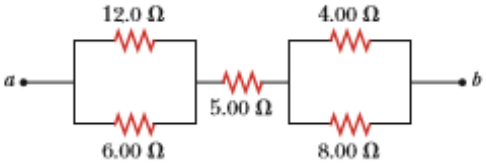
BTU1113 PHYSICS : ASSIGNMENT 3

Chapter 7 & 8 : Electricity & Magnetism

1. Explain how four resistors of value *R* can be combined to produce an equivalent resistance of *R*.

2. A battery with an emf of 1.5 V delivers a current of 0.44 A to a flashlight bulb for 64s. Find
   a) the charge that passes through the circuit.
   b) the work done by the battery.

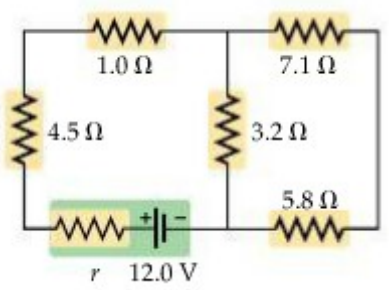
3. Consider the combination of resistors shown below. Find



   a) the equivalent resistance between points a and b.

   b) the current in each resistor if a voltage of 35.0 V is applied between points a and b

4. The circuit in figure below includes a battery with a finite internal resistance, $r = 0.50\ \Omega$.
   a) Find the current flowing through the 7.1Ω and the 3.2Ω resistors.
   b) How much current flows through the battery?
   c) What is the potential difference between the terminals of the battery?
   d) If the 3. 2Ω resistors is increased in value, will the current in the battery increase or decrease? Explain.



5. The electron and proton of a hydrogen atom are separated (on the average) by a distance of approximately 5.3×10^{-11} m. Find the magnitude of the electric force and the gravitational force between the two particles.

6. a) In certain region of space, a uniform electric field has a magnitude of 4.60 × 104 N/C and points in the positive x direction. Find the magnitude and direction of the force this field exerts on a charge of

   i) +2.80 μC

   ii) -9.30 μC

b) A surface encloses the charges q1 = 3.2 μC, q2 = 6.9 μC and q3 = −4.1μC. Find the electric flux through this surface.

7. A 52 mC charged particle moves parallel to a long wire with a speed of 720 m/s. The separation between the particle and the wire is 13 cm, and the magnitude of the force exerted on the particle is 1.4×10^{-7} N. Find

a) the magnitude of the magnetic field at the location of the particle

b) the current in the wire

8. A rectangular coil of dimensions 5.40 cm × 8.50 cm consists of 25 turns of wire and carries a current of 15.0 mA. A 0.350 T magnetic field is applied parallel to the plane of the coil.

a) Calculate the magnitude of the magnetic dipole moment of the coil.

b) Determine the magnitude of the torque acting on the loop.