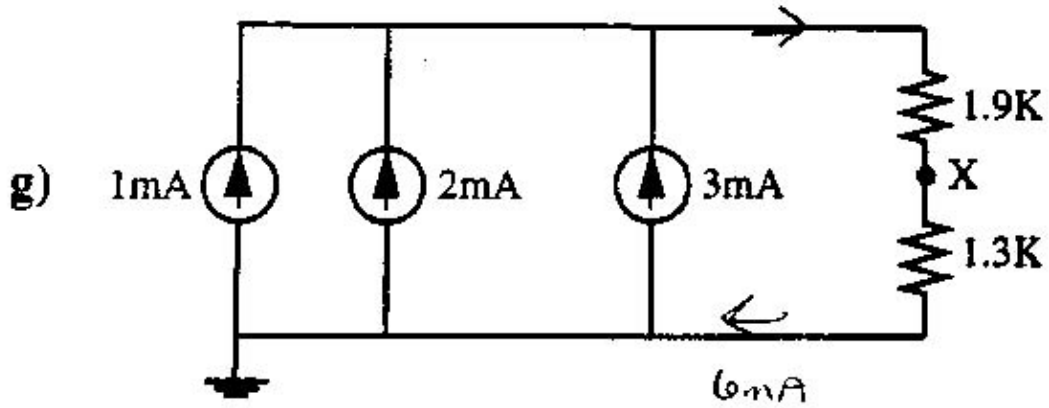
f)



Find I_1

I1 = _____microAmps

g.



Vx = ___V

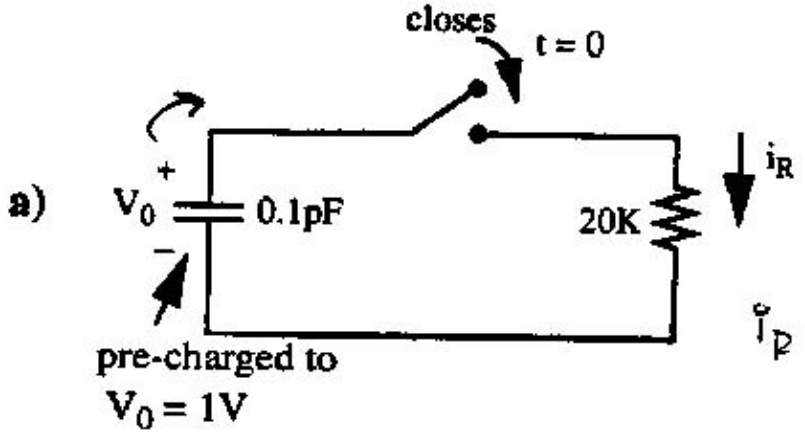
Problem #3

Initial Conditions

<!--course, exam #, semester/year (e.g., CS 150, Midterm #2, Fall 1994)-->

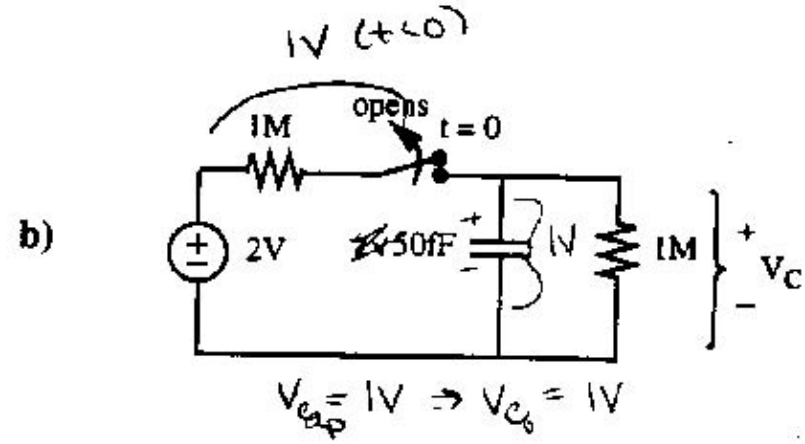
In each of the problems below, find the value of the current or voltage just after the switch moves (i = 0+). (What is requested is just a numerical value, Not an equation or function of time.

a.



iR= ___ microAmps

b.

