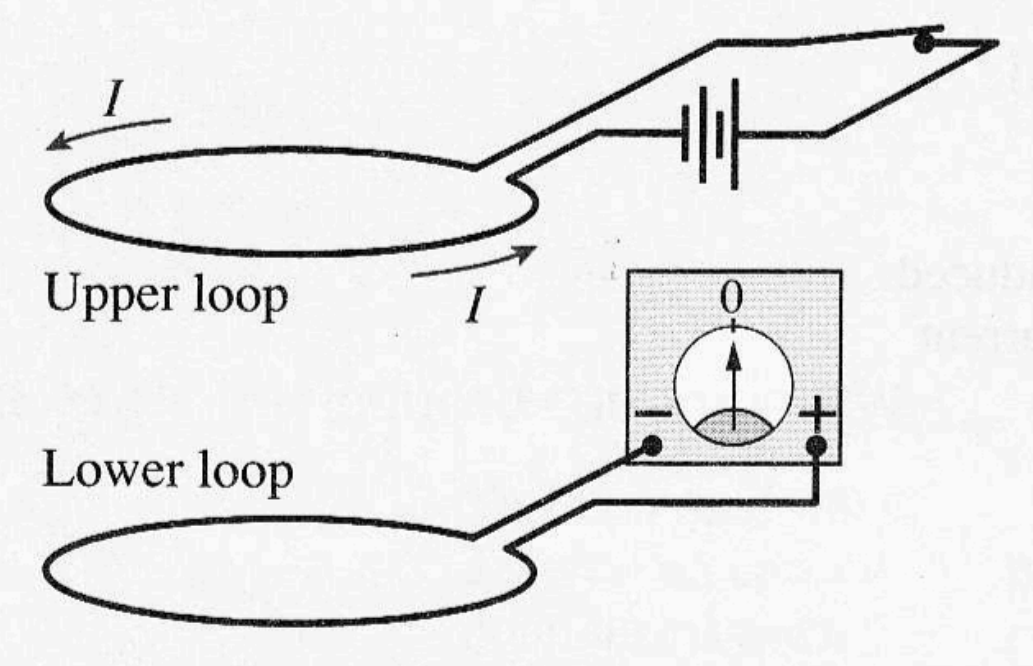
York University
Winter 2013
PHYS 1410 (4/02/13)

Reference/Acknowledgement:
Figures come fro R. Knight (Physics: For Scientists & Engineers)

Ex.1

The figure below shows two loops, one above the other. The upper loop has a battery and a switch that has been closed for a long time. How does the lower loop respond when the switch is opened in the upper loop?



Ex.2

A digital cell phone broadcasts a 0.60 W signal at a frequency of 1.9 GHz. What are the amplitudes of the electric and magnetic fields at a distance of 10 cm, about the distance to the center of the user's brain?

Ex.2

→ Assume cell phone is spherically-symmetric point source

$$I = \frac{P_{source}}{4\pi r^2}$$

informs about how intensity falls of with distance

$$I = \frac{P}{A} = \frac{1}{2c\mu_o} E_o^2 = \frac{c\epsilon_o}{2} E_o^2$$

relates intensity to electric field

$$|E| = c|B|$$

relates electric & magnetic fields

Ex.3

Consider the three circuits shown below. Assume a battery (with potential V_o) was connected to points 1 and 2 (for each circuit) for a long time, then disconnected at t=0. Of the three circuits, which will take the longest to reach 10% of its initial current? Precisely how long will that take and what will be the current at that time?