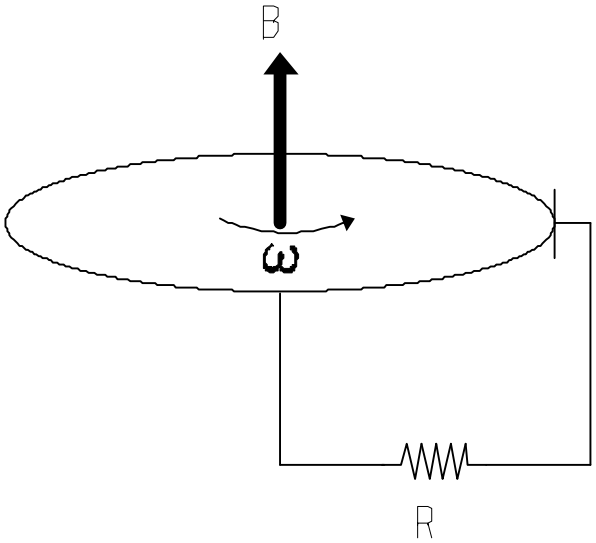
Problem 1. Consider the rotating disk shown at the right. The disk is made of conducting material, has a radius of *a*, and rotates with an angular velocity of *w* in a magnetic field of ***B*** as shown.



- Which way does current flow through the resistor and why?
- What is the induced EMF in this circuit?
- If w = 10 rad/sec, R = 10Ω, B = 5 Tesla, a = 10 cm, what current flows through the circuit?

Hint: Faraday's Law doesn't work here because there is no *change* in magnetic flux.

$e = vBl$

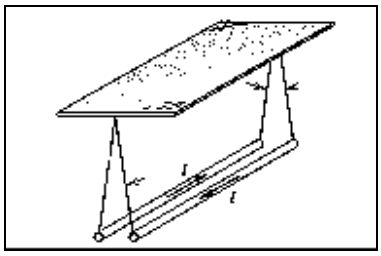
Since ***B*** is constant

$$e = B\int vl = B\int_0^a wrdr = Bw\int_0^a rdr = \frac{1}{2}Bwa^2$$

Answers:

- R to L
- 0.25 volts
- 25 mA

Problem 2. The sketch below shows two long conducting wires of mass 1.0 kg/m, suspended on 1 meter long strings. When the wires carry identical currents in the opposite directions, the angle between the strings holding the wires is 20 degrees. What current flows through the wires?



Answer: 1740 Amps