

ECE1050/60 Exam 1 given: Fall 03

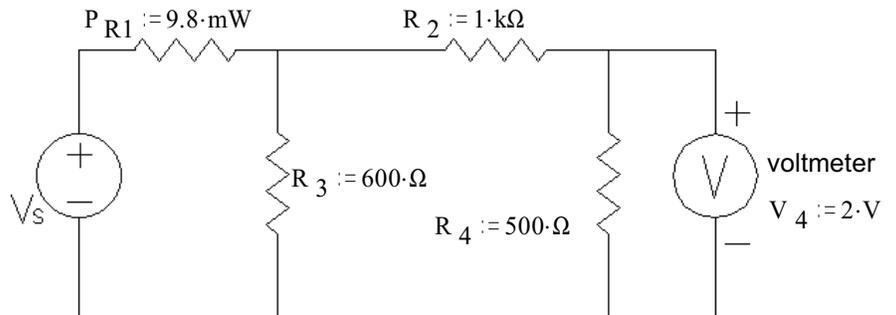
(The space between problems has been removed.)

Remember, to get the most possible partial credit, always show all the intermediate values that you can calculate. If further calculations depend on a value that you can't figure out, just use a letter (like I_{R1}) or a guessed value and proceed.

1. (24 pts) In the circuit shown we measure the voltage across R_4 as 2.0 V.
The power dissipated by R_1 is 9.8mW.

a) What must V_S be?

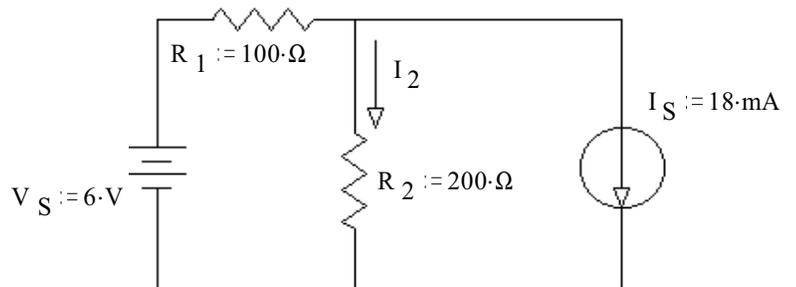
Note: feel free to show answers & work right on the schematic



b) What is the value of R_1 ?

c) How much power does R_4 dissipate?

2. (18 pts) Use the method of superposition to find the current I_2 (through R_2). Be sure to clearly show and **circle** your intermediate results.



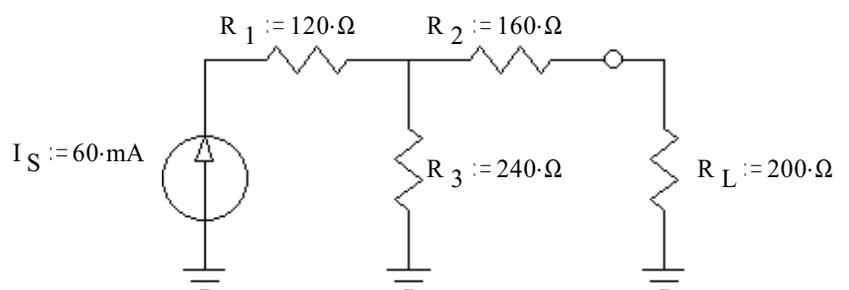
3. (18 pts)

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

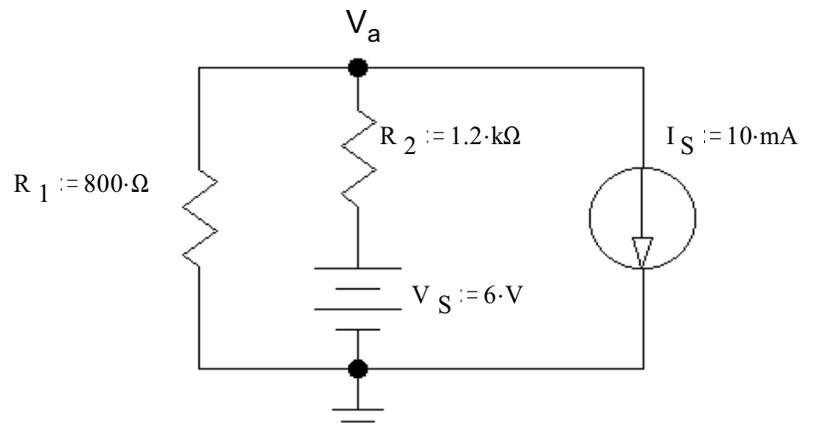
b) Find and draw the Norton equivalent of the same circuit.

