

For each question, select the best answer from the four alternatives.

- Rabbit fur is above rubber in the electrostatic series. What would happen if rabbit fur were rubbed with a rubber balloon? (11.2) **K/U**
  - The rabbit fur and the balloon would become positively charged.
  - The rabbit fur and the balloon would become negatively charged.
  - The rabbit fur would take on a positive charge, and the balloon would take on a negative charge.
  - The rabbit fur would take on a negative charge, and the balloon would take on a positive charge.
- Which of these materials is the best insulator? (11.4) **K/U**
  - aluminum
  - steel wool
  - salt water
  - glass
- A balloon is rubbed on carpet and assumes a charge. The balloon will stick to all of these except (11.6, 11.8) **K/U**
  - a metal door
  - a plaster wall
  - a glass window
  - a wooden cabinet
- Object A has a negative charge. Object A is repelled by object B. Object B is attracted to object C and repelled by object D. Object C is attracted to object D. What are the charges on objects B, C, and D? (11.1, 11.2) **K/U**
  - B, C, and D are all negative.
  - B and D are negative, and C is positive.
  - B is negative, and C and D are positive.
  - B and D are positive, and C is negative.
- Metal ball A has a charge of +8, and metal ball B has a charge of +2. What will the charges on the balls be after they come in contact while remaining insulated from their surroundings? (11.1) **T/I**
  - A +2, B +8
  - A +2, B -4
  - A +5, B +5
  - A +8, B -6

Indicate whether each of the statements is TRUE or FALSE. If you think the statement is false, rewrite it to make it true.

- Oppositely charged objects are attracted to each other. (11.1) **K/U**
- In the electrostatic series, materials are arranged in order of their electrical conductivity. (11.2) **K/U**
- Electricians use tools with metal handles for safety. (11.4) **K/U**

Copy each of the following statements into your notebook. Fill in the blanks with a word or phrase that correctly completes the sentence.

- The charge on an object changes when atoms within the object gain or lose \_\_\_\_\_ . (11.1) **K/U**
- When a charged object loses its charge by making contact with a large neutral object such as Earth, the process is called \_\_\_\_\_ . (11.8) **K/U**
- Water that contains impurities conducts electricity because \_\_\_\_\_ carry the charge. (11.4) **K/U**

Match each term on the left with the most appropriate description on the right.

- |                   |   |
|-------------------|---|
| 12. (a) electron  | (i) a term describing charges on objects that are fixed, rather than flowing as a current |
| (b) electroscope  | (ii) a material that prevents the flow of electrical current                              |
| (c) electrostatic | (iii) a particle with a negative electrical charge  |
| (d) induction     | (iv) a device used to demonstrate static charges  |
| (e) insulator     | (v) the process of charging an object from a distance (11.1, 11.2, 11.4, 11.6) <b>K/U</b> |

Write a short answer to each of these questions.

13. Explain what, on an atomic level, causes the buildup of an electrostatic charge. (11.1) **K/U**
14. Why are electrical wires coated with rubber or plastic? (11.4) **K/U**
15. Imagine you are installing lightning rods on a farmer's barn. (11.8)
  - (a) Describe where you would position the rods and why.
  - (b) Describe additional steps you would take to protect the barn from lightning strikes. **T/I C**
16. Suppose you are employed by an electrical company to repair damage to power lines. It is raining and you receive a call from the company to go out and repair a power line that fell down when a tree landed on it. Describe what you would wear on your hands and feet as you repaired the fallen power line. Justify your answer. (11.4) **T/I C**
17. You are performing an experiment with an electroscope (Figure 1).

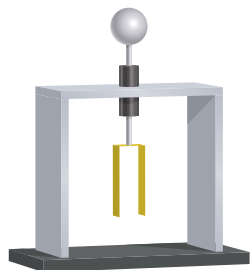


Figure 1

- (a) Describe how you would charge the electroscope, and explain how you would know if you were successful.
- (b) Describe how you would discharge the electroscope, and explain how you would know if you were successful. (11.1, 11.2, 11.6, 11.8) **T/I C**

18. Figure 2 shows three balls hanging from strings. Redraw the diagram to show how the balls would hang if the centre ball and the left ball were positively charged and the ball on the right were negatively charged. Use the symbols “+” and “-” to mark the charge of each ball. (11.1, 11.3) **T/I C**

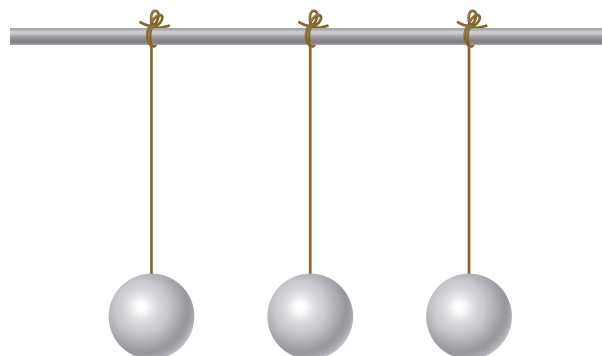


Figure 2

19. Using a diagram, explain how lightning occurs. (11.8) **T/I C**
20. When plastic adhesive tape that is stuck to glass is quickly pulled away, it becomes negatively charged. (11.1, 11.2)
  - (a) Explain what happened to the tape in terms of electrons and protons. **K/U**
  - (b) Explain what happened to the glass in terms of electrons and protons. **C A**
21. Explain why clothes cling to each other after tumbling around in a clothes dryer. (11.2) **C A**
22. Vinyl is near the bottom of the electrostatic series, while glass is near the top of the series. Design an experiment using glass and vinyl to find out where cat fur and hard rubber would be placed in the electrostatic series. (11.2) **T/I A**
23. Explain why trucks carrying flammable materials have what appears to be a metal chain attached to the underside that drags along the ground. (11.8) **A**