EE100 Spring 2005 Midterm I Review Problems

Bharath "Bart Simpson" Muthuswamy

Note(s):

1. These problems have been recycled from old EE40 midterm/final problems. The answers to these problems may not be whole numbers (unlike your actual midterm). However they will hopefully drill the concepts into your head.
2. The midterm is on Thursday, March 10th 2005.
3. Here is the first page from the actual midterm:

UNIVERSITY OF CALIFORNIA, BERKELEY
Department of Electrical Engineering and Computer Sciences

EE 100 — Spring 2005
Intro. To Electronics Engineering — Bharath "Bart Simpson" Muthuswamy

MIDTERM 1
March 10th 2005
Time Allotted: 3 hours

NAME: _____ , _____
(print) Last First

STUDENT ID#:_____

I WILL NOT CHEAT ON THIS EXAM. Signature:_____

Note(s):

1. **You will receive [3 pts] for filling out the information above.**
2. **MAKE SURE THE EXAM HAS 10 NUMBERED PAGES.**
3. **This is a CLOSED BOOK exam. However, you may use one 8.5 x 11" of notes (both sides) and a calculator.**
4. **SHOW YOUR WORK on this exam. MAKE YOUR METHODS CLEAR TO THE GRADER so you can receive partial credit.**
5. **WRITE ANSWERS CLEARLY IN THE SPACES (lines or boxes) PROVIDED.**
6. **Remember to specify units on answers whenever appropriate.**
7. **Please note: If you are asked a numerical answer to a problem, then the answer is a whole number. If you get a decimal answer, negative answer etc. you are making a mistake! If it is a function, then it is exponential with integer coefficients and an integer exponent. If you are asked to setup equation(s) only, do NOT attempt to solve the equation(s).**

SCORE: This page: _____ / 3

1:_____ / 30

2:_____ / 25

3:_____ / 30

4:_____ / 12

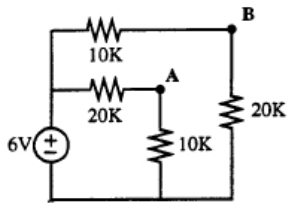
TOTAL:_____ / 100

1

Problem _ "Circuit Solution by Inspection"

Each of these problems should take no more than 1-2 minutes. WRITE ANSWER IN PLACE PROVIDED.

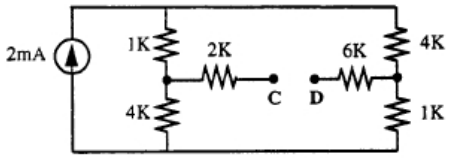
a)



Find V_{AB}

V_{AB} = _____ V

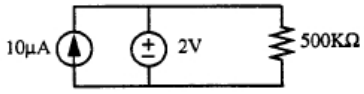
b)



Find V_{CD}

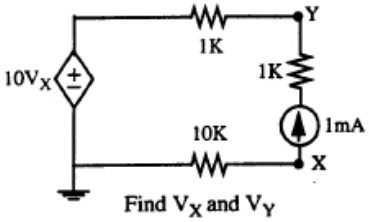
V_{CD} = _____ V

c)



P = _____ W

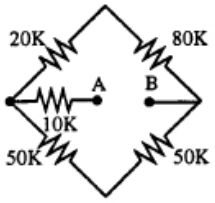
d)



Find V_X and V_Y

V_X = _____ V
V_Y = _____ V

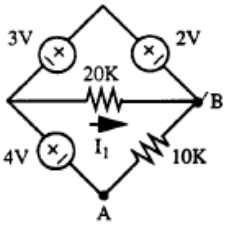
e)



Find R_{AB}

R_{AB} = _____ KΩ

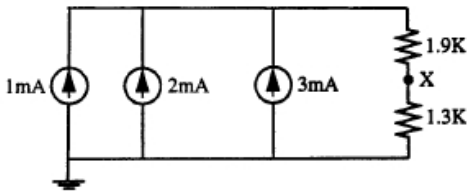
f)



Find I_1

I_1 = _____ μA

g)

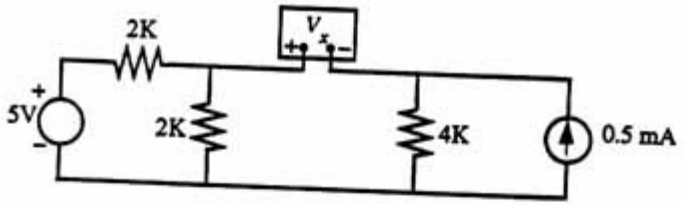


Find V_X

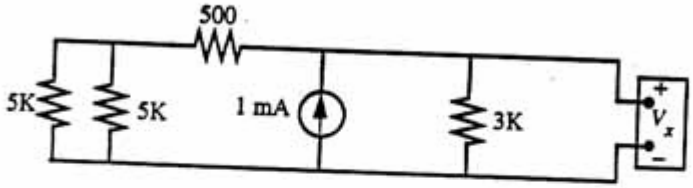
V_X = _____ V

Problem 2: Find the voltage V_x or current I_x which would be read by the ideal voltmeter or ammeter. Hint: Nodal analysis is not needed and will take too much time.

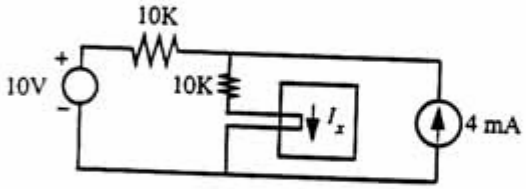
(a)



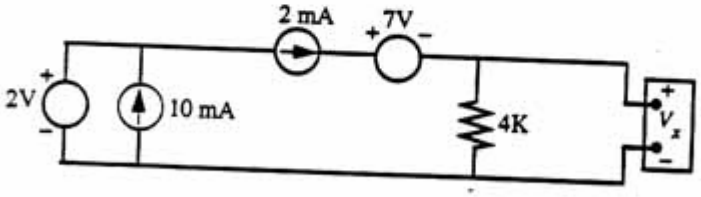
(b)



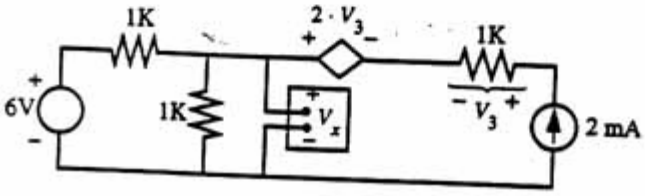
(c)



(d)



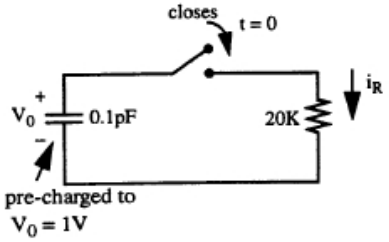
(e)



Problem . "Initial Conditions"

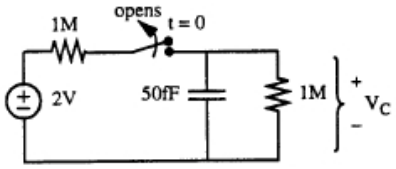
In each of the problems below, find the value of the current or voltage just after the switch moves ($t = 0^+$). (What is requested is just a numerical value, NOT an equation or function of time.)

a)



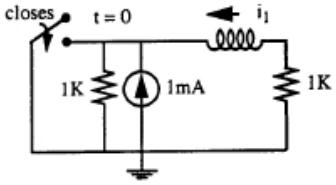
i_R = _____ μA

b)



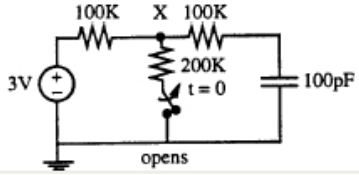
V_C = _____ V

c)



i_1 = _____ mA

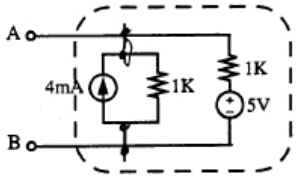
d)

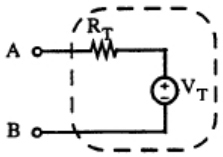


V_X = _____ V

Problem

a) Find the Thévenin Equivalent Circuit of the following:

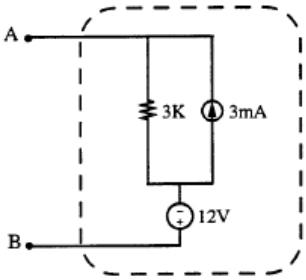


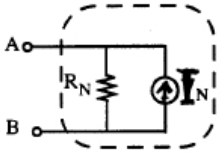


V_T = _____ V

R_T = _____ K

b) Find the Norton Equivalent of the following linear circuit:



