

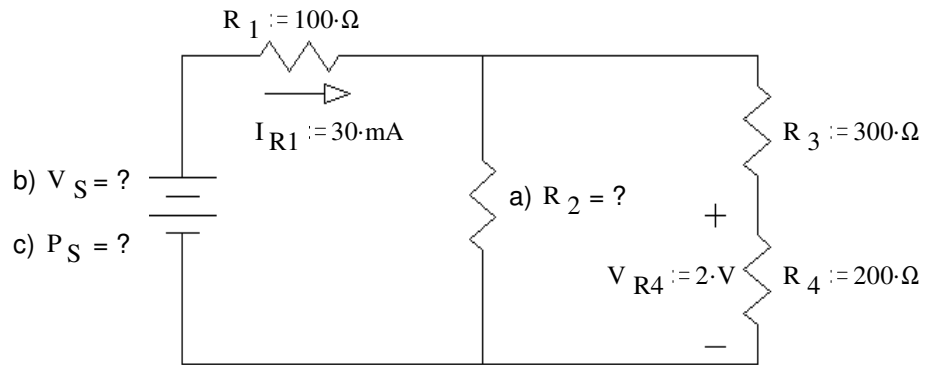
ECE 2210/00 Exam 1 given: Spring 07 (The space between problems has been removed.)

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

1. (20 pts) Show your work

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

a) $R_2 = ?$



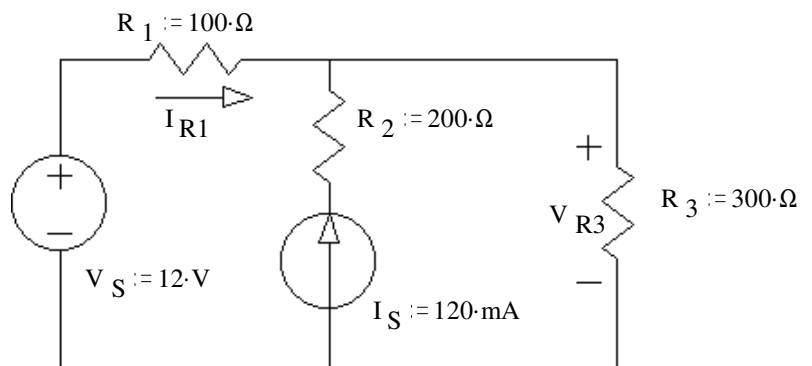
b) $V_S = ?$

c) $P_S = ?$

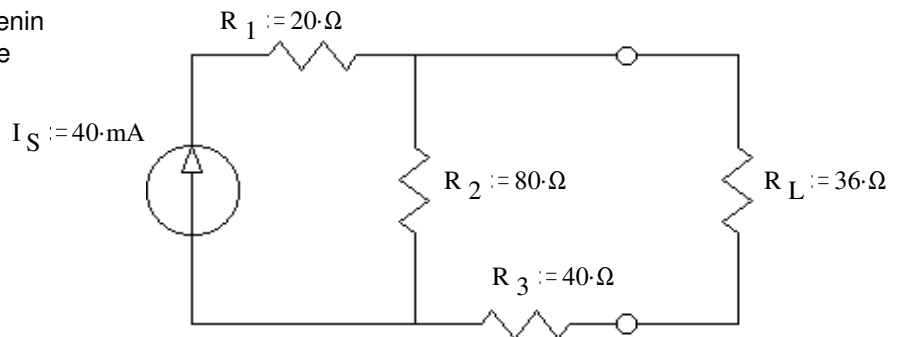
b) What is the value of V_S ?

c) How much power is provided by the source?

2. (20 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.



3. (22 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.

