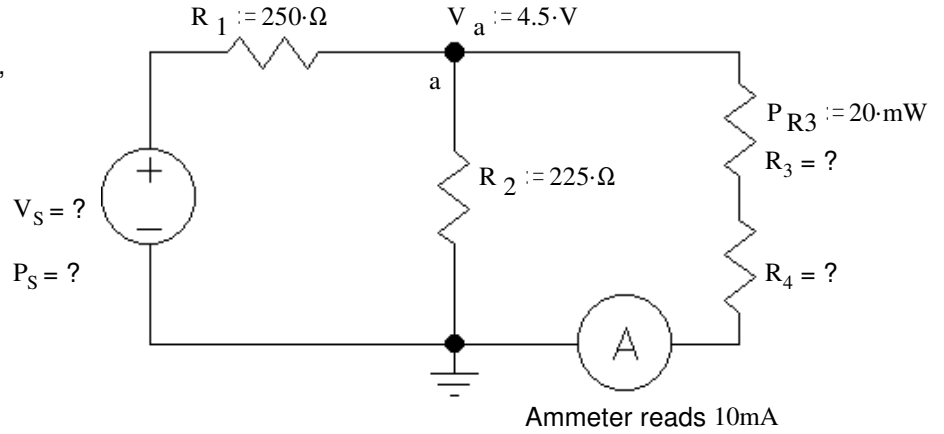


# ECE 2210/00 Exam 1 given: Fall 06

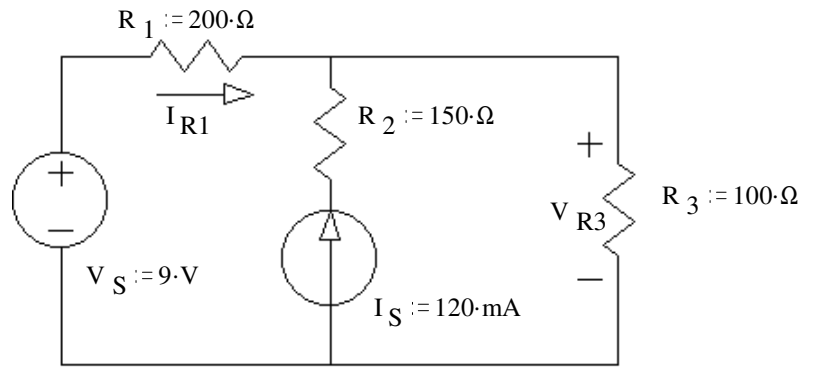
(The space between problems has been removed.)

1. (20 pts) In the circuit shown the ammeter is ideal and measures 10mA. Find the voltage source ( $V_S$ ), the power input by the source ( $P_S$ ), and the resistor values;  $R_3$  and  $R_4$ .



Reminder, you were asked for 4 items:  $V_S$ ,  $P_S$ ,  $R_3$ , and  $R_4$ .

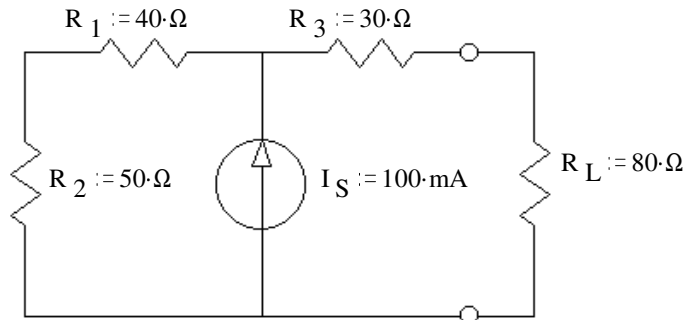
2. (18 pts) Use the method of superposition to find the current through  $R_1$  ( $I_{R1}$ ) and the voltage across  $R_3$  ( $V_{R3}$ ). Be sure to clearly show and **circle** your intermediate results.



Reminder, you were asked for 2 items:  $I_{R1}$  and  $V_{R3}$ .

Be sure to clearly show and **circle** your intermediate results.

3. (24 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 power dissipated in the load ( $R_L$ ).

- d) What value of load resistor ( $R_L$ ) would you choose if you wanted to maximize the power dissipation in the load.

