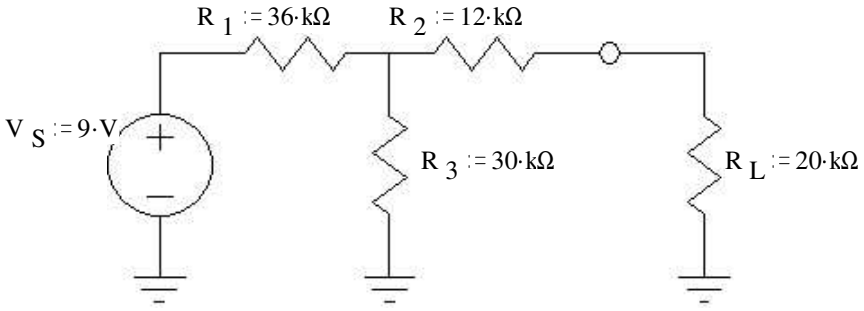
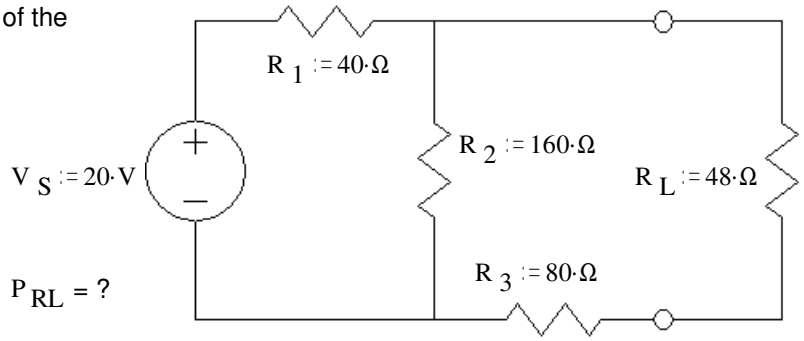
ECE 1250 homework # 5

a

1. Find and draw the Thevenin equivalent circuit of the circuit below. The load resistor is R_L.

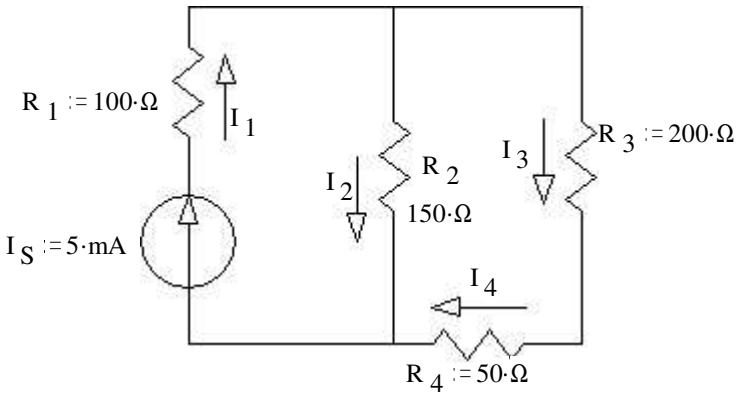


2. a) Find and draw the Thévenin equivalent of the circuit shown.



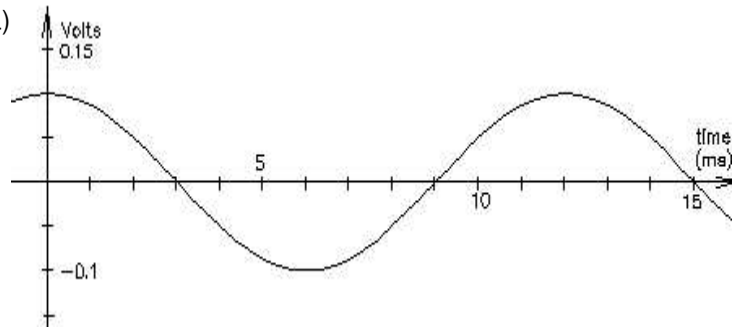
b) Find the power dissipated in the load using your Thévenin equivalent circuit. P_{RL} = ?

3. For the circuit shown at right, use Thevenin's theorem to find the current through the 50 Ω resistor R_4.

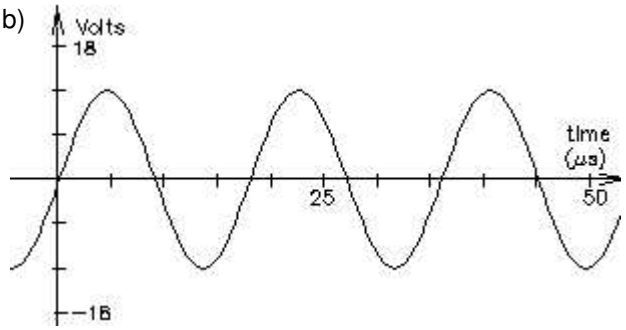


4. For each of the following sinusoidal waves, find:
   1) Peak-to-peak voltage or current, V_{pp} or I_{pp}
   2) Amplitude, A, (V_p, or I_p)
   3) Period, T
   4) Frequency f in cycles/sec or Hz
   5) An expression for v(t) or i(t) in terms of $A\cos(\omega t + \phi)$
   (The frequency ω is in radians/sec
   the phase angle ϕ is in rad/sec or degrees)

