University of Portland
School of Engineering

EE 261-Electrical Circuits-3 cr. hrs.
Spring 2011

Midterm Exam # 1

(Friday, February 18, 2011*)
(Closed Book Exam, One Formula Sheet Allowed)
(Total Time: 55 minutes)

*Today's math puzzle by Inan: Today's date expressed as a single date number as 2182011 equals 39×55949 where 55949 is a prime number. Interestingly enough, the difference of numbers 55949 and 39 relate to Inan's age. Can you figure out how? ☺

Name:_____☺

# Signature:_____☺

> "*An honest mind possesses a kingdom.*"
> **Lucius Annaeus Seneca (4B.C.–65A.D.)**
>
> "*Honest people are the true winners of the universe.*"
> **Anonymous**

NOTE: On all the problems, please show your work clearly, and provide the appropriate units for your answers. Also mark on the schematic to show any current or voltage that you define in your solution.

1. (25 points) In the electric circuit shown, find the value of the voltage v_a across the 2 kΩ resistor shown. (Please show your work clearly and provide brief justifications for the steps you take. Also, don't forget to provide the correct units for your answers.)

4 kΩ

42 V   6 kΩ   21 mA v_a=? 2 kΩ

8 kΩ
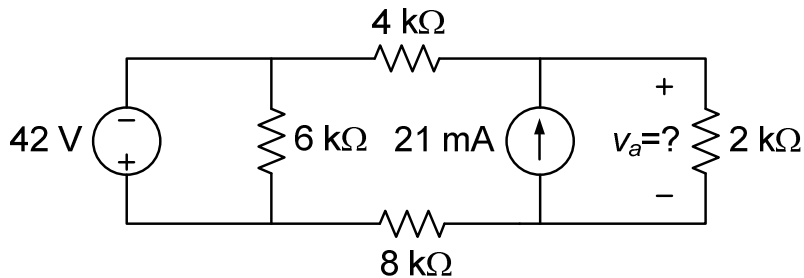
2. (Total: 25 Points) Consider the electric circuit with two digital multi-meters (DMM's) connected as shown.
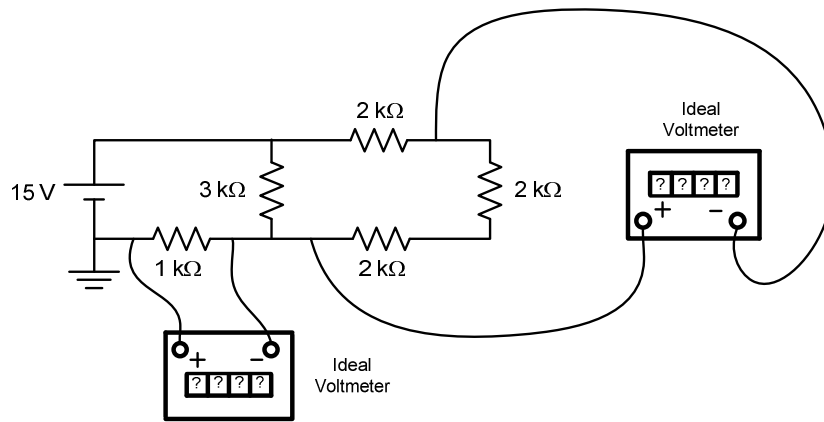

(a) (12.5 points) Determine the readings of the two DMMs if each is set to measure voltage. Please provide appropriate units for the measured values. (Note: Pay attention to the polarities of each DMM!)

(b) (12.5 points) Find the readings of the two DMMs shown in the circuit below if one is set to measure voltage and the other to measure current. Again, indicate your units.
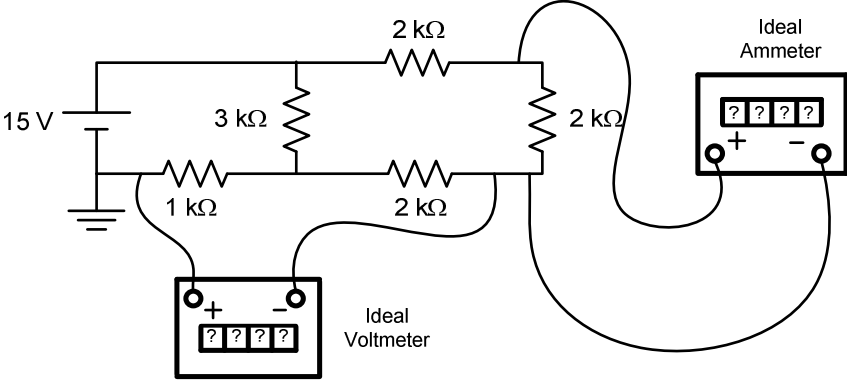
3. (25 Points) Consider the electric circuit shown. Determine the current i_x that flows through the 1.2 kΩ resistor as shown. Please provide your work step by step with justifications.

1 kΩ

600 Ω

12 V

1 kΩ

1.2 kΩ

i_x=?

600 Ω
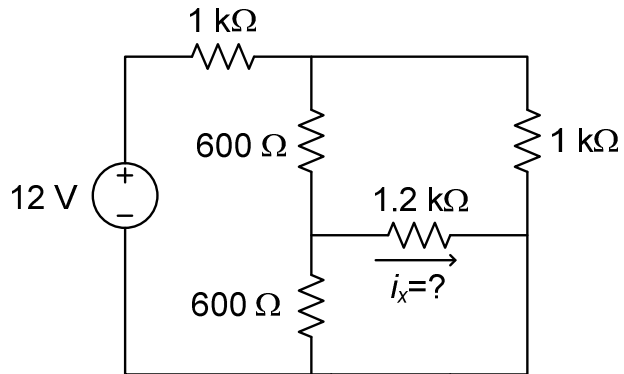
4. (25 Points) In the electric circuit shown, find the values of the voltage v_x and the current i_y indicated <u>using Node Voltage Method</u>. Please show your work step by step. Provide appropriate units for your answers.