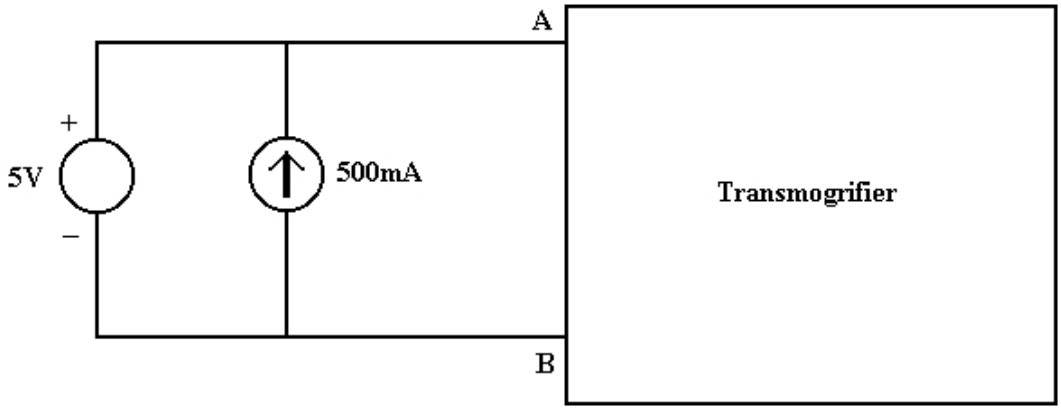


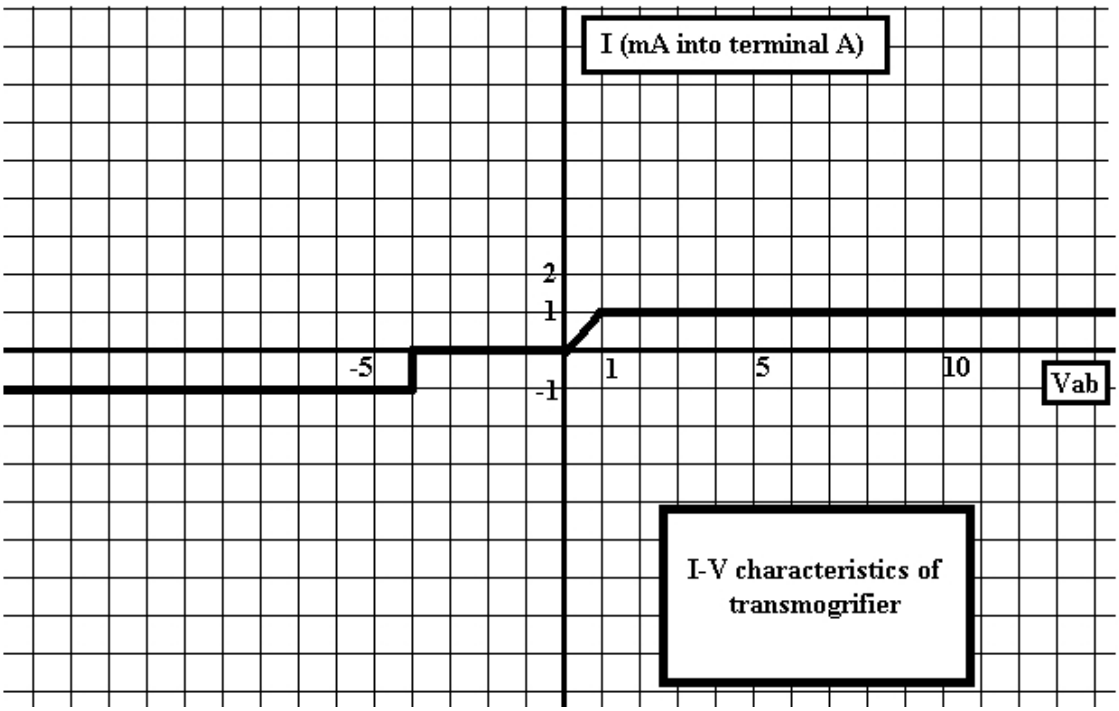
I_N = _____

R_N = _____ K

Problem 4: Transmogrifier

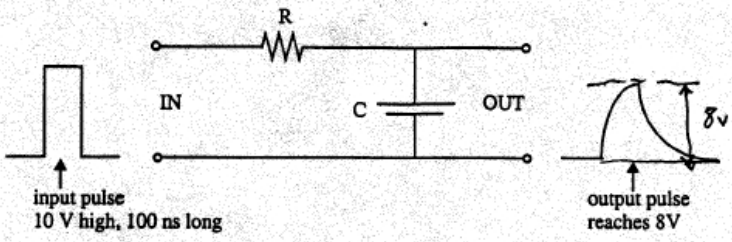
You find a tremendous bargain on a transmogrifier at the Berkeley flea market. You do not know what it is, but it's a great big plastic box with two terminals and it's labeled "type 1 transmogrifier", and most importantly, the price is 50 cents. You take it home and measure its I-V characteristic and plot I versus V, as shown below. Now your lab partner connects the device into the circuit shown and you find the box gets warm. How much power is the transmogrifier consuming when connected this way? Which of the two sources is providing the energy?





Problem

In the lab on RC circuits, you measure the pulse response of the circuit below.



You know R is 2KΩ. What is the value of C?

C = _____

For other problems, please refer to the midterm problems and review problems from EE100 Summer 2004:

http://inst.eecs.berkeley.edu/~ee100/ee100_fall_04/webpage/ee100_summer_04/webpage/exams/exams.html

Of course, you could surf http://hkn.eecs.berkeley.edu/student/onlineexams.shtml for more online exams from EE40 and EE100, but many of these problems are way too difficult and confusing for your midterm.