1. Solve the following simultaneous equations for i_1, i_2, and i_3:

$$5(i_1+i_2)+(2i_2-i_3-4i_3)-20=0$$

$$-3(i_1+i_2)+2(3i_3)=0$$

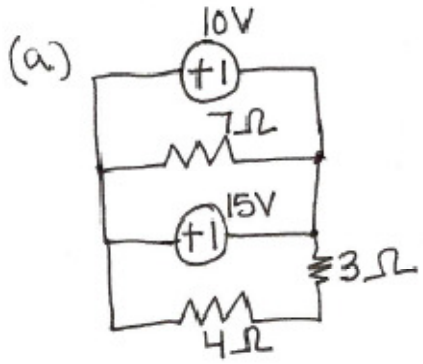
$$-5+i_1-2i_2=0$$

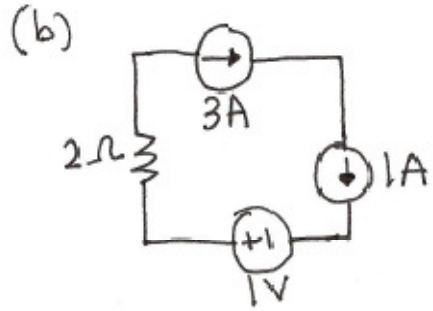
2. Perform the following calculations. Write the answers with appropriate prefixes (such as µ, m, k etc.) for engineering untis:

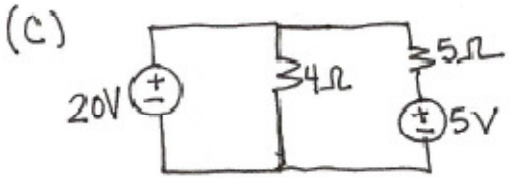
a) $P=5\,\mu A\times 6\,GV$ (Note: V*A=W)

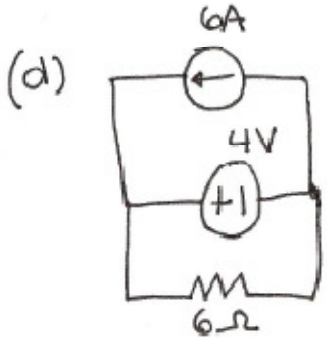
b) $R=5.1\,k\Omega+160\Omega$

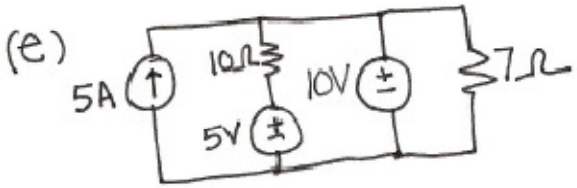
3. Determine whether each of the following circuits is valid or invalid.



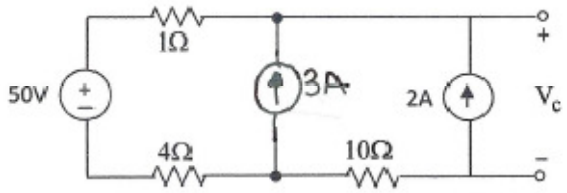




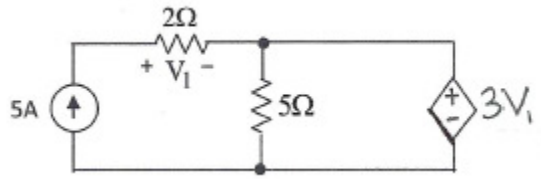




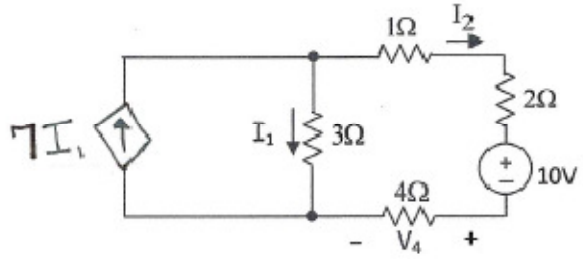
4. Use Kirchoff's laws and Ohm's Law to find the value of Vc. Note that it is also the voltage across the 2A current source.



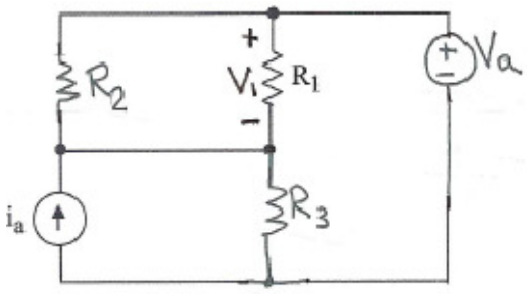
5. Use Kirchoff's laws and Ohm's Law to find the current through the 5Ω resistor. The current source is not ideal and so will have a voltage drop across it.



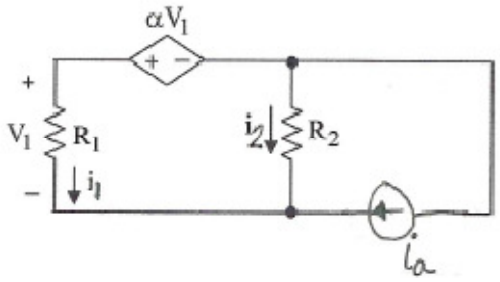
6. Use Kirchoff's laws and Ohm's Law to find I_2 and V_4 in the circuit below.



7. Use Kirchoff's laws and Ohm's Law to find the expression for V_1. The expression can contain no other parameters than V_a, i_a, R_1, R_2, and/or R_3.

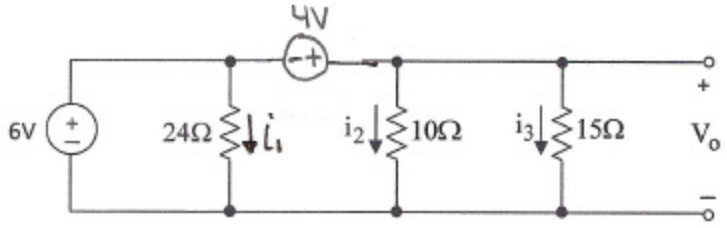


8. Use Kirchoff's laws and Ohm's Law to find the expression for i_1. The expression can contain no other parameters than i_a, α, R_1, and/or R_2. (Hint: Eliminate V_1 from the expression)



9. (a) Find i_1, i_2, i_3, and v_o.

(b) Find the power dissipated in the 24Ω resistor and the power supply.



10. Find i_1, i_2, i_3, and v_o.