

Duke University
Edmund T. Pratt, Jr. School of Engineering

EE 61L Section 2, Fall 2001

Test I

Michael R. Gustafson II

Name (please print)_____

In keeping with the Honor Code, I have neither provided nor received any assistance on this test. I understand if it is later determined that I gave or received assistance, I will fail the class and will be brought before the Undergraduate Judicial Board.

Signature:_____

Problem I: [15 pts] Element Table

Fill in the table below. For the **Equation** column, you can put *any* equation for the given variable in terms of other variables *except* you may only use Ohm's Law **once**.

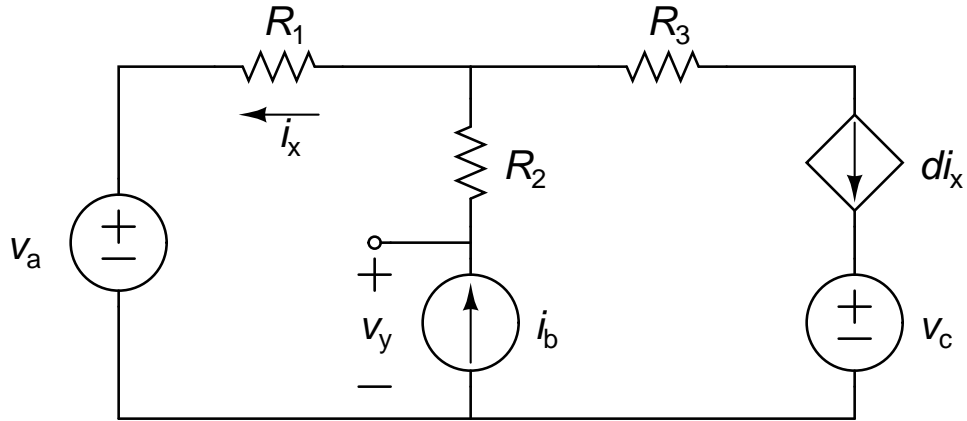
Name	Variable	Units	Equation
charge			(blank)
current			
work			(blank)
voltage			
power			
resistance			
conductance			(blank)

Name (please print):

Honor Code (please initial):

Problem II: [15 pts] Basic Circuit Relationships

Given the following circuit:



and known values v_a , i_b , v_c , d , R_1 , R_2 , and R_3 , find the following quantities in terms of the known values:

(1) i_x

(2) v_y

(3) p_{abs, R_2}

(4) p_{del, i_b}

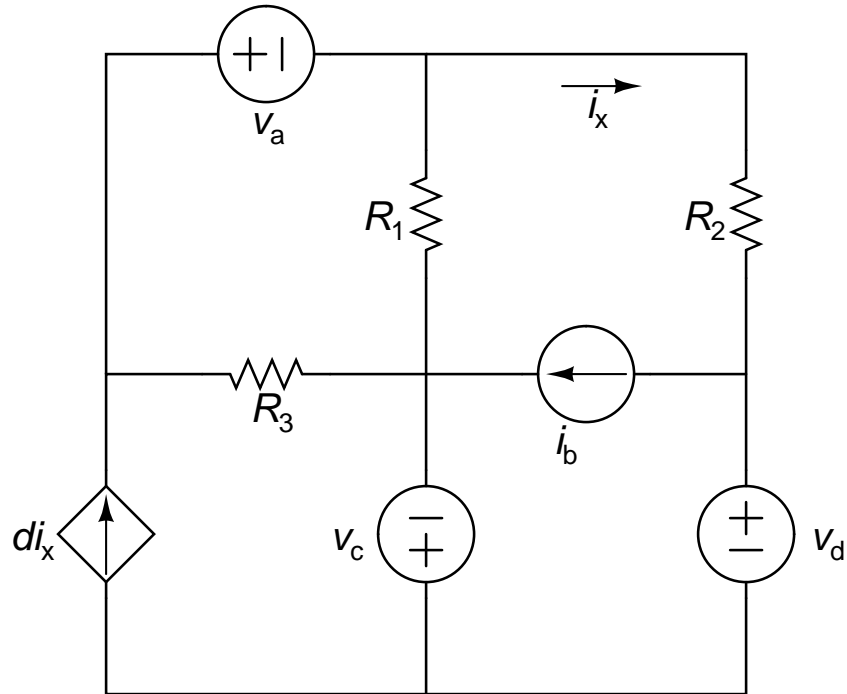
(5) $p_{\text{abs}, \text{CCCS}}$

Name (please print):

Honor Code (please initial):

Problem III: [30 pts] Node Voltage Method

Given the following circuit:



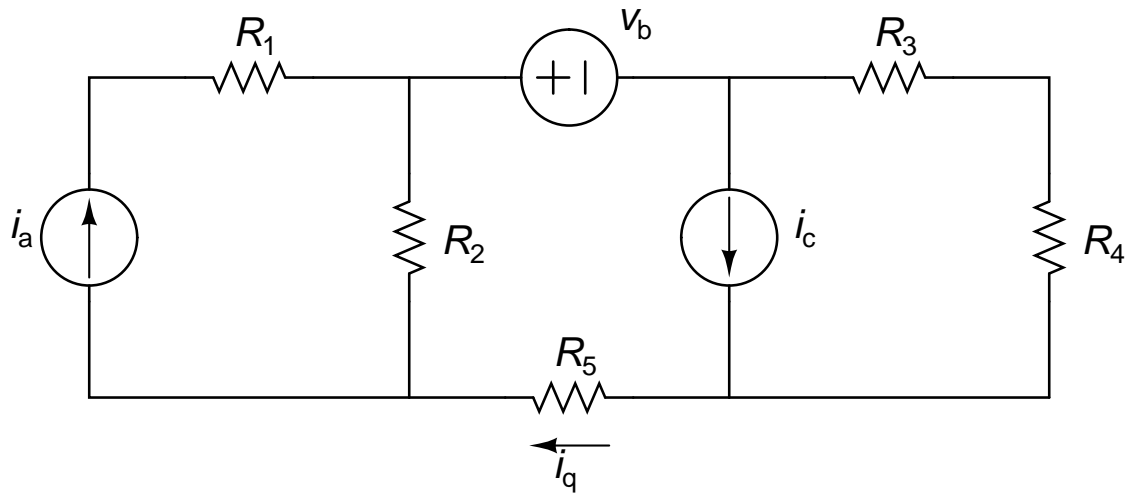
and known values v_a , i_b , v_c , v_d , d , R_1 , R_2 , and R_3 , find i_x in terms of the known values using the Node Voltage Method.

Name (please print):

Honor Code (please initial):

Problem IV: [30 pts] Current Methods

Given the following circuit:



and known values i_a , v_b , i_c , R_1 , R_2 , R_3 , R_4 , and R_5 , find i_q and p_{del, i_c} in terms of the known values using either the Mesh Current Method or the Branch Current Method.

Honor Code (please initial):

Given the following set of three linear equations:

$$3x - 2y + 3z = 2$$

- (1) Write the system as a matrix equation.
- (2) Use Cramer's Rule to solve for y . Be sure to show your work.