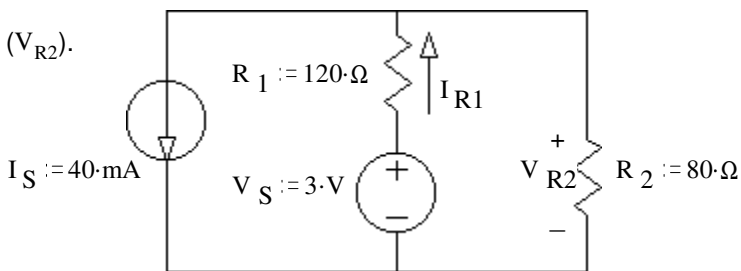
c) Find the load current using your Thévenin equivalent circuit.

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. (18 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_1 (I_{R1}).

5. (20 pts) For the waveform shown, find:

a) peak-to-peak voltage, V_{pp}

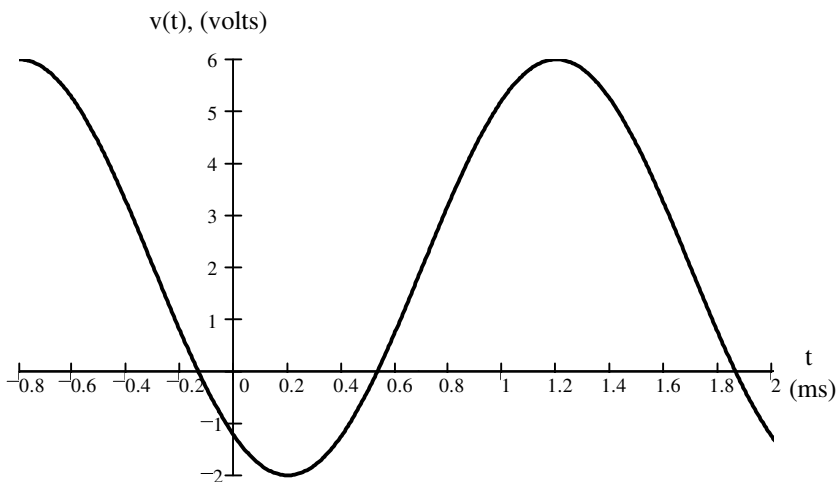
b) amplitude, A

c) period, T

d) frequency f in cycles/sec or Hz

e) frequency ω in radians/sec

f) the phase angle in degrees



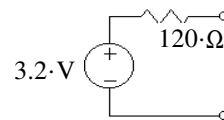
g) a complete expression for $v(t)$, include numbers and units

Answers

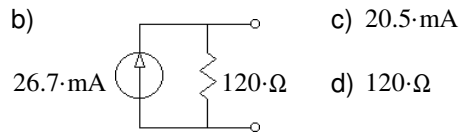
1. a) $250\ \Omega$ b) $8\ \text{V}$ c) $240\ \text{mW}$

2. $-60\ \text{mA}$ $18\ \text{V}$

3. a)



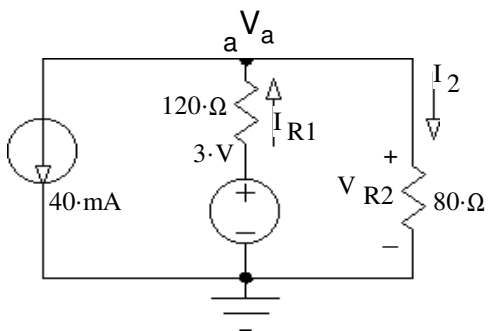
b)



c) $20.5\ \text{mA}$

d) $120\ \Omega$

4.



a) $-0.72\ \text{V}$

b) $31\ \text{mA}$

5. a) $8\ \text{V}$ b) $4\ \text{V}$ c) $2\ \text{ms}$ d) $500\ \text{Hz}$ e) $3142\ \frac{\text{rad}}{\text{sec}}$

f) 144° g) $4\ \text{V} \cdot \cos\left(3142 \cdot \frac{\text{rad}}{\text{sec}} \cdot t + 144^\circ\right) + 2\ \text{V}$

ECE 2210 / 00 Midterm #1 Arn Stolp

Name _____

Scores:

Pages 1&2 _____ of a possible 40 pts

Pages 3&4 _____ of a possible 40 pts

Pages 5&6 _____ of a possible 20 pts

Total _____ of a possible 100 pts