

ECE 2210/00 Exam 1 given: Spring 08 (The space between problems has been removed.)

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 symbol (like I_{R1}) or a guessed value and proceed.

1. (21 pts) Find the resistor values. Show your work

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

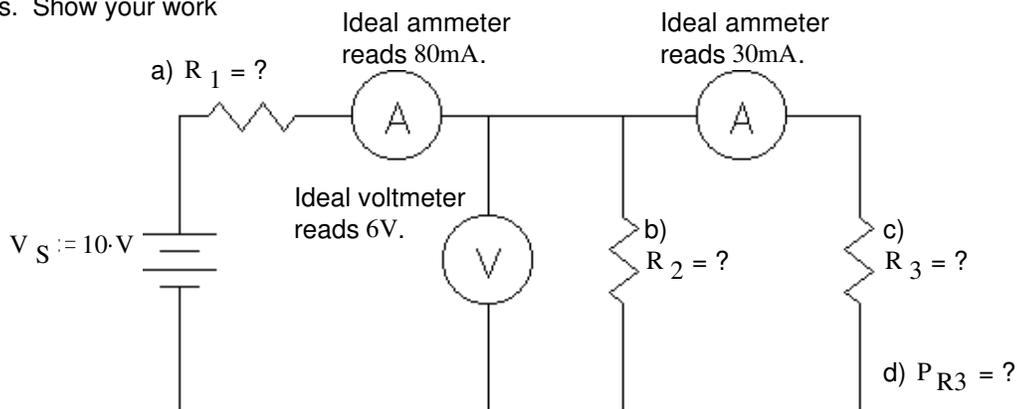
a) $R_1 = ?$

b) $R_2 = ?$

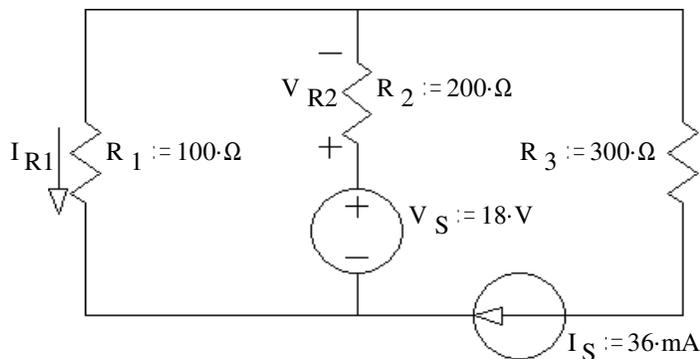
c) $R_3 = ?$

d) How much power is dissipated by R_3 ?

$P_{R3} = ?$



2. (21 pts) Use the method of superposition to find the voltage across R_2 (V_{R2}) and the current through R_1 (I_{R1}). Be sure to clearly show and **circle** your intermediate results.

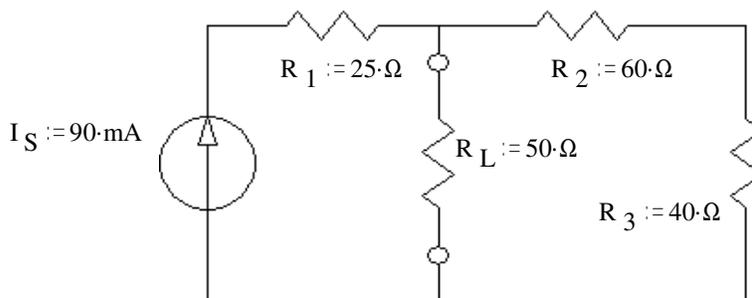


3. (20 pts) a) Find and draw the Thévenin equivalent of the circuit shown. The load resistor is R_L .

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

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

d) Find the power dissipation in the load resistor (R_L). $P_{R_L} = ?$

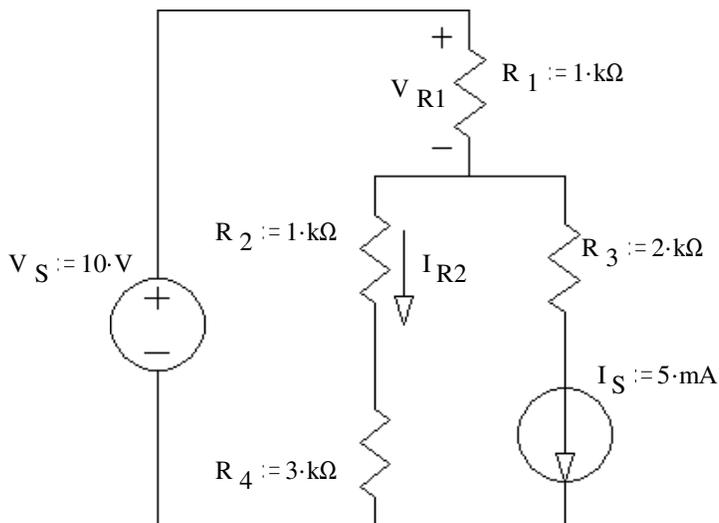


4. (20 pts) a) Use nodal analysis to find the voltage across R_1 (V_{R1}).

