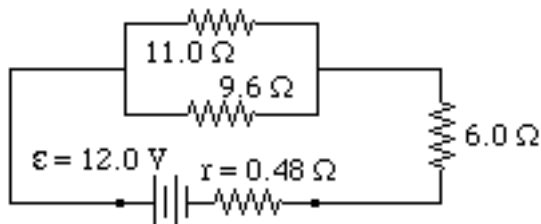# PHYSICS 12 CIRCUITRY WORKSHEET 5

1. The diagram below shows a circuit containing a battery with an EMF of 12.0 V and an internal resistance of 0.48 Ω.


   a) What is the current through the battery?
   b) What is the terminal voltage of the battery?

2. A battery has an EMF of 12.5 V. When a current of 35 A is drawn from it, its terminal voltage is 11.45 V. What is the internal resistance of the battery?

3. A dry cell with an EMF of 1.5 V and an internal resistance of 0.050 Ω is "shorted out" with a piece of wire of resistance only 0.20 Ω. What will a voltmeter read if it is connected to the terminals of the dry cell at this time?

4. Determine the value of R in the circuit below, if the current through the battery is 5.0 A.
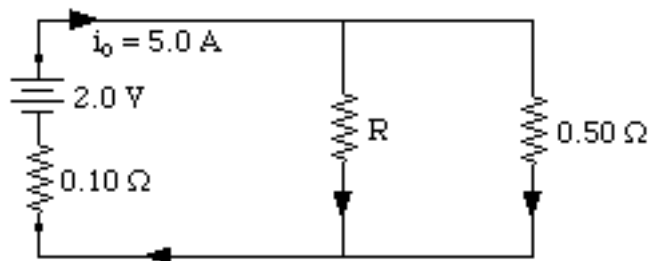
5. In the following diagram, the battery has an EMF of 9.0 V and an internal resistance of 0.50 Ω.
   a) What current does it supply?
   b) What is the total power dissipated by the circuit?
   c) What is the terminal voltage of the battery?
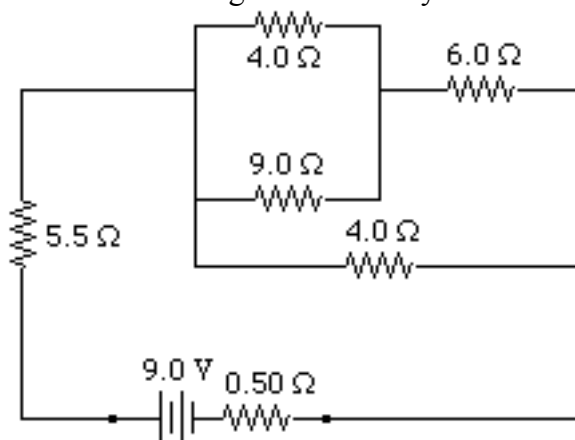
6. Given an EMF of 9.0 V and an internal resistance of 0.50 Ω in the following diagram, determine:
   a) the current supplied by the battery.
   b) the terminal voltage.
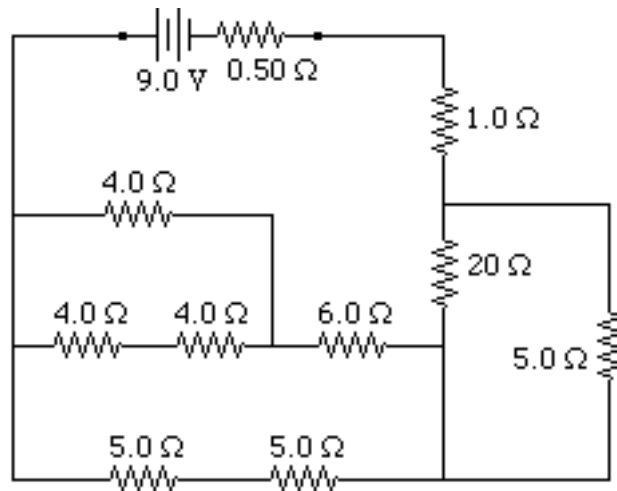
7. In the following circuit, when K_1 is closed and K_2 open, the voltmeter (which has a very high resistance) reads 12 V. However, when K_1 is open and K_2 closed, the voltmeter reads 16 V.
   a) Calculate the EMF and internal resistance of the power supply.
   b) Calculate the voltmeter reading if both switches are closed.
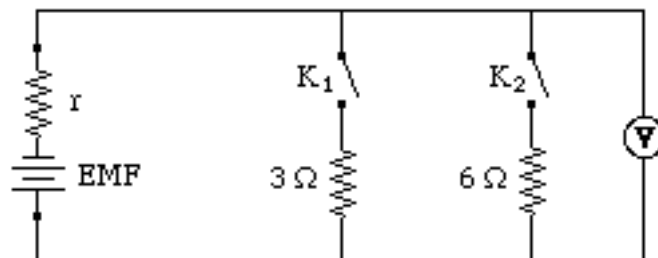
1. a) 1.03 A b) 11.5 V   2. 0.030 Ω   3. 1.2 V   4. 0.75 Ω   5. a) 1.03 A b) 8.7 W c) 8.5 V   6. a) 0.89 A b) 8.6 V
7. a) 24 V, 3.0 Ω b) 9.6 V