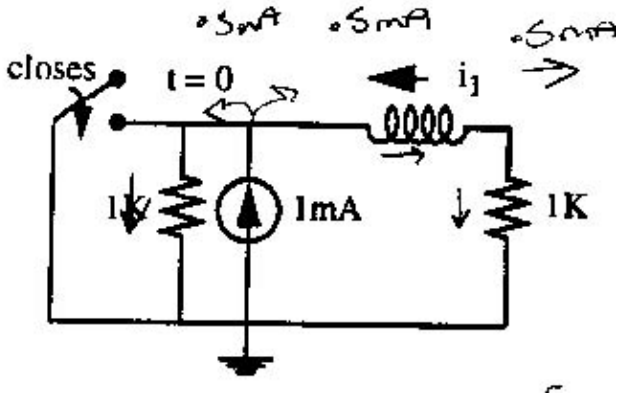


Vc = ____v

c.

<!--course, exam #, semester/year (e.g., CS 150, Midterm #2, Fall 1994)-->

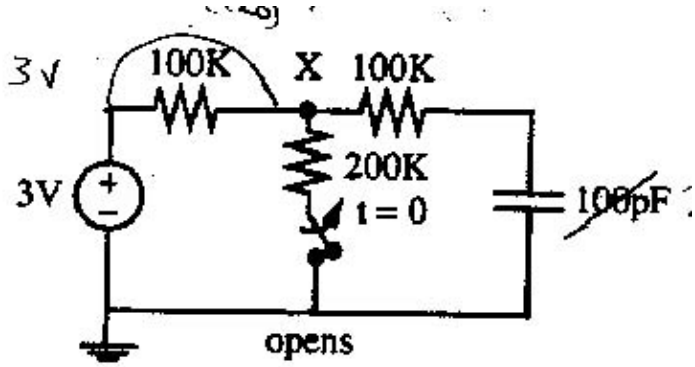
c)



I1 = ____milliAmps

d.

d)

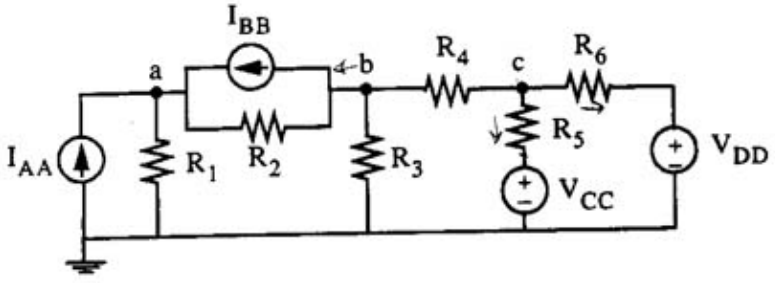


Vx = ____ v

Problem #4

"Nodal Analysis"

a. For the circuit below you are asked to write sufficient equations to find the unknowns. you MUST put the equations into the space Indicated. Do any scratch work on the page opposite. Do not Solve.

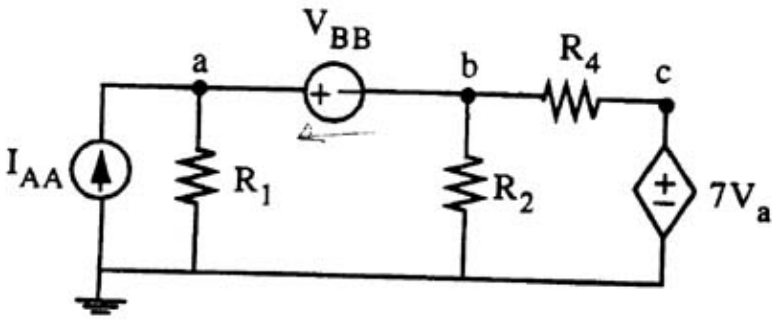


Unknowns: V_a, V_b, V_c

b. Similar to part a, you are asked to write sufficient equations to find the unknowns. Do not solve. you

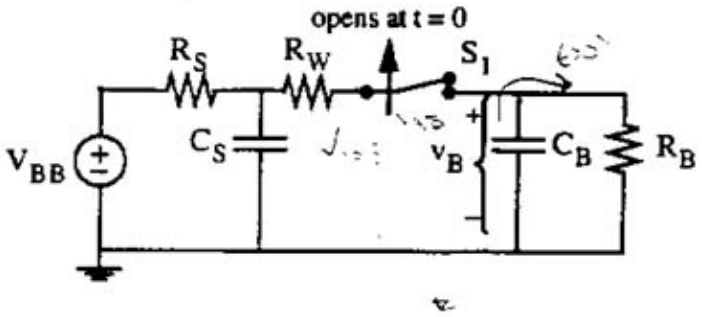
<!--course, exam #, semester/year (e.g., CS 150, Midterm #2, Fall 1994)-->

must put the equations in the space indicated below



Problem #5

The following circuit is used to study one phase of the operation of a DRAM cell __ the slow decay of a stored "I". First the switch S1 is closed and kept closed to write a "I". Then it opens and the storage capacitor Cb is supposed to maintain the stored inforamtion. In this memory, a valid "I" is any voltage Vb in the range of 1 to 3V.