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

b) Find the current through R_2 (I_{R2}).

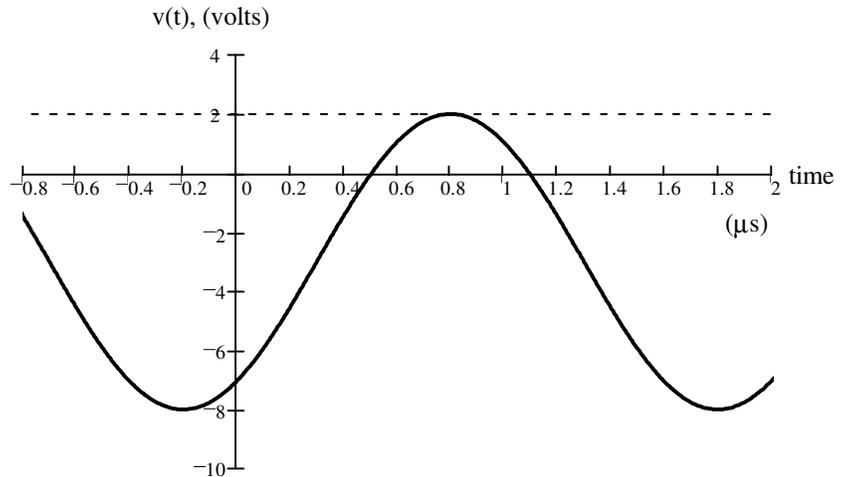
$I_{R2} = ?$



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

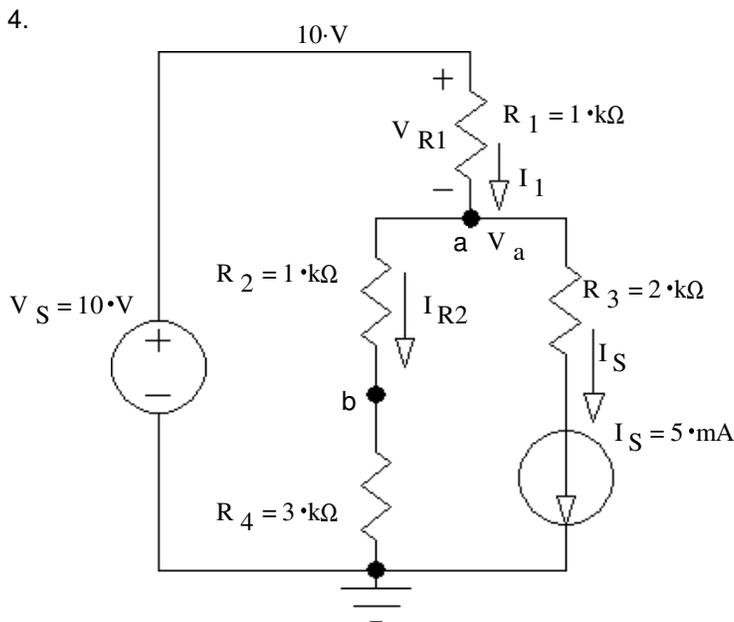
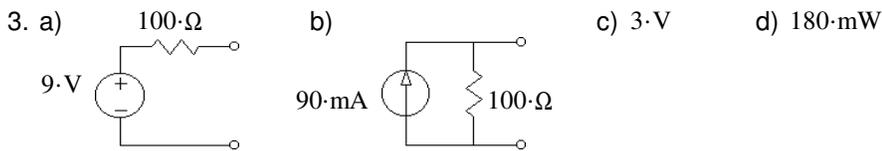
- a) peak-to-peak voltage, V_{pp}
- b) amplitude, A
- c) period, T
- d) frequency f in cycles/sec or Hz
- e) frequency ω in radians/sec
- f) the phase angle in degrees
- g) a complete expression for $v(t)$, include numbers and units



Answers

1. a) $50 \cdot \Omega$ b) $120 \cdot \Omega$ c) $200 \cdot \Omega$ d) $180 \cdot \text{mW}$

2. $36 \cdot \text{mA}$ $14.4 \cdot \text{V}$



a) $6 \cdot \text{V}$ b) $1 \cdot \text{mA}$

5 a) $10 \cdot \text{V}$ b) $5 \cdot \text{V}$ c) $2 \cdot \mu\text{s}$ d) $500 \cdot \text{kHz}$ e) $3.14 \cdot 10^6 \cdot \frac{\text{rad}}{\text{sec}}$

f) -144° g) $5 \cdot \text{V} \cdot \cos\left(3.14 \cdot 10^6 \cdot \frac{\text{rad}}{\text{sec}} \cdot t - 144 \cdot \text{deg}\right) - 3 \cdot \text{V}$

ECE 2210 / 00 Midterm #1 Arn Stolp

Name _____

Scores:

Pages 1&2 _____ of a possible 42 pts

Pages 3&4 _____ of a possible 40 pts

Page 5 _____ of a possible 18 pts

Total _____ of a possible 100 pts