ECE 2210/00 Exam 1   given: Spring 13   (The space between problems has been removed.)
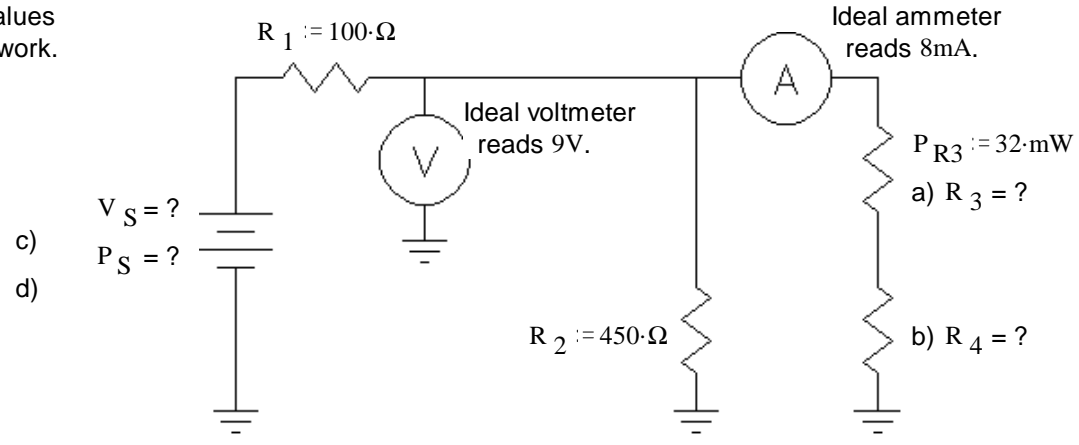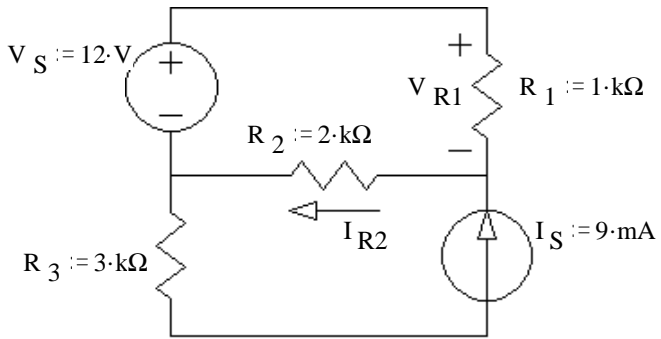
1. (26 pts) Find the values below. Show your work.
   a) R_3 = ?
   b) R_4 = ?
   c) V_S = ?
   d) P_S = ?

$R_1 := 100 \cdot \Omega$

Ideal voltmeter reads 9V.

V_S = ?
c)
P_S = ?
d)

Ideal ammeter reads 8mA.

$P_{R3} := 32 \cdot mW$

a) R_3 = ?

$R_2 := 450 \cdot \Omega$

b) R_4 = ?

2. (25 pts) Use the method of superposition to find I_{R2} and V_{R1}.

   Be sure to redraw the circuit as needed and to clearly show and **circle** your intermediate results.

$V_S := 12 \cdot V$

V_{R1} $R_1 := 1 \cdot k\Omega$

$R_2 := 2 \cdot k\Omega$

I_{R2}

$R_3 := 3 \cdot k\Omega$

$I_S := 9 \cdot mA$

3. (20 pts) a) Find and draw the Thévenin equivalent of the circuit shown. The load resistor is R_L.

$I_S := 90 \cdot mA$

$R_1 := 40 \cdot \Omega$
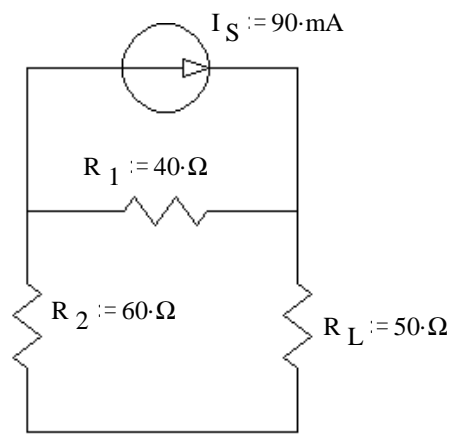
b) Find and draw the Norton equivalent of the same circuit.

$R_2 := 60 \cdot \Omega$

$R_L := 50 \cdot \Omega$

c) Find the load voltage using your Thévenin equivalent circuit.

4. (7 pts)   Find C_{eq} between terminals a and b.

