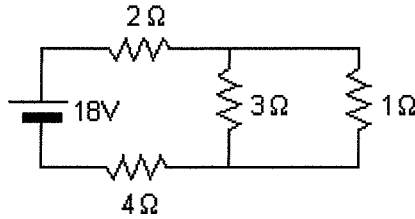
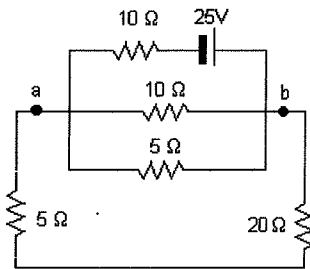


Physics 111 Homework Set #10

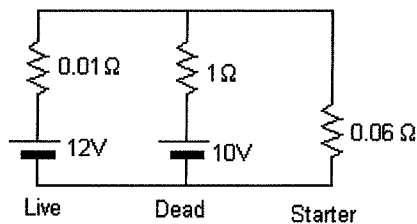
- 1) A typical fresh AA dry cell battery has an emf of 1.5V and an internal resistance of 0.311Ω . (a) Find the terminal voltage of the battery when it supplies 58mA to a circuit. (b) What is the resistance of the external circuit?
- 2) You need a 45Ω resistor, but the storeroom only has 20Ω and 50Ω resistors. How can the desired resistance be obtained under the circumstances? What can you do if you need a 35Ω resistor?
- 3) Calculate the power dissipated in each of the resistors for the circuit shown.



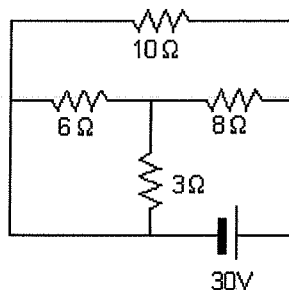
- 4) Consider the circuit shown. Find (a) the current in the 20Ω resistor and (b) the potential difference between a and b.



- 5) A dead battery is charged by connecting it to the live battery of another car. Determine the current in the starter and in the dead battery.



- 6) Calculate (a) the equivalent resistance of the network, (b) the current through the battery and (c) the current in the 6Ω resistor.



- 7) At $t=0$, an uncharged capacitor C is connected through a resistor R to a constant emf ϵ . (a) How long does it take for the capacitor to reach one half of its final charge? (b) How long does it take for the capacitor to reach its final charge?
- 8) A capacitor in an RC circuit is charged to 60% of its maximum value in 0.9 s. What is the time constant for the RC circuit?
- 9) A 1000 W toaster, an 800W microwave oven and a 500 W coffee pot are all plugged into the same 120 V outlet. If the circuit is protected by a 20 A fuse, will the fuse blow if all three of these appliances are used at once?
- 10) When two unknown resistors are connected in series with a battery, 225 W of power is dissipated with a total current of 5.0 A. For the same total current, 50 W is dissipated when the resistors are in parallel. Determine R_1 and R_2 .
- 11) Consider the circuit shown. (a) Calculate the current in the 5Ω resistor. (b) What is the power dissipated by the entire circuit? (c) What is the potential difference between a and b?

