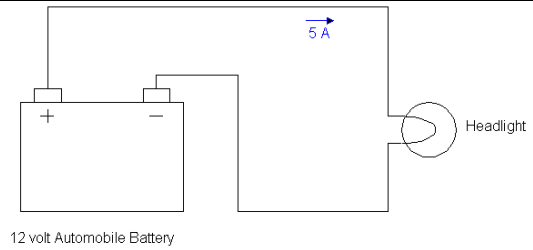
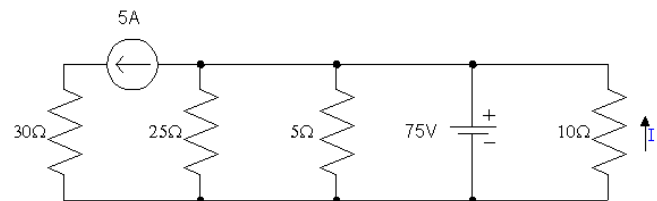


- 1) How much energy is delivered to the headlight if it is left on overnight for 8 hours? Express your answer in kW-hours.



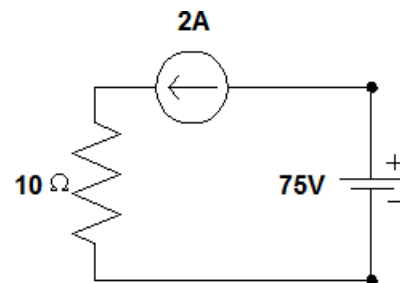
- 2) Find I in the circuit on the right:



- 3) How much total current is provided by the 75 V source for the circuit shown in Prob 2?

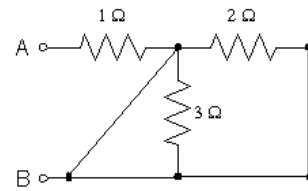
- 4) What is the Voltage change across the 5A current source for the circuit in Prob 2? Reference + to the head of the current arrow, and - to the tail.

- 5) For the circuit on the right, what is the power associated with the current source and the voltage source and indicate whether each is absorbing or releasing power.

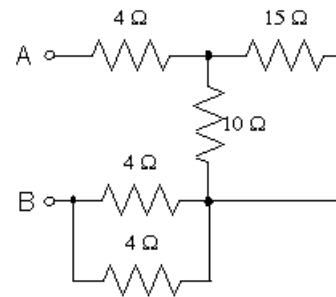


6) What is the power associated with the resistor for the circuit in Prob 5?

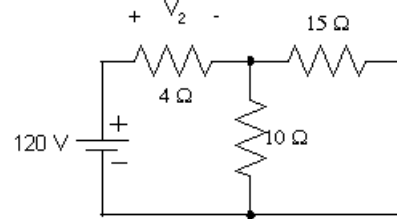
7) What is the equivalent resistance from A to B?



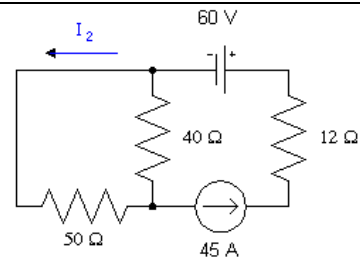
8) What is the equivalent resistance from A to B?



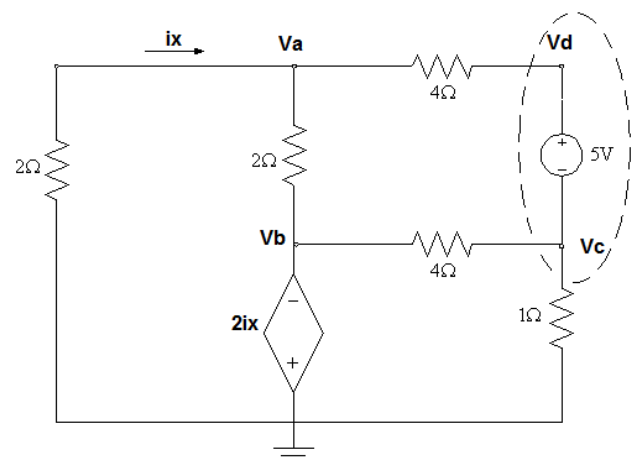
9) Use the Voltage Divider Formula to find V_2

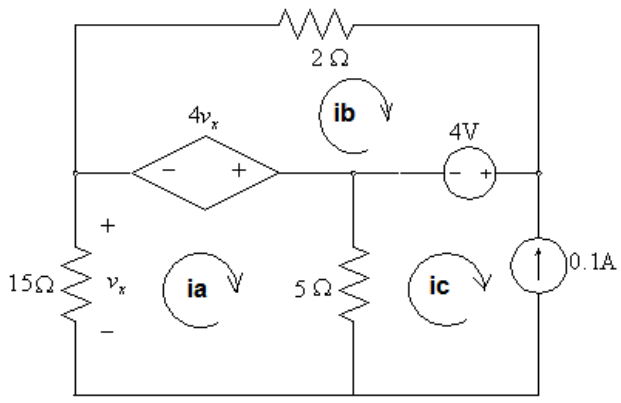
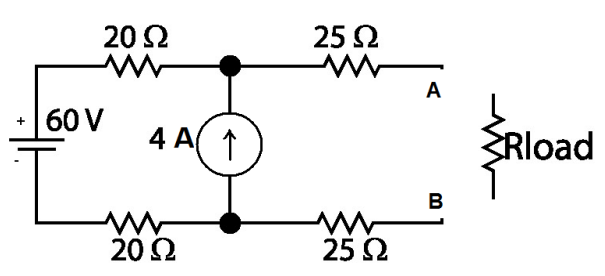


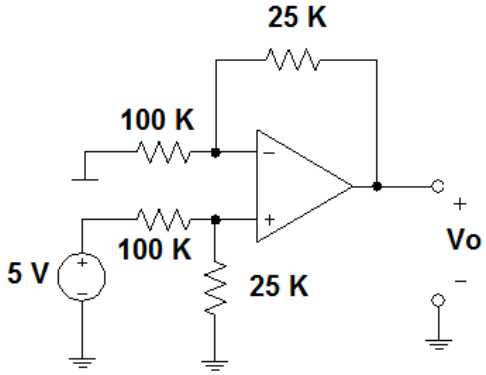
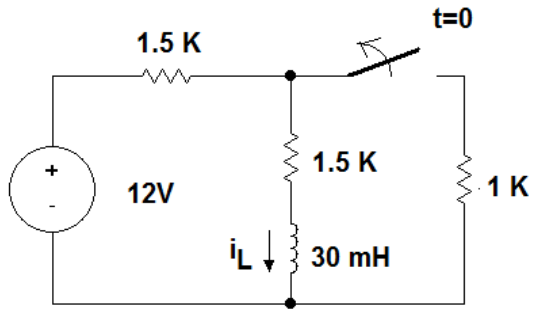
10) Use the Current Divider Formula to find I_2



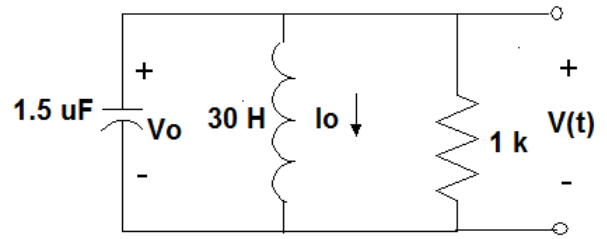
11) Write the Node Voltage Equation for the V_a node in terms of V_a , V_d , and V_b (ignore the supernode and i_x for now):



<p>12) Express V_d in terms of V_c in the circuit for prob 11, in other words, $V_d = V_c + \underline{\hspace{2cm}}$</p>	<p>13) Write the Node Voltage Equation for the Supernode shown in the above circuit:</p>
<p>14) Express i_x in terms of V_a for the circuit in #11</p>	<p>15) Substitute your answer for 14) for i_x in the dependent source to arrive at an expression for V_b in terms of V_a:</p>
<p>16) For the Mesh Current circuit on the right, express V_x in terms of i_a:</p>	
<p>17) Express the mesh equation for Mesh A without using V_x (substitute answer for #16):</p>	<p>18) Express the mesh equation for Mesh B without using V_x (substitute your answer for #16)</p>
<p>19) By inspection, what is the current i_c?</p>	
<p>20) What is the Thevenin Voltage of the Circuit shown:</p>	

<p>21) What is the Thevenin Resistance of the circuit from Problem 20?</p>	<p>22) What value of R_{load} will result in maximum power transferred to the load resistor?</p>
<p>23) What is the value of V_+ at the Op-Amp input?</p>	
<p>24) Assuming the Op-amp is in its linear range, what is the value of V_- ?</p>	<p>25) Still assuming linearity, what is the output voltage V_o?</p>
<p>26) For the circuit at right, prior to $t=0$ the switch has been closed a long time. What is the resistance seen by the 12V supply before the switch opens?</p>	
<p>27) What is the current through the inductor before the switch opens?</p>	<p>28) What is the final value of current through the inductor after the switch has been open a long time?</p>
<p>29) What is the time constant for the R-L circuit after the switch opens?</p>	<p>30) Write the equation for inductor current as a function of time</p>

31) For the parallel RLC circuit shown, find α , ω_0 , s_1 , and s_2



32) Is the circuit over, under or critically damped?

33) If $V_o = 10V$ and $i_o = 2 \text{ mA}$, calculate v , and dv/dt at $t=0^+$

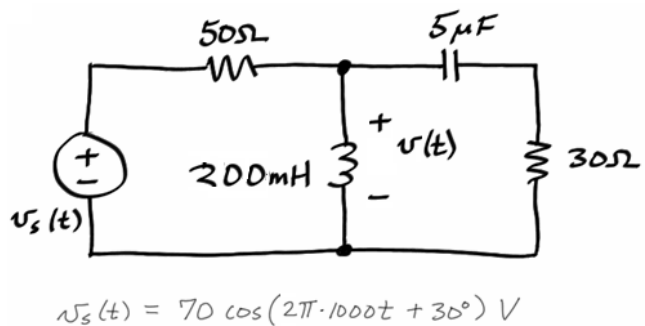
34) Suppose $v(t) = 220\cos(50t - 67^\circ)$ volts

- What is the radian frequency, ω in Rad/sec?
- What is the frequency in Hz?
- What is the period, T ?
- What is the rms value of $v(t)$?

35) Complex Math

- Convert $50 - 45j$ to polar form
- Convert $30/\underline{25}$ to rectangular form
- Calculate $(25/\underline{-60}) / (40 + 10j)$ in phasor form:

36) For the AC circuit to the right, find Z_c and Z_L



37) Find the equivalent impedance of the parallel portion of the circuit in problem 36:

38) Find an expression for the phasor voltage V across the 10 mH inductor:

39) Convert your answer to 38) into the time domain:

40) If the current into a load is $I = 40 \angle 35^\circ$ and the Voltage is $V = 10 \angle -20^\circ$,

Determine the:

- a) Average power P :
- b) Reactive power Q :
- c) Complex Power S :

41) A 3 phase Y-source has phase voltages:
 $V_{an} = 120 \angle 50^\circ$, $V_{bn} = 120 \angle 170^\circ$, $V_{cn} = 120 \angle -40^\circ$
Find the line voltages V_{ab} , V_{bc} , and V_{ca}

42) Write the mesh equation ONLY for mesh 2 in the transformer circuit on the right:

