

**Chemistry: The Central Science, 14e (Brown, et al.)**  
**Chapter 1 Introduction: Matter, Energy, and Measurement**

1.1 Multiple-Choice Questions

1) What is the physical state in which matter has a specific volume but does not have a specific shape?

- A) gas
- B) solid
- C) liquid
- D) salts
- E) ice

Answer: C

Diff: 1 Var: 1 Page Ref: Sec. 1.2

LO: 1.2

GO: G2

2) The law of constant composition applies to \_\_\_\_\_.

- A) solutions
- B) heterogeneous mixtures
- C) compounds
- D) homogeneous mixtures
- E) solids

Answer: C

Diff: 1 Var: 1 Page Ref: Sec. 1.2

LO: 1.1

GO: G2

3) A combination of sand, salt, and water is an example of a \_\_\_\_\_.

- A) homogeneous mixture
- B) heterogeneous mixture
- C) compound
- D) pure substance
- E) solid

Answer: B

Diff: 1 Var: 1 Page Ref: Sec. 1.2

LO: 1.1

GO: G2

4) A small amount of salt dissolved in water is an example of a \_\_\_\_\_.

- A) homogeneous mixture
- B) heterogeneous mixture
- C) compound
- D) pure substance
- E) solid

Answer: A

Diff: 1 Var: 1 Page Ref: Sec. 1.2

LO: 1.2

GO: G2

5) Which one of the following has the element name and symbol correctly matched?

- A) S, sodium
- B) Tn, tin
- C) Fe, iron
- D) N, neon
- E) B, bromine

Answer: C

Diff: 1 Var: 1 Page Ref: Sec. 1.2

LO: 1.2

GO: G2

6) Which one of the following elements is identified by the chemical symbol, Al?

- A) tin
- B) aluminum
- C) mercury
- D) copper
- E) lead

Answer: B

Diff: 2 Var: 1 Page Ref: Sec. 1.2

LO: 1.2

GO: G2

7) Which one of the following is often separated into its components by simple techniques such as filtering or decanting?

- A) heterogeneous mixture
- B) compounds
- C) homogeneous mixture
- D) elements
- E) solutions

Answer: A

Diff: 2 Var: 