Midterm 1
EE40
Spring 2013

NAME:_____

Instructions

Read all of the instructions and all of the questions before beginning the exam.

There are 4 problems in this exam. The total score is 100 points. Points are given next to each problem to help you allocate time. Do not spend all your time on one problem.

Unless otherwise noted on a particular problem, you must show your work in the space provided, on the back of the exam pages or in the extra pages provided at the back of the exam.

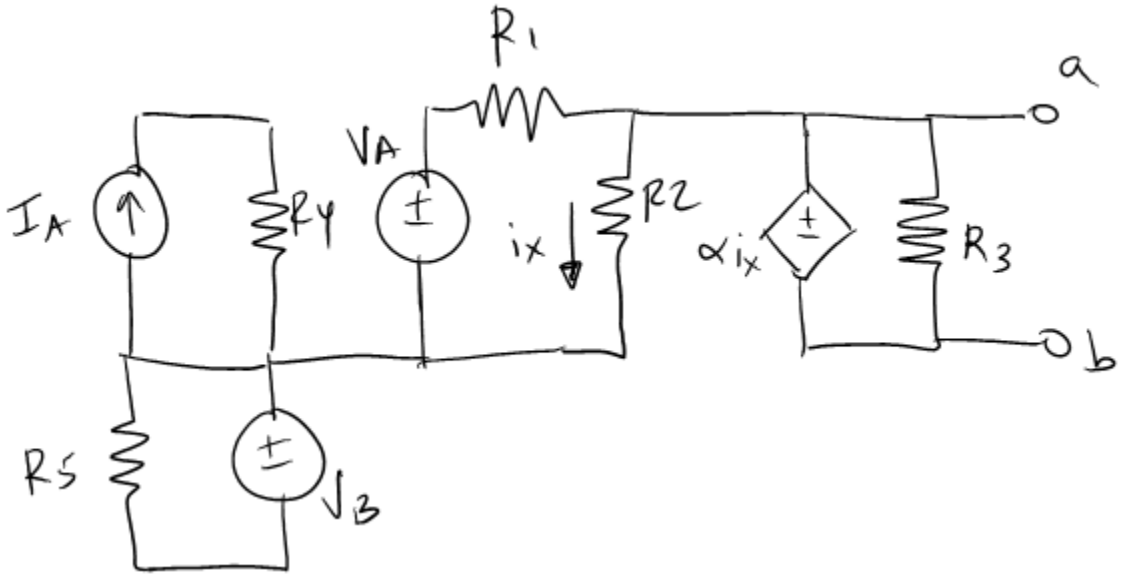
Draw a BOX or a CIRCLE around your answers to each problem.

Be sure to provide units where necessary.

GOOD LUCK!

PROBLEM	POINTS	MAX
1		
2		
3		
4		

Problem 1 *Warm-up* (N points)

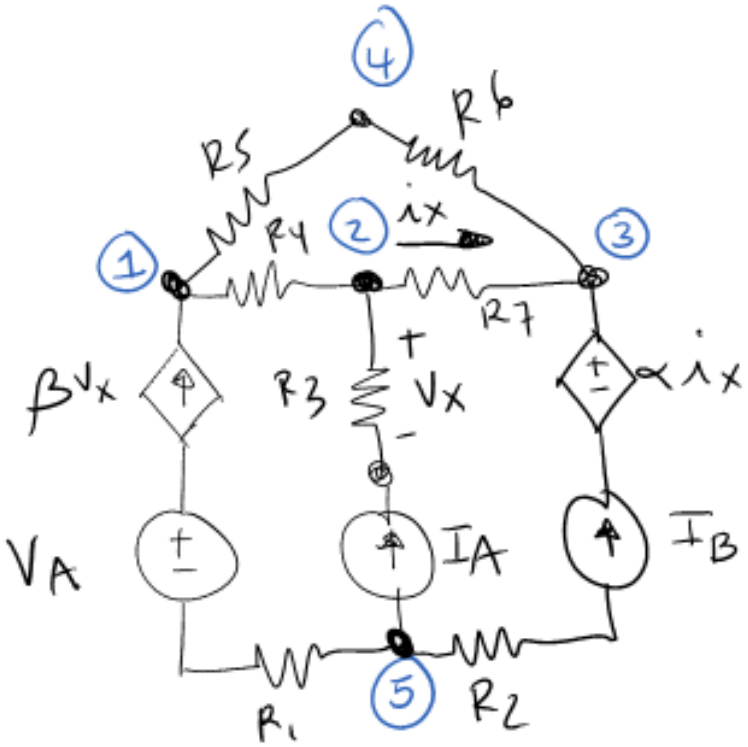


What is the Thevenin equivalent R_{TH} and V_{TH} for the circuit above?

R_{TH} =	V_{TH} =

Problem 2 *Nodal* (N points)

USING NODAL analysis*, provide a* ***complete*** *set of equations which I can use to solve the circuit below. Use the node numbers and labels provided.*



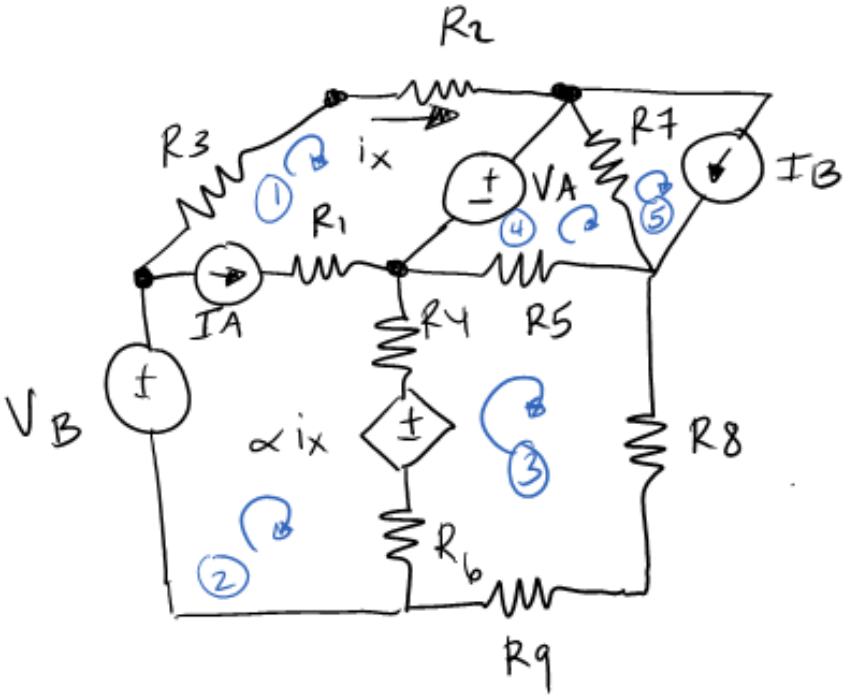
In the box below, provide your answer with equations in this form or lose points (v1 refers to the voltage at node 1, etc):

(____)v1 + (____)v2 + … + (____)vn = (____)

Solution:

Problem 3 *Mesh* (N points)

USING mesh analysis*, provide a* ***complete*** *set of equations which I can use to solve the circuit below. Use the labels provided.*



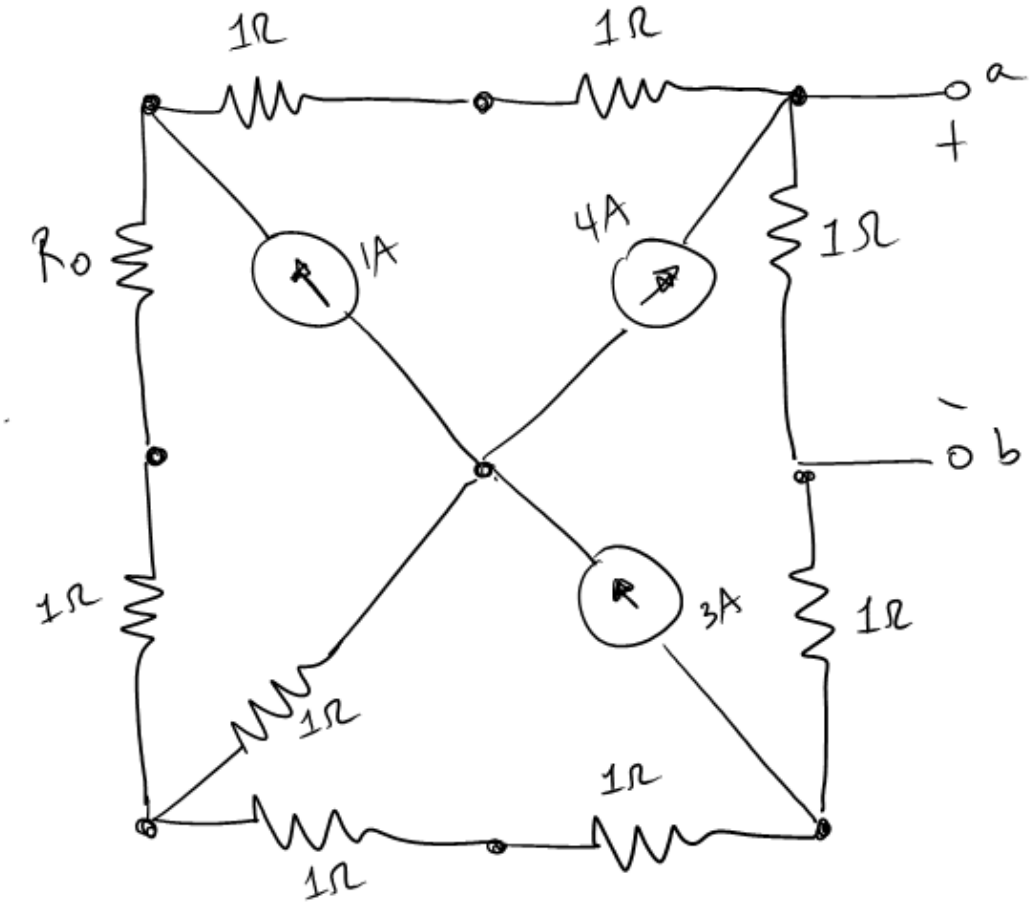
In the box below, provide your answer with equations in this form or lose points (i1 refers to mesh current 1, etc:

$$(\_\_\_\_)i_1 \quad + \quad \ldots \quad + \quad (\_\_\_\_)i_n \quad = \quad (\_\_\_\_)$$

Solution:

Problem 4 *Equivalent circuits* (N points)

Consider the circuit below.



a) If I connect a resistive load, R_L, between terminals (a,b) what is the value of R_L needed to obtain the maximum amount of power through R_L from the circuit above?

Solution:

b) What is the simplest equivalent circuit for the circuit above when looking at it through terminals (a,b)?

Solution:

Solution: