ECE 2210/00 Exam 1   given: Fall 13   (The space between problems has been removed.)
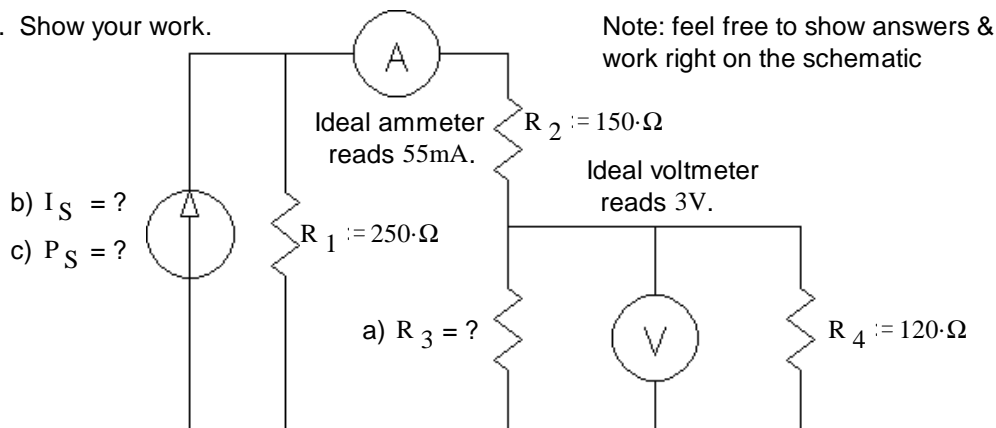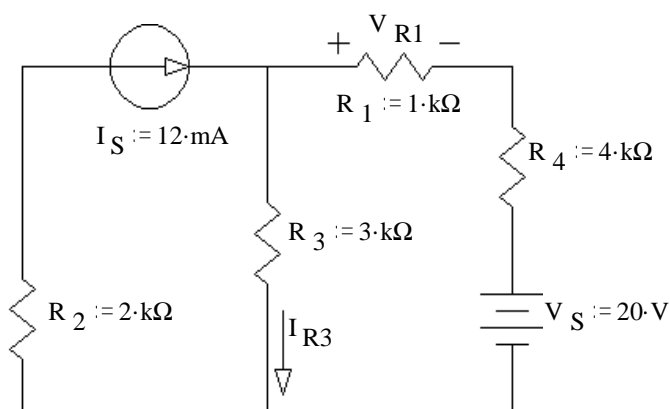
1. (23 pts) Find the values below. Show your work.

   a) R_3 = ?

   b) I_S = ?

   c) P_S = ?

Note: feel free to show answers & work right on the schematic

b) I_S = ?

c) P_S = ?

A

Ideal ammeter reads 55mA.

$R_2 := 150 \cdot \Omega$

Ideal voltmeter reads 3V.

$R_1 := 250 \cdot \Omega$

a) R_3 = ?

V

$R_4 := 120 \cdot \Omega$

2. (23 pts) Use the method of superposition to find I_{R3} and V_{R1}.

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

$+ \quad V_{R1} \quad -$

$R_1 := 1 \cdot k\Omega$

$I_S := 12 \cdot mA$

$R_4 := 4 \cdot k\Omega$

$R_3 := 3 \cdot k\Omega$

$R_2 := 2 \cdot k\Omega$

I_{R3}

$V_S := 20 \cdot V$

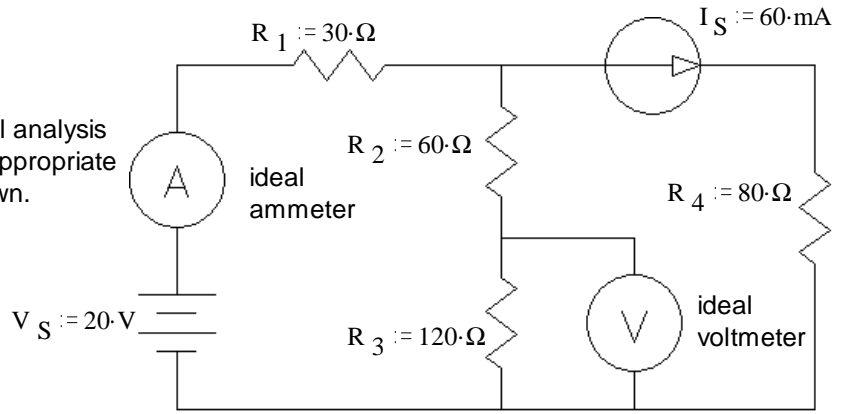3. (23 pts) a) Find and draw the Thévenin equivalent of the circuit shown. The load resistor is R_L.

   b) Find and draw the Norton equivalent of the same circuit.

