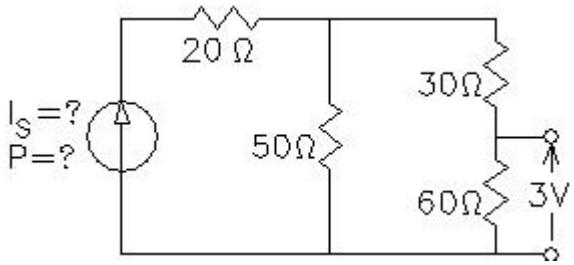
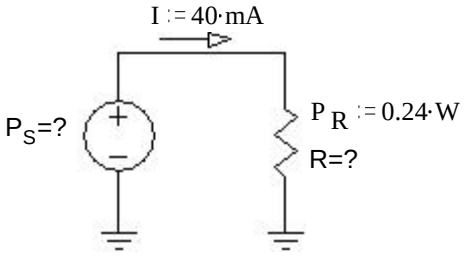
EE1050/60 Exam 1 given: Fall 00 (The space between problems has been removed.)

1. (16 pts) Refer to the figure.
   a) What is the value of the current source?
   b) How much power does it contribute to the circuit?



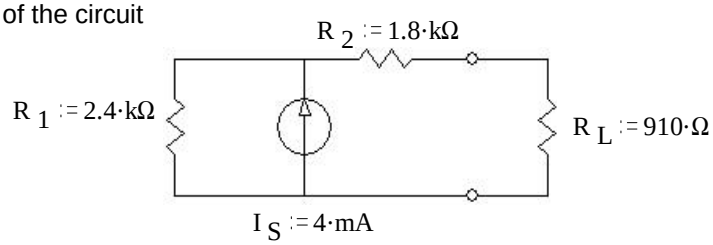
2. (7 pts) Refer to the figure.
   a) What is the value of the resistor?
   b) How much power does the voltage source contribute to the circuit?



3. a) (11 pts) Find and draw the Thévenin equivalent of the circuit shown. The load resistor is R_L.

   b) (7 pts) Find and draw the Norton equivalent of the same circuit.

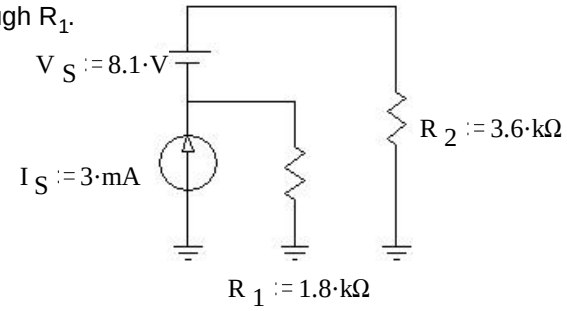
   c) (3 pts) Find the load voltage using your Thévenin equivalent circuit.



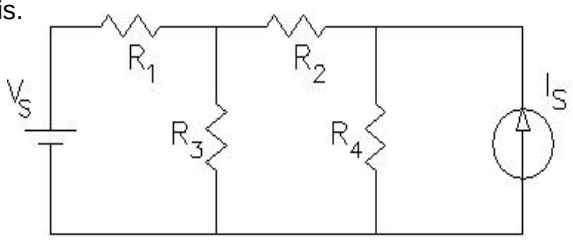
4. a) (15 pts) Use the method of superposition to find the current trough R_1. Be sure to clearly show and **circle** your intermediate results.

   b) (3 pts) What is the direction of this current? Circle one:

