Chapter 21 Test Answers

1.      **A**

The magnet moving downward creates a downward magnetic flux. Using the right-hand rule, we find that the current related to a downward flux flows clockwise.

2.      **C**

The induced emf, http://img.sparknotes.com/content/testprep/bookimgs/sat2/physics/0029/phy.total852.gif, from a bar of length *l* moving along rails at a speed *v* in a magnetic field of magnitude *B* is given by the formula http://img.sparknotes.com/content/testprep/bookimgs/sat2/physics/0029/phy.total853.gif= *vBl*. Since we are given the values for *v*, *B*, and *l*, this is simply a matter of plugging numbers into a formula. Remember that we need to convert to units of meters:

http://img.sparknotes.com/content/testprep/bookimgs/sat2/physics/0005/e=vbl.electro.gif

3.      **A**

Magnetic flux is given by the formula http://img.sparknotes.com/content/testprep/bookimgs/sat2/physics/0029/phy.total854.gif= http://img.sparknotes.com/content/testprep/bookimgs/sat2/physics/0029/phy.total855.gif= *BA* coshttp://img.sparknotes.com/content/testprep/bookimgs/sat2/physics/0029/phy.total856.gif, where *B* is the magnetic field strength, *A* is the area, and http://img.sparknotes.com/content/testprep/bookimgs/sat2/physics/0029/phy.total857.gifis the angle between the magnetic field vector and a vector pointing perpendicular to the area. In this case, the value of http://img.sparknotes.com/content/testprep/bookimgs/sat2/physics/0029/phy.total858.gifis 90º, and since cos 90º = 0, the magnetic flux through the area is zero.

A more intuitive way of thinking about this problem is to see that, since the magnetic field lines pass across the triangle rather than through it, there are no magnetic field lines passing through the area, and so the flux is equal to zero.

4.      **E**

A generator, also called a dynamo, is normally run by a gas-powered motor that rotates a coil in a magnetic field, thereby inducing emf and generating an electric current.





