

## What Is Electricity

To the ancients, electricity meant many things. They had no idea that there was any relationship between electricity and magnetism. They saw lightning, but did not appreciate how it was caused. They knew that a certain fish called an "electric eel" could give a powerful electric shock; indeed, Roman emperors were subjected to this as a cure for rheumatism. The Greeks knew that the fossil resin called elektron, from which our word "electricity" was derived, became electrified when rubbed. They also knew that a dark-colored mineral found at Magnesia had the properties of attraction and repulsion which we now call magnetic.

However, all this was some time ago, and we now believe that we have an answer to the question "What is electricity?" Electricity is an invisible force that can produce heat, light, motion, and many other physical effects. The force is an attraction or repulsion between electric charges. Electricity is generated at large power stations by big machines known as generators. They are, in fact, large dynamos driven by powerful engines which derive their power from water or steam. The electricity which derives its power from water is known as hydroelectricity.

Electricity can also be explained in terms of current, voltage, and resistance. The flow of electricity, the electric current, along a wire may be compared to the flow of water along a pipe. If you consider water flowing along a pipe, the volume of water passing a certain point in a given time is similar to the electric current. Electric current is measured in amperes. The pressure of the water in the pipe may be compared to the electric potential. Potential is measured in volts. The resistance of the walls of the pipe to the water current may be compared to the resistance of the wire to the electric current, i.e. a narrow pipe offers more resistance than a wide pipe, and, similarly, a thin wire offers more resistance than a thick wire of the same metal. Resistance is measured in ohms.

A. Read each statement and decide whether it is true or false. Write "T" before true statements and "F" before false statements

1. .... Electricity is the force generated by big machines.
2. .... The word "elektron" is derived from the word "electricity."
3. .... Hydroelectricity is the production of electricity by water power.
4. .... The attraction and repulsion characteristics of a mineral called magnetic properties.
5. .... The ancients had no ideas at all about electricity.

B. Circle a,b,c, or d which best completes the following items.

1. Generators transform .....
  - a. chemical energy into mechanical energy
  - b. electrical energy into mechanical energy
  - c. chemical energy into electrical energy
  - d. mechanical energy into electrical energy
2. It is not true that .....
  - a. Roman emperors very often experienced the electric shock given by an eel to cure rheumatism
  - b. electric potential is the same as the pressure of water in a pipe
  - c. a thin wire offers more resistance than a thick wire of the same metal
  - d. Roman emperors were unaware of electricity and its effect on rheumatism.
3. In line 11, "this" refers to .....
  - a. a dark-colored mineral found at Magnesia
  - b. the electron being electrified when rubbed
  - c. the fact that ancient people did not know much about electricity
  - d. properties of attraction and repulsion.
4. In paragraph 3, the writer does not compare .....
  - a. flow of water and flow of electricity
  - b. resistance of the walls of a pipe to water and resistance of a wire to electric current

- c. volume of pipes and volume of wires
  - d. pressure of water and electric potential
5. The contrast in paragraphs 1 and 2 is between .....
- a. the relationship between lightning and magnetism on the one hand and electricity on the other
  - b. the past and present knowledge of electricity
  - c. electricity produced by nature and electricity generated by machines
  - d. static electricity and hydroelectric current

C. Answer the following questions orally.

1. What is electricity?
2. What do we call the force which is the result of attraction or repulsion between electric charges?
3. What important quantities are involved in the description of electricity?
4. How does water power lead to electricity?
5. What is the relationship between electricity and magnetism?
6. How is hydroelectricity defined?
7. How do you explain electric current, electric potential, and electric resistance?

9. If we ..... an iron bar, the quality of attracting pieces of iron will be found at two regions at the ends of the bar.
10. Accurate ..... is essential for making good quality machines and parts.
11. The ..... lands of Iran are mostly located in the Northern part of the country.
12. Scientists are experimenting on cars that run .....

**B. Fill in the blanks with the appropriate words from the list below. There are more options than required.**

field	repel
current	magnet
electrical	electrons
resistance	positive
attraction	potential
properties	element

1. Unlike poles attract whereas like poles ..... one another.
2. If there is a potential difference between the ends of a conductor, a ..... will flow along it.
3. The magnetic ..... increases with an increase in the current.
4. Resistors are devices whereby ..... is interposed in a circuit.
5. Generally speaking, mixtures of metals containing a magnetic substance have magnetic .....
6. The magnetic force of ..... is concentrated near the ends of the magnet.
7. Generators are machines used for the large-scale production of ..... energy.
8. A substance which is attracted by a magnet can itself be made into a .....

C. Match the words in Column I with their appropriate equivalents in Column II. Insert the letters a, b, c... in the parentheses provided. There are more options in Column II than required.

<u>Column I</u>	<u>Column II</u>
1. electromagnetism ( )	a. work got out of a machine <u>divided</u> by the work put in
2. efficiency ( )	b. cause to exist or occur; produce
3. magnetization ( )	c. multiplying by two
4. loop ( )	d. science of the properties and relations between magnetism and electric currents
5. electrify ( )	e. process of turning a piece of magnetic material into a magnet
6. generate ( )	f. charge something with electricity
7. kinetic ( )	g. made into liquid by heat
	h. <u>due</u> to motion; moving
	i. of magnets
	j. simple closed connection; part of a circuit

Section Two:

Grammatical Exercises

A. Do the following exercises according to the explanations given in the Pre-reading Part. Write your sentences in the spaces provided.

1. a. He bought the watch.  
The watch was made **in Switzerland.** (know)
- b. ....
2. a. She heard the noise.  
The noise was made **by a tractor.** (realize)
- b. ....

Section One:Vocabulary Exercises

A. Fill in the blanks with the words from the following table to complete the sentences. Base your choices on the items of the table only. Make necessary changes if required.

Verb	Noun	Adjective	Adverb
electrify	electricity	electric	electrically
magnetize	magnet	magnetic	magnetically
produce	production	productive	productively
measure	measurement	measurable	measurably

1. In some countries agricultural ..... has been mechanized.
2. The standard unit of mass is the kilogram ; however we ..... very small masses in grams.
3. .... currents cannot flow easily in all substances.
4. Iran ..... a large quantity of oil every day.
5. Copper allows ..... to flow easily through it.
6. Of all the metals, iron, cobalt and nickel have the greatest ..... properties.
7. A ..... produces a magnetic field in the space around it.
8. In physics, the researchers came within ..... distance of success.