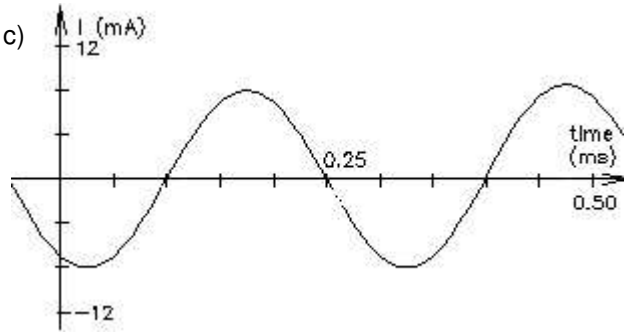
a)



b)

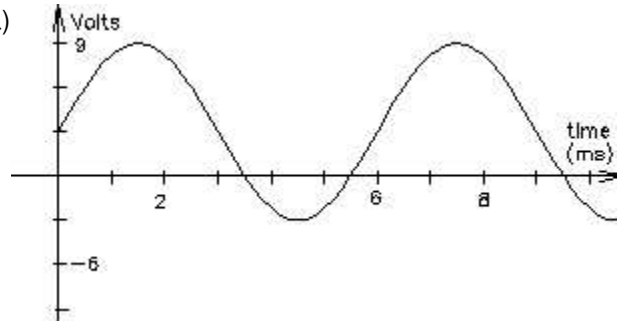


c)

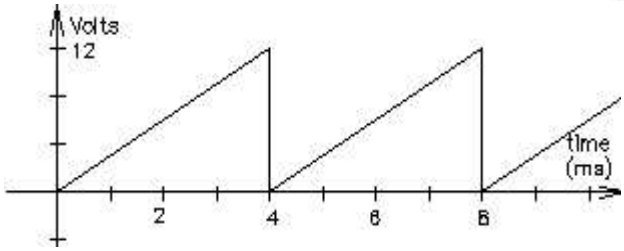


5. For each of the following waveforms, find:
   1) Peak-to-peak voltage or current, V_{pp} or I_{pp}
   2) Average, (V_{DC}, I_{DC}, V_{ave}, or I_{ave})
   3) Period, T
   4) Frequency f in cycles/sec or Hz

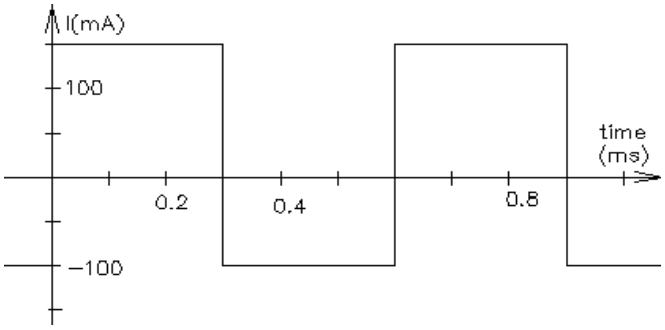
a)



b)



c)



6. For problem 5a above, write a full expression for v(t) in terms of $v(t) = A\cos(\omega t + \phi) + V_{DC}$

7. What is special about a "signal".

8. Could any of the waveforms shown in problems 4, 5, and 6 be considered a "signals"? Why?

Answers

1. a) $4.091\cdot V$, $28.4\cdot k\Omega$ 2. a) $16\cdot V$, $112\cdot\Omega$ b) $480\cdot mW$ 3. $1.88\cdot mA$

4. a) $0.2\cdot V$ $0.1\cdot V$ $12\cdot ms$ $83.3\cdot Hz$ $0.1\cdot V\cdot\cos(523.6\cdot t)$

   b) $24\cdot V$ $12\cdot V$ $0.018\cdot ms$ $55.6\cdot kHz$
   $v(t) := 12\cdot V\cdot\cos(349100\cdot t - 90\cdot deg)$

   c) $16\cdot mA$ $8\cdot mA$ $0.3\cdot ms$ $3333\cdot Hz$
   $8\cdot mA\cdot\cos(20940\cdot t + 150\cdot deg)$

5. a) $12\cdot V$ $3\cdot V$ $6\cdot ms$ $167\cdot Hz$

   b) $12\cdot V$ $6\cdot V$ $4\cdot ms$ $250\cdot Hz$

   c) $250\cdot mA$ $25\cdot mA$ $0.6\cdot ms$ $1.667\cdot kHz$

6. $v(t) := 6\cdot V\cdot\cos(1047\cdot t - 90\cdot deg) + 3\cdot V$

7. It carries information 8. No, you say why

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