a. What is the value of Vb just after the switch S opens, i.e. at t = 0+? (1% accuracy is sufficient.)

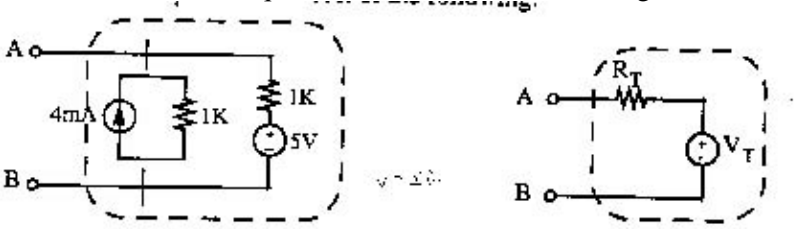
b. What is the value of Vb much later, (e.g. 1 hour later)?

c. on the axes provided on the facing page, neatly sketch the graph of Vb(t) versus time. You must label the axes with units

d. Write an equation for Vb as a function of time.

Problem #6

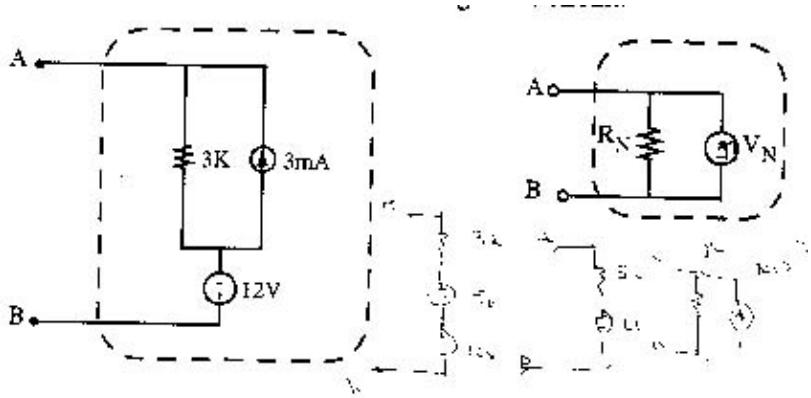
a. Find the Thevenin Equivalent Circuit of the following



<!--course, exam #, semester/year (e.g., CS 150, Midterm #2, Fall 1994)-->

Vt = ___V
Rt = ___Kohms

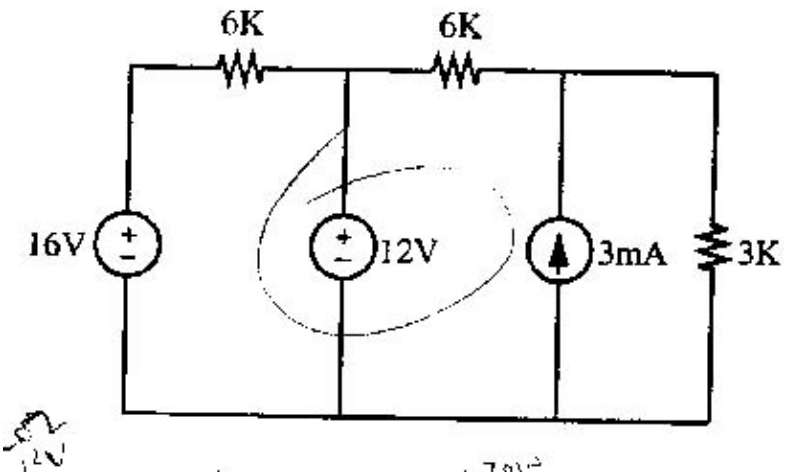
b. Find the Norton Equivalent of the folowing linear circuit:



Vn = ___V

Rn = ___Kohms

c. Find the powers supplied by the voltage source in the following circuit.



Power out = ____ W
