

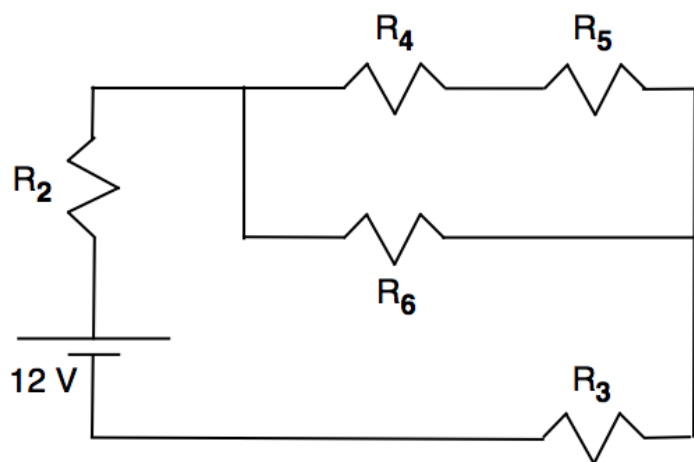
Physics 10164 – Spring 2019 Exam 2A

Partial credit will be given provided you show all work and are solving parts of the problem correctly. Points will be deducted if you don't show your work even if you get the right answer.

Clearly indicate your answer with a circle or a box and remember to include correct units and significant figures.

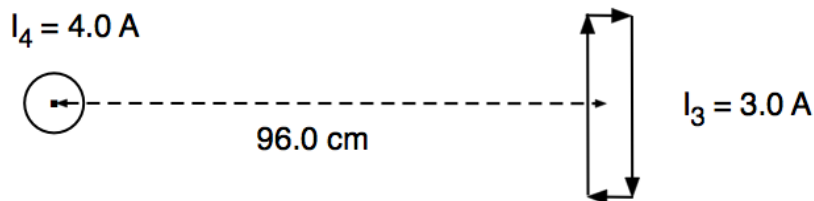
(30 pts) For the circuit below, $R_2 = 2.0\ \Omega$, $R_3 = 3.0\ \Omega$, $R_4 = 4.0\ \Omega$, $R_5 = 5.0\ \Omega$, $R_6 = 6.0\ \Omega$.

- (a) Find the power dissipated by the resistor R_6 .
- (b) If the branch containing R_4 and R_5 were removed from the circuit, what happens to your answer to (a)? Explain.



2. (40 pts) A long straight wire with current I_4 pointing out of the page generates a magnetic field in the vicinity of the rectangular loop shown. Assume the magnetic field in that loop is uniform and equal to the magnitude and direction of the field at the geometric center of the loop, located 96.0 cm away from wire I_4 . The 5.0 cm x 18 cm single-turn rectangular loop is in the plane of the page and contains a clockwise current I_3 .

- a) Determine the magnitude and direction of the magnetic force on (i) the left wire of the loop and (ii) the top wire of the loop.
- b) Determine the magnitude of the torque acting on the loop.
- c) Describe how the loop will rotate in response to the torque.



3. (30 pts) A single turn rectangular loop measures 6.0 cm x 15 cm and is moving in the +x direction with $v = 5.0$ cm/sec. The loop is in a uniform magnetic field of 2.0 Tesla, but it is about to exit the region containing this field. The resistance of the loop is 0.80 Ohms. Assuming we are looking at an instant when the loop is exiting the field while 1/3 of the loop is out of the field and 2/3 of the loop is in the field, find...

- the induced current (magnitude and direction) in the loop.
- the net magnetic force acting on the loop (magnitude and direction).

