

Chapter 37 Test Electromagnetic Induction

True or False Questions*Circle the correct answer.*

- T** **F** 1. Underlying the operation of an electric motor is a current-carrying wire that is rotated when in a magnetic field.
- T** **F** 2. Step-up transformers can be used to get more energy out of them than is put into them.
- T** **F** 3. Almost all energy today is sold in the form of DC current because of the ease with which it can be transported from one place to another.
- T** **F** 4. An electric field is induced in any region of space where a magnetic field is changing with time.
- T** **F** 5. An electromagnetic wave consists of an electric field vibrating at right angles to another electric field.

Multiple Choice Questions*Choose the best answer to each question and write the appropriate letter in the space provided.*

- _____ 6. A magnet is moved in and out of a coil of wire connected to a high-resistance voltmeter. If the number of coils doubles, the induced voltage
- a. quadruples.
 - b. doubles.
 - c. is the same.
 - d. halves.
- _____ 7. A magnet is moved in and out of a coil of wire connected to several lamps. If the number of coils is doubled,
- a. it is easier to move the magnet.
 - b. it is harder to move the magnet.
 - c. there is no difference in moving the magnet.
- _____ 8. The phenomenon of inducing voltage by changing the magnetic field around a conductor is called
- a. generated voltage.
 - b. Faraday's induction.
 - c. transformer induction.
 - d. electromagnetic induction.
- _____ 9. A device consisting of a coil that is mechanically rotated in a stationary magnetic field is called
- a. a transformer.
 - b. a motor.
 - c. a generator.
 - d. a dipole.

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- _____ 10. A generator is used to light a bulb. Energy for lighting the bulb actually comes from a
- coil of wire.
 - mechanical input to the generator.
 - magnet in the generator.
 - plug where the generator is connected to the wall.
- _____ 11. A device that uses two coils around an iron core to change the voltage across a circuit is called a
- voltmeter.
 - diode.
 - transformer.
 - generator.
- _____ 12. The primary coil of a transformer has 100 turns on it and the secondary coil has 50 turns on it. This is
- a step-up transformer.
 - a step-down transformer.
 - either of the above depending on relative input and output currents
- _____ 13. The voltage across a transformer primary coil that has 100 turns is 10 V. What is the voltage across the secondary coil, which has 20 turns?
- 100 V
 - 20 V
 - 10 V
 - 5 V
 - 2 V
- _____ 14. If a transformer increases AC voltage, it will also increase
- power.
 - energy.
 - magnetic field strength.
 - none of the above
- _____ 15. In a vacuum, electromagnetic waves travel at speeds
- greater than the speed of light.
 - equal to the speed of light.
 - less than the speed of light.

Essay Question

On a separate sheet of paper, answer the following question.

16. State Faraday's law, explain what it means, and cite its use in detecting weapons at airports.