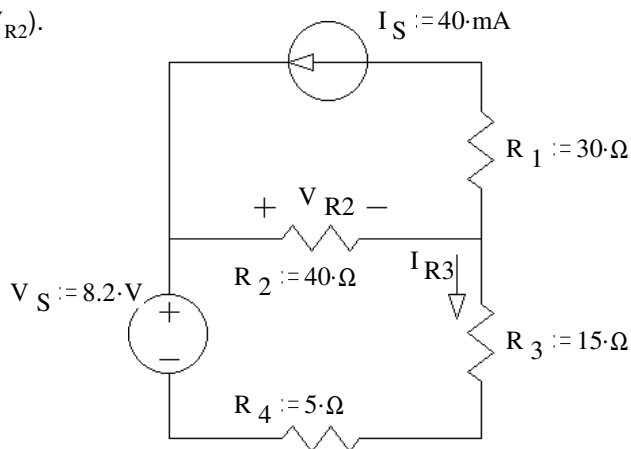
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4. (20 pts) Use nodal analysis to find the voltage across  $R_2$  ( $V_{R2}$ ).

You **MUST** show all the steps of nodal analysis work to get credit, including drawing appropriate symbols and labels on the circuit shown.

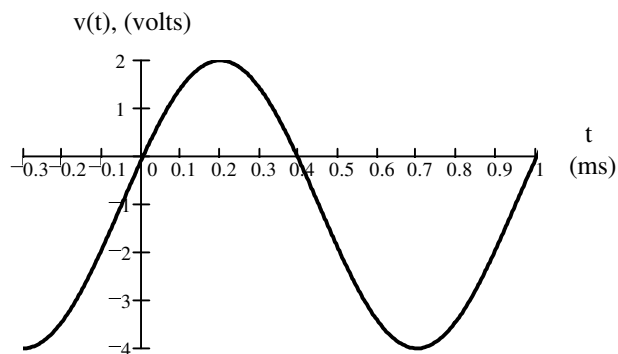
Remember, you want to find  $V_{R2}$ .

b) Find the current through  $R_3$  ( $I_{R3}$ ).



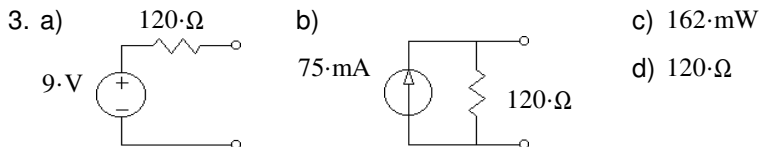
5. (18 pts) For the waveform shown, find:

- a) peak-to-peak voltage,  $V_{pp}$
- b) amplitude, A
- c) period, T
- d) frequency  $f$  in cycles/sec or Hz
- e) frequency  $\omega$  in radians/sec
- f) the phase angle in degrees
- g) a complete expression for  $v(t)$ , include numbers and units

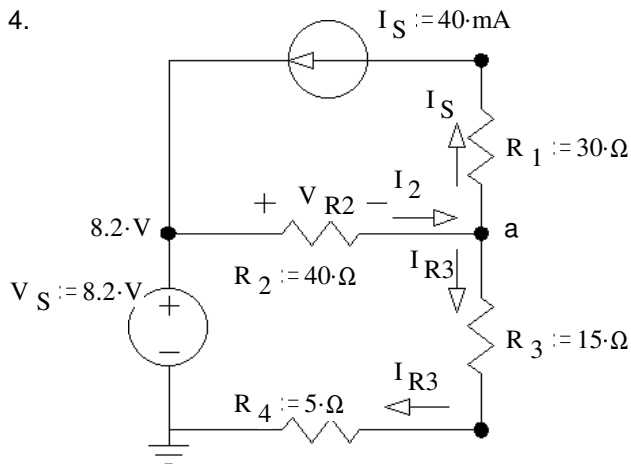


**Answers**

1. 12·V 0.36·W 200· $\Omega$  250· $\Omega$       2. -10·mA 11·V



4.      a) 6·V      b) 110·mA



5. a) 6·V    b) 3·V    c) 1·ms    d) 1·kHz    e)  $6283 \cdot \frac{\text{rad}}{\text{sec}}$   
 f)  $-72^\circ$     g)  $3 \cdot V \cdot \cos\left(6283 \cdot \frac{\text{rad}}{\text{sec}} \cdot t - 72 \cdot \text{deg}\right) - 1 \cdot V$

ECE 2210 / 00 Midterm #1 Arn Stolp

Name \_\_\_\_\_

Scores:

Pages 1&2 \_\_\_\_\_ of a possible 38 pts

Pages 3&4 \_\_\_\_\_ of a possible 44 pts

Page 5 \_\_\_\_\_ of a possible 18 pts

Total \_\_\_\_\_ of a possible 100 pts