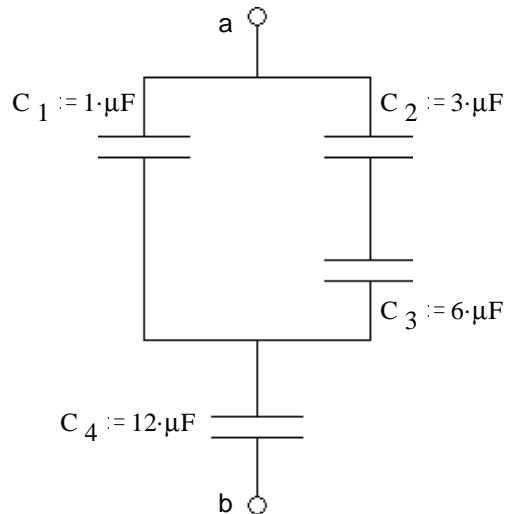   c) Find the load current using your Thévenin equivalent circuit.

$R_1 := 40 \cdot \Omega$

$R_2 := 60 \cdot \Omega$

$R_L := 20 \cdot \Omega$

$R_3 := 50 \cdot \Omega$

$I_S := 60 \cdot mA$
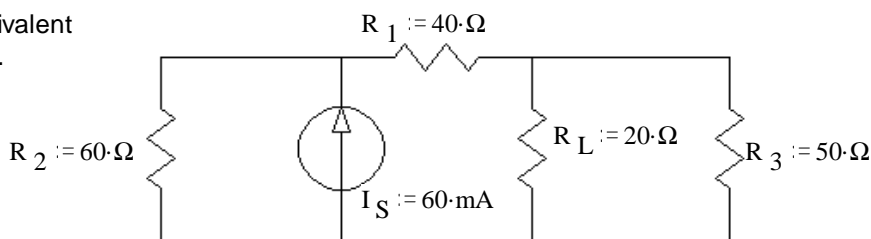
4. (23 pts) Use nodal analysis to find the readings of the two ideal meters.
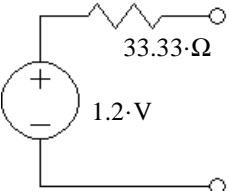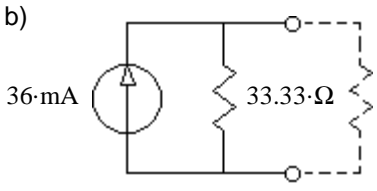
You **MUST** show all the steps of nodal analysis work to get credit, including drawing appropriate symbols and labels on the circuit shown.

$I_S := 60 \cdot mA$

$R_1 := 30 \cdot \Omega$

$R_2 := 60 \cdot \Omega$

(A) ideal ammeter

$R_4 := 80 \cdot \Omega$

$V_S := 20 \cdot V$

$R_3 := 120 \cdot \Omega$

(V) ideal voltmeter

5. (8 pts) Find C_{eq} between terminals a and b.

a

$C_1 := 1 \cdot \mu F$

$C_2 := 3 \cdot \mu F$

$C_3 := 6 \cdot \mu F$

$C_4 := 12 \cdot \mu F$

b

Answers

1. a) $100 \cdot \Omega$ b) $100 \cdot mA$ c) $1125 \cdot mW$ 2. $7.5 \cdot mA + 2.5 \cdot mA = 10 \cdot mA$ $4.5 \cdot V - 2.5 \cdot V = 2 \cdot V$

3. a)

$33.33 \cdot \Omega$

$1.2 \cdot V$

b)

$36 \cdot mA$ $33.33 \cdot \Omega$

c) $22.5 \cdot mA$

4. $10.4 \cdot V$ $146.7 \cdot mA$

5. $2.4 \cdot \mu F$