

EECS 40, Spring 2007
Prof. Chang-Hasnain
Midterm #1

September 17, 2007
Total Time Allotted: 50 minutes
Total Points: 100

1. This is a closed book exam. However, you are allowed to bring one page (8.5" x 11"), single-sided notes.
2. No electronic devices, i.e. calculators, cell phones, computers, etc.
3. **SHOW** all the steps on the exam. Answers without steps will be given only a small percentage of credits. Partial credits will be given if you have proper steps but no final answers.
4. Draw **BOXES** around your final answers.
5. **Remember to put down units.** Points will be taken off for answers without units.

Last (Family) Name: _____

First Name: _____

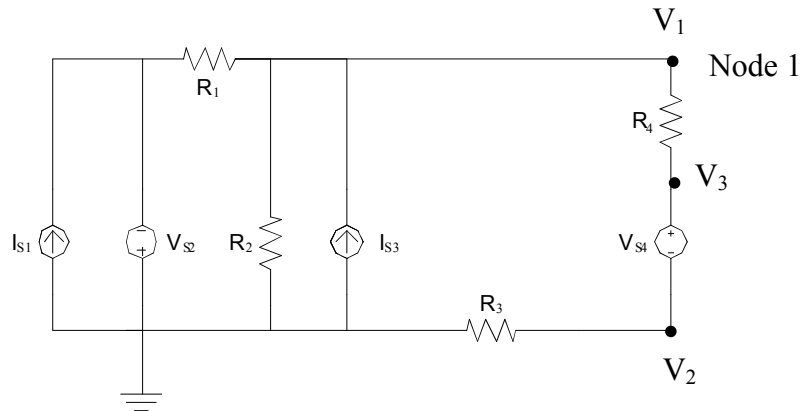
Student ID: _____ Discussion Session: _____

Signature: _____

Score:	
Problem 1 (25 pts)	
Problem 2 (43 pts):	
Problem 3 (32 pts)	
Total	

1. (25 pts) Node-Voltage Analysis

All voltages of the voltage sources, the currents of the current sources and the values of the resistors are given.

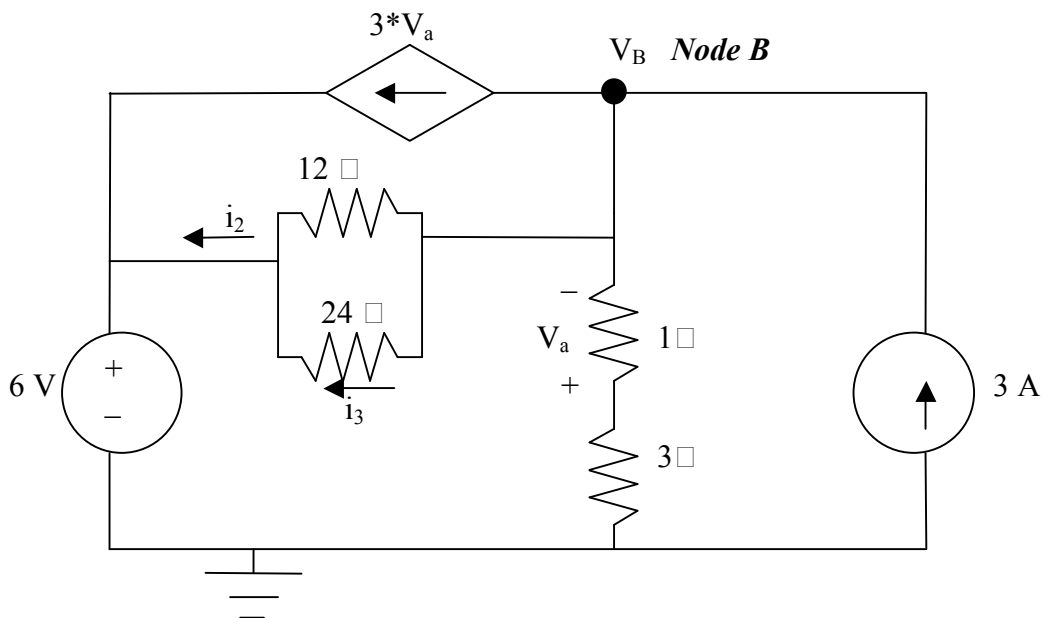


a) (7 pts) Does the current source I_{S1} have impact on voltages V_1 and V_2 ? Justify your answer. (**Hint: You do not need to solve the rest of the problem to do this part!!**)

b) (12 pts) Write KCL equation for node 1.

c) (6 pts) Consider the two terminals surrounding V_{S4} a super node. Write a KCL equation for the branch connecting R_4 , R_3 and V_{S4} .

2. (43 pts) Dependent Source



- a) (4 points) Write V_a in terms of V_B (the voltage at node B).

- b) (18 points) Use KCL at node B, and your answer to part (a), to write an expression for V_B in terms of i_2 and constants in the problem.

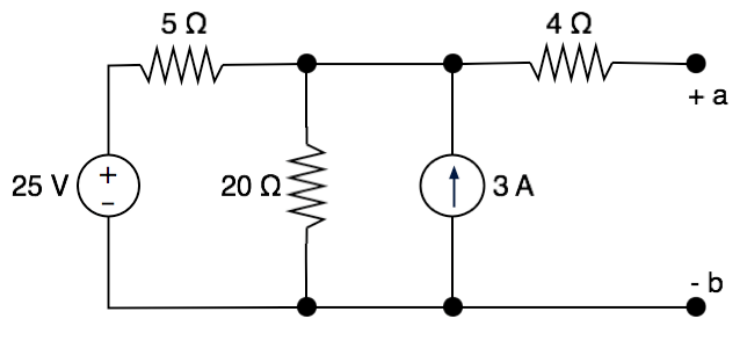
- c) (8 points) Use KVL and Ohm's Law (of parallel resistors) to write an expression for i_2 in terms of V_B and constants in the problem.

d) (8 points) Solve for V_B and i_2 . Hint: both should be integers. If they are not, go back and check your work.

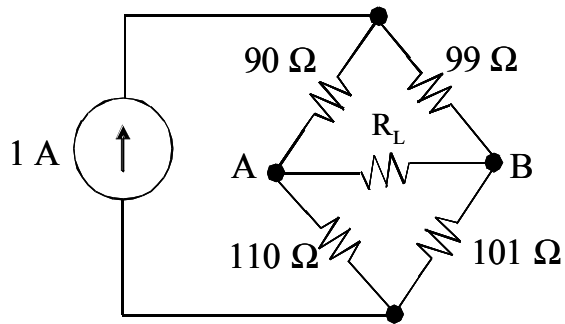
e) (5 points) Determine the value of i_3 .

3. (32 pts) Thévenin and Norton Equivalent Circuits

- (a) (18 pts) Looking into terminals across a and b. What are the open circuit voltage V_{ab} , and the Thévenin Resistance R_{th} ?



(b) (7 pts) Looking into terminals across A and B. What is the open circuit voltage V_{ab} ?



(c) (7 pts) Same circuit as above, looking into terminals across A and B. What is the Thevenin Resistance R_{th} ? (You do not need to carry out the division.)