Quiz.

1. Voltage can be induced in a wire by
   a. moving the wire near a magnet.
   b. moving a magnet near the wire.
   c. changing the current in a nearby wire.
   d. Choices a, b, & c are all true.
   e. None of the above choices are true.

2. A device that transforms mechanical energy into electrical energy is a
   a. generator.
   b. motor.
   c. transformer.
   d. magnet.
   e. None of the above choices are correct.

3. A generator that produces alternating current is called a(n)
   a. motor.
   b. rotor.
   c. armature.
   d. alternator.

4. A transformer actually transforms
   a. voltage.
   b. magnetic field lines.
   c. generators into motors.
   d. All of the above choices are correct.

5. The metal detectors that people walk through at airports operate via
   a. Ohm's law.
   b. Faraday's law.
   c. Coulomb's law.
   d. Newton's laws.

6. Why do signs warn, "DANGER: HIGH VOLTAGE?"
   a. High voltage can kill you.
   b. A large amount of current can kill you.
   c. A large amount of electrical resistance can kill you.
   d. To protect the equipment and not a personal safety issue.

7. If a magnet is pushed into a coil, voltage is induced across the coil. If the same magnet is pushed into a coil with twice the number of loops, then
   a. one half as much voltage is induced.
   b. the same voltage is induced.
   c. twice as much voltage is induced.
   d. four times as much voltage is induced.

8. Electromagnetic induction occurs in a coil when there is a change in
   a. electric field intensity in the coil.
   b. magnetic field intensity in the coil.
   c. voltage in the coil.
   d. Both a and b are correct.

9. The magnetic field strength inside a current-carrying coil will be greater if the coil encloses a
   a. vacuum.
   b. wooden rod.
   c. glass rod.
   d. rod of iron.

Answer Key.

1. d)

In a, b, and c, the magnetic field is changing relative to the wire, so electromagnetic induction will create a voltage difference across the wire.

2. a)

A generator transforms mechanical energy into electrical energy. (A motor is similar to a generator, but it converts electrical energy into mechanical energy.)

3. d)

Alternators are generators that produce alternating current. The rotor is the part of the alternator that generates a moving magnetic field, and the armature is the part of the alternator that contains the wires where current is induced.

4. a)

Transformers increase or decrease voltage. For example, a step-down transformer is used to lower the voltage of alternating current before converting it into direct current to be used in your household appliances.

5. b)

Metal detectors operate using electromagnetic induction and detect metal, but usually only when the metal is moving or if the detector is moving, because it only works when there is a change in magnetic flux. (The current may also be varied, but it is usually not required.)

6. b)

Current can kill you, not voltage, but in order for current to flow in a circuit a voltage difference is required, and the greater the voltage difference (the higher the voltage) the greater the current.

7. c)

The number of loops in a coil of wire is directly related to the amount of electromotive force or voltage induced.

8. b)

Only the change of magnetic field intensity may cause electromagnetic induction.

9. d)

Iron has the most magnetic domains of the choices.