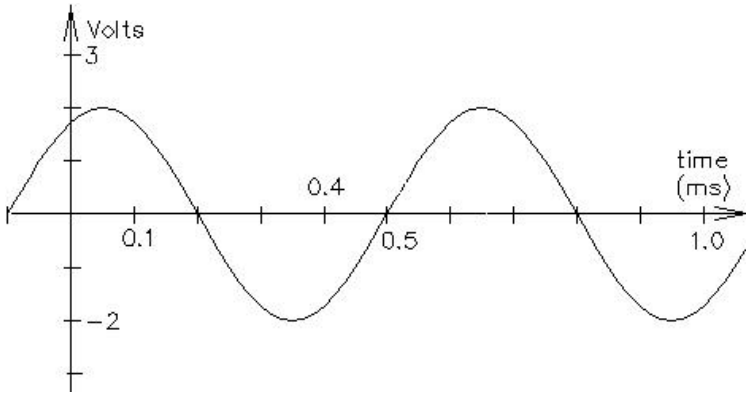
   UP DOWN



5. (14 pts) Nodal analysis.
   a) Select a ground (reference) node and label it on the schematic.
   b) Label other nodes as necessary to perform nodal analysis.
   c) How many simultaneous equations will you need to perform this analysis?
   d) Write all the necessary equations in terms of the resistors, the sources, and the unknown nodes. Just write and circle the equations, do not try to simplify or solve them.

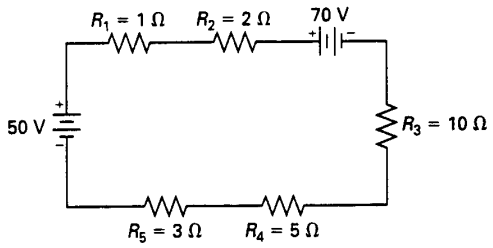


6. (20 pts) For the waveform shown, find:
   a) peak-to-peak voltage or current, V_{pp}
   b) amplitude, A
   c) period, T
   d) frequency f in cycles/sec or Hz
   e) frequency ω in radians/sec
   f) the phase angle in degrees
   g) a complete expression for v(t), include numbers and units



7. (4 pts) The question below is similar to what you might see on the FE exam. They expect you to answer this in less than 2 minutes.

   ~~6~~. What is the voltage across the 10 Ω resistor in the circuit shown?



(A) 9.5 V
(B) 24 V
(C) 33 V
(D) 57 V

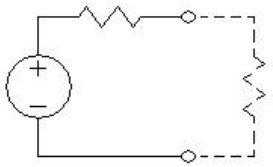
circle one

1.a) 140mA b) 1.022W 2.a) 150Ω b) 0.24W

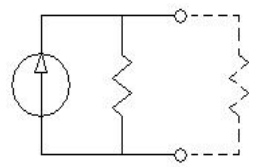
3.a) $R_{Th} := 4.2 \cdot k\Omega$ b) $R_N := 4.2 \cdot k\Omega$ c) 1.71V

Answers

$V_{Th} := 9.6 \cdot V$

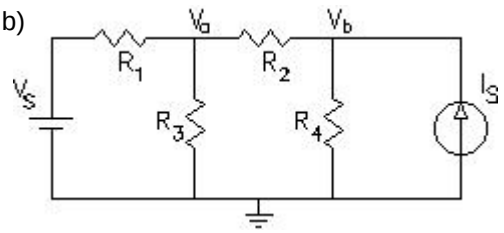


$I_N := 2.29 \cdot mA$



4.a) -1.5mA + 2mA = 0.5mA b) DOWN

5.a) & b)



c) 2 d) $\frac{V_s - V_a}{R_1} = \frac{V_a - V_b}{R_2} + \frac{V_a}{R_3}$

& $\frac{V_a - V_b}{R_2} + I_S = \frac{V_b}{R_4}$

6.a) $V_{pp} = 4 \cdot V$ b) $A = 2 \cdot V$ c) $T = 0.6 \cdot ms$ d) $f = 1667 \cdot Hz$ e) $\omega = 1.047 \cdot 10^4 \cdot \frac{rad}{sec}$

f) $\phi = -30 \cdot deg$ g) $v(t) := 2 \cdot V \cdot \cos\left(10470 \cdot \frac{rad}{sec} \cdot t - 30 \cdot deg\right)$

7. A