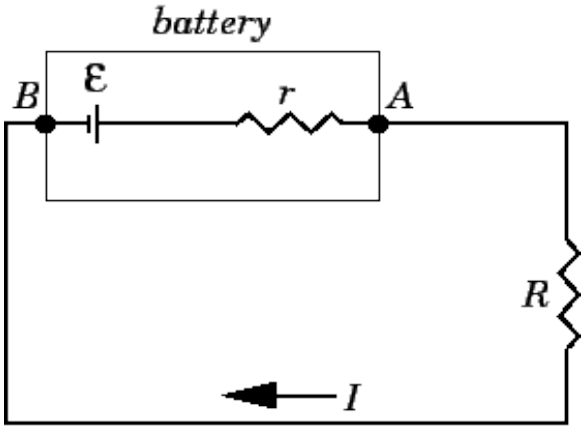
P3323 quiz9-3
October 24, 2016

A battery of emf $\mathcal{E}$ and internal resistance r is hooked up to a variable "load" resistance, R. If you want to deliver the maximum possible power to the load, what resistance R should you choose? (You can't change $\mathcal{E}$ and r.)



1. What is **H** in the region between the tubes?

   A)

   $R = 0$

   B)

   $R = \infty$

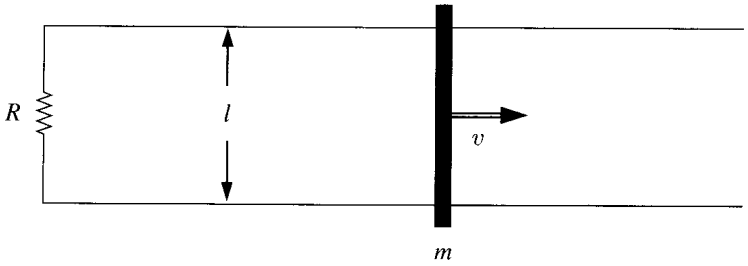
   C)

   $R = 10\Omega$

   D)

   $R = r$

A metal bar of mass m slides frictionlessly on two parallel conducting rails a distance l apart. A resistor R is connected across the rails and a uniform magnetic field $\mathbf{B}$, pointing into the page, fills the entire region.



2. If the bar moves to the right at speed v, what is the current in the resistor?

A)

$$I = \frac{Bv}{R}$$

B)

$$I = 0$$

C)

$$I = Blv$$

D)

$$I = \frac{Blv}{R}$$

3. In what direction does the current flow?

   A) clockwise

   B) counterclockwise

   C) Not enough information

4. What is the magnetic force on the bar?

A)

$$F_{mag} = \frac{B^2 v l}{R}$$

B)

$$F_{mag} = \frac{B v l^2}{R}$$

C)

$$F_{mag} = \frac{B^2 v l^2}{R}$$

D)

$$F_{mag} = 0$$

5. What is the direction of the magnetic force on the bar?

   A) to the left

   B) to the right

   C) there is no force