

1. Chapter 1-The Foundations of Chemistry Question MC #1

Which of the following statements is **incorrect**?

- a. A body in motion possesses kinetic energy because of its motion.
- b. An object possesses potential energy because of its position or composition.
- c. Nuclear energy is an important kind of potential energy.
- *d. Chemical reactions and physical changes that release energy to their surroundings are endothermic.
- e. The Law of Conservation of Matter and Energy states that the combined amount of matter and energy in the universe is fixed.

2. Chapter 1-The Foundations of Chemistry Question MC #2

A braking automobile converts kinetic energy into heat in the brake pads. This is an example of the:

- *a. law of conservation of energy
- b. law of constant composition
- c. law of conservation of matter
- d. law of multiple proportions
- e. law of gravity

3. Chapter 1-The Foundations of Chemistry Question MC #3

When magnesium is burned in air the mass of the product is heavier than the original mass of the magnesium. However, the product formed still has the same exact mass of magnesium with the remainder of the mass being oxygen. This is an example of:

- a. law of conservation of energy
- b. law of definite proportions
- *c. law of conservation of matter
- d. law of multiple proportions
- e. law of gravity

4. Chapter 1-The Foundations of Chemistry Question MC #4

Which of the following represents matter that could be described as macroscale?

- a. a bromine atom
- b. molecules of water
- c. bacteria observed under a microscope
- *d. a paperclip
- e. none of these

5. Chapter 1-The Foundations of Chemistry Question MC #5

Dalton's Atomic Theory included all of the ideas listed below **except**:

- a. Atoms cannot be created or destroyed.
- *b. An element is composed of very small particles called protons, neutrons and electrons.

- c. All atoms of a given element have identical properties.
- d. All atoms of a given element have properties that differ from those of other elements.
- e. Compounds are formed when atoms of different elements combine with one another in small whole-number ratios.

6. Chapter 1-The Foundations of Chemistry Question MC #6

Atoms consist of three fundamental particles. What are these particles and their charges?

- *a. proton (+1), neutron (neutral) and electron (-1)
- b. proton (-1), neutron (+1) and electron (neutral)
- c. proton (+1), neutron (-1) and electron (neutral)
- d. proton (neutral), neutron (+1) and electron (-1)
- e. proton (-1), neutron (neutral) and electron (+1)

7. Chapter 1-The Foundations of Chemistry Question MC #7

One of the following does not describe gases. Which one is it?

- a. Expands infinitely.
- *b. Rigid shape.
- c. Easily compressed.
- d. Relatively low densities.
- e. Particles far apart.

8. Chapter 1-The Foundations of Chemistry Question MC #8

One of the following does not describe solids. Which one is it?

- a. Particles in definite positions.
- b. Definite shape.
- *c. Easily compressed.
- d. Relatively high densities.
- e. Particles compact.

9. Chapter 1-The Foundations of Chemistry Question MC #9

Which response lists characteristics of liquids?

- I. Volume does not vary much upon heating.
- II. Shape is constant.
- III. Easily compressed.
- IV. Fills the container completely.
- V. Flows.

- a. I, III, IV, and V
- b. II, III, and V
- c. I
- d. I, II, IV, and V

*e. I and V

10. Chapter 1-The Foundations of Chemistry Question MC #10

All of the following are properties of antimony. Which one is **not** a physical property?

- a. It is a solid at room temperature.
- b. It has both yellow and gray forms (allotropes) in the solid state.
- *c. It burns in an atmosphere of chlorine.
- d. It is one of the few substances that expands upon freezing.
- e. The gray form melts at 631°C.

11. Chapter 1-The Foundations of Chemistry Question MC #11

The following properties describe zinc. Which one(s) is (are) **chemical** properties?

- I. It is bluish-white metal.
- II. It corrodes upon prolonged contact with moist air.
- III. Its density is 7.14 g/cm³.
- IV. It melts at 419°C.
- V. It conducts electricity.

- a. IV and V
- b. IV
- c. V
- d. II, IV, and V
- *e. II

12. Chapter 1-The Foundations of Chemistry Question MC #12

All of the following are properties of oxygen. Which one is a **physical** property?

- a. It supports combustion.
- *b. It condenses to a liquid at -219°C and atmospheric pressure.
- c. It causes iron to rust.
- d. It reacts with calcium to produce calcium oxide, CaO.
- e. All of these are physical properties.

13. Chapter 1-The Foundations of Chemistry Question MC #13

The following statements describe some physical and chemical properties of sucrose (table sugar). Which response includes all that describe **chemical** properties, and none that describe physical properties?

- I. It is a colorless solid.
- II. It chars or blackens when heated gently.
- III. Its density is 1.6 g/mL.
- IV. It ignites and burns with a yellow flame when heated strongly.

V. It is usually in the form of small crystals although it can occur as a powder.

- a. I, III, and IV
- *b. II and IV
- c. II, IV, and V
- d. I and V
- e. another combination is the answer

14. Chapter 1-The Foundations of Chemistry Question MC #14
Which of the following is **not** an intensive property of matter?

- a. color
- b. density
- c. melting point
- *d. weight
- e. boiling point

15. Chapter 1-The Foundations of Chemistry Question MC #15
Which of the following is an **extensive** property of matter?

- *a. weight
- b. melting point
- c. specific gravity
- d. color
- e. density

16. Chapter 1-The Foundations of Chemistry Question MC #16
Identify which of the following properties of methane would be observed only with a change in composition.

- a. The melting point is -182.5°C .
- b. The density is $6.67 \times 10^{-4} \text{ g/cm}^3$.
- *c. Carbon dioxide forms when it burns.
- d. The boiling point is -161.5°C .
- e. It dissolves slightly in water.

17. Chapter 1-The Foundations of Chemistry Question MC #17
Which response includes all of the following that involve **chemical** changes, and none that involve physical changes?

- I. converting milk to cheese
- II. converting water to steam
- III. composting leaves
- IV. burning of gasoline
- V. melting wax

- a. II and V
- *b. I, III, and IV
- c. I, II, and III
- d. IV and V
- e. III, IV, and V

18. Chapter 1-The Foundations of Chemistry Question MC #18

Which answer includes all of the following that are **physical changes** and no chemical changes?

- I. the electrolysis of molten sodium chloride to produce metallic sodium and gaseous chlorine
- II. the solidification of mercury by cooling
- III. the reaction of hydrochloric acid with calcium carbonate
- IV. the mixing of water with ethyl alcohol
- V. cutting an iron bar into small pieces

- a. I and III
- *b. II, IV, and V
- c. I and IV
- d. II, III, and V
- e. IV

19. Chapter 1-The Foundations of Chemistry Question MC #19

Which of these physical changes would require the liberation of energy?

- *a. condensation of steam to form liquid water
- b. melting of ice
- c. boiling of water
- d. all of these
- e. none of these

20. Chapter 1-The Foundations of Chemistry Question MC #20

Which of the following changes in water represents a chemical change?

- a. Melting of ice.
- b. Boiling water.
- c. Sublimation of solid ice directly to gaseous water.
- *d. Electrolyzing water to produce hydrogen and oxygen.
- e. Heating water from 25°C to 60°C.

21. Chapter 1-The Foundations of Chemistry Question MC #21

Which answer lists all the substances below that are **compounds** and not any elements or mixtures?

- I. ethanol
- II. neon
- III. bromine