$C_1 := 1 \cdot \mu F$

a

$C_2 := 3 \cdot \mu F$

$C_3 := 2 \cdot \mu F$

b

$C_4 := 6 \cdot \mu F$
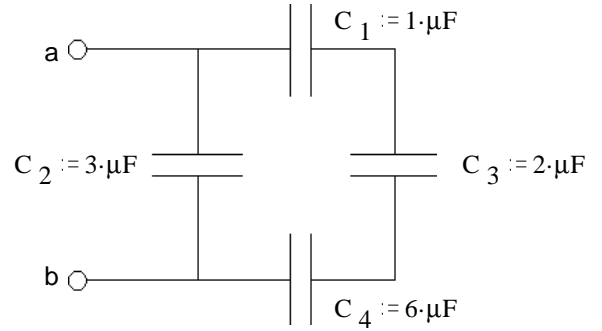
5. (13 pts) The circuit below has been connected as shown for a long time

a) Find the voltage across each capacitor.

b) How much energy is stored in capacitor C_2.

$R_1 := 400 \cdot \Omega$

$C_1 := 30 \cdot \mu F$

$C_2 := 40 \cdot \mu F$

$R_2 := 200 \cdot \Omega$

$V_{C1} = ?$
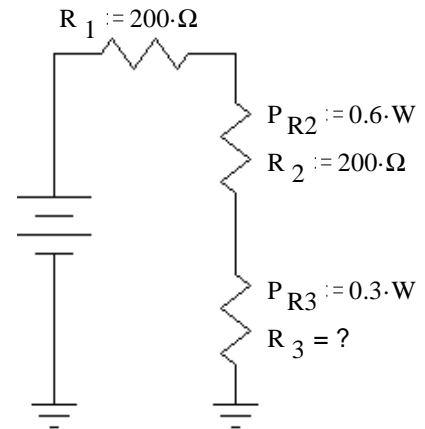
$I_S := 40 \cdot mA$

$V_{C2} = ?$
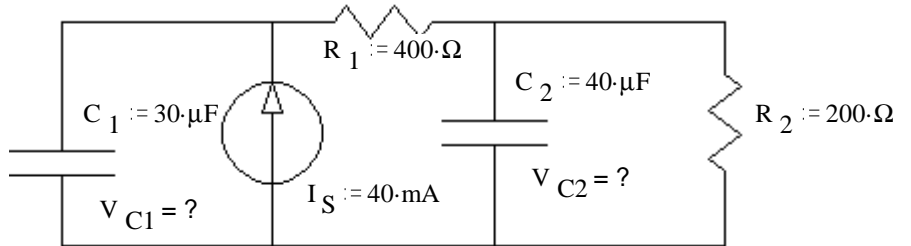
The questions below are similar to what you might see on the FE exam.
They expect you to average about 2 minutes per question.

6. (5 pts)

In the circuit shown, the power loss in R_2 is 0.6 W and the power loss in R_3 is 0.3 W. What is the value of the resistor, R_3?

a) 100 Ω b) 141 Ω c) 283 Ω d) 400 Ω

$R_1 := 200 \cdot \Omega$

$P_{R2} := 0.6 \cdot W$
$R_2 := 200 \cdot \Omega$

7. (4 pts)

In the circuit above, what is output power of the battery?

a) 0.6 W   b) 0.9 W   c) 1.2 W   d) 1.5 W

$P_{R3} := 0.3 \cdot W$
$R_3 = ?$

Answers

1. a) $500 \cdot \Omega$ b) $625 \cdot \Omega$ c) $11.8 \cdot V$ d) $0.33 \cdot W$

2. $7 \cdot mA$ $-2 \cdot V$

3. a) $100 \cdot \Omega$ b)   c) $1.2 \cdot V$

   $3.6 \cdot V$ $36 \cdot mA$ $100 \cdot \Omega$
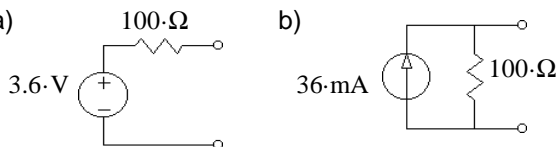
4. $3.6 \cdot \mu F$ 5. a) $24 \cdot V$ $8 \cdot V$ b) $1.28 \cdot mJ$

6 a)   7. d)

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ECE 2210 / 00   Midterm #1   Arn Stolp

Name _____
Scores:
   Prob 1 _____ of a possible 26 pts

   Prob 2 _____ of a possible 25 pts

   Prob 3 _____ of a possible 20 pts

Probs 4&5 _____ of a possible 20 pts

Probs 6&7 _____ of a possible 9 pts
   Total _____ of a possible 100 pts