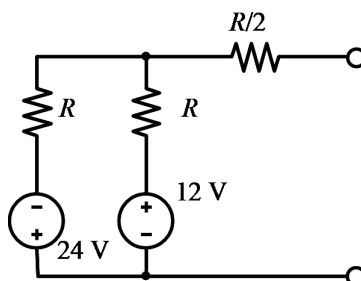


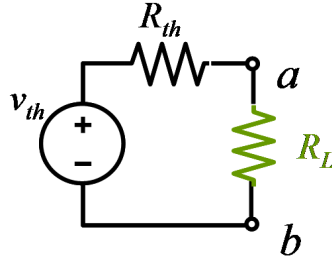
Basic Electronic Circuits Fall 2007 Test 1

1. In a metal conductor are the charge carriers (a) protons, (b) electrons, or (c) neutrons? (5 points)
2. If CV has units of charge (Coulomb) and V/R has units of current (Ampere), then what are the units of RC ? (5 points)
3. It is easy to show how resistances in series combine by using (KVL or KCL, *choose one*) and how resistances in parallel combine by using (KVL or KCL, *choose one*). (5 points)
4. A light bulb sees a 3-A current for 15 seconds. The light bulb generates 3 kJ of energy in the form of light and heat. What is the voltage drop across the light bulb? (5 points)
5. How much energy does a 75-W light bulb consume in six hours? (5 points)
6. Find the Thévenin equivalent resistance of the circuit below. (5 points)

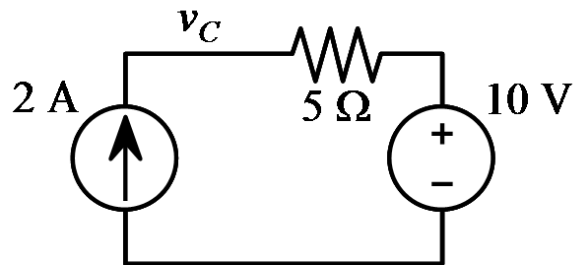


7. Find the magnitude of the Norton equivalent current for the circuit above with $R = 2\ \Omega$. (5 points)
8. Given capacitors of $2\ \mu\text{F}$ and $500\ \text{nF}$, find the total capacitance if the capacitors are in series and if they are in parallel. (5 points)
9. Kirchoff's Voltage law is based on the conservation of _____. Kirchoff's Current law is based on the conservation of _____. (5 points)
10. Draw the circuit diagram of a Wheatstone bridge. Show the supply voltage and the voltmeter. (5 points)

11. Find the current flowing through the load resistor in the following Thévenin equivalent circuit with $V_{th} = 5 \text{ V}$, $R_{th} = 20 \text{ } \Omega$ and $R_L = 80 \text{ } \Omega$. (5 points)

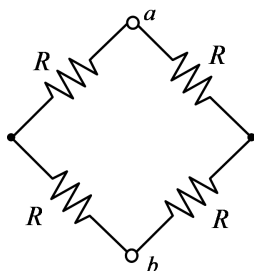


12. Find the value of the load resistor above, using the parameters in the previous problem, that will maximize the power transferred to the load. (5 points)
13. Find the voltage v_C in the circuit below. (5 points)

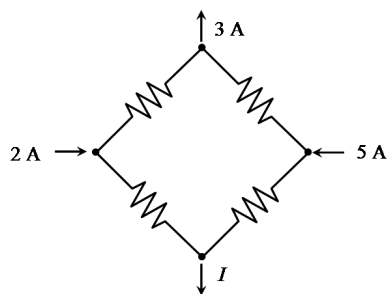


14. Find the power for each element in the circuit above. Which elements are absorbing power? (5 points)
15. If you zero out an ideal voltage source, you create a _____ circuit. If you zero out an ideal current source you create a _____ circuit. (5 points)
16. Give an example of a conductor material, an insulator material, and a semiconductor material. (5 points)
17. Does the human body conduct current? (5 points)

18. Find the resistance between the points a and b . (5 points)



19. Find the current I in the circuit below (assume all resistors are equal). (5 points)



20. How much energy is stored in a $50\ \mu\text{F}$ capacitor charged to 20 V ? (5 points)