c) Use the Norton equivalent circuit to find the current through the load.

$$I_{RL} = ?$$



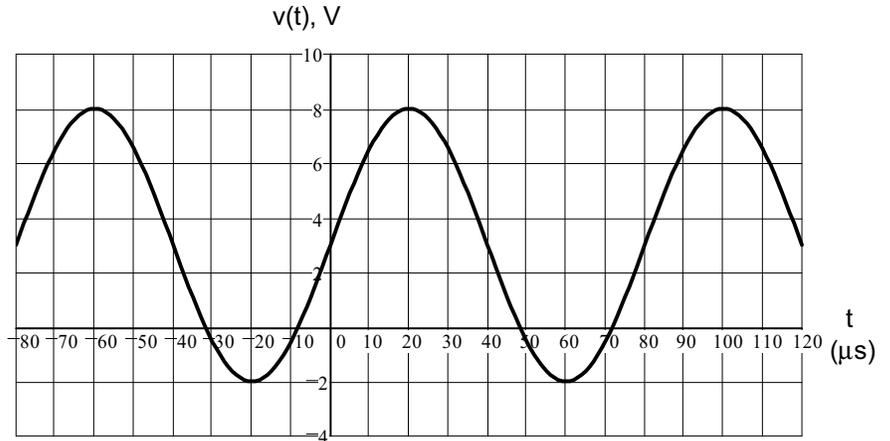
4. (16 pts) Use nodal analysis to find V_a .



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5. (19 pts) For the waveform shown, find:

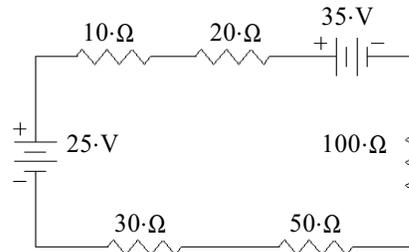
- a) peak-to-peak voltage, V_{pp}
- b) amplitude, A
- c) period, T
- d) frequency f in cycles/sec or Hz
- e) frequency ω in radians/sec
- f) the phase angle in degrees
- g) a complete expression for $v(t)$, include numbers and units



6. (5 pts) The question below is similar to what you might see on the FE exam. They expect you to average about 2 minutes per question.

a) The voltage across the 50-ohm resistor in the circuit shown is most nearly:

- (A) 0.95 V
- (B) 2.4 V
- (C) 5.95 V
- (D) 8.33 V
- (E) 14.3 V

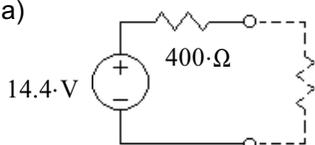


Answers

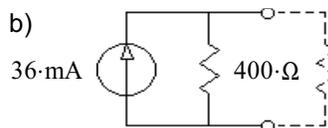
1. a) 6.7-V b) 50-Ω c) 8-mW

2. $I_{2V_S} := 20\text{-mA}$ $I_{2I_S} := -6\text{-mA}$ $I_2 := 14\text{-mA}$

3. a)



b)



c) 24-mA

4. -2.4-V

5. a) 10-V b) 5-V c) 80-μs d) 12.5-kHz e) $78.5 \cdot \frac{\text{krad}}{\text{sec}}$

f) -90-deg g) $5\text{-V} \cdot \cos\left(78540 \cdot \frac{\text{rad}}{\text{sec}} \cdot t - 90\text{-deg}\right) + 3\text{-V}$

6. B

ECE 1050 / 60 Midterm #1 Arn Stolp

Name _____

Scores:

Pages 1&2 _____ of a possible 42 pts

Pages 3&4 _____ of a possible 34 pts

Pages 5&6 _____ of a possible 24 pts

Total _____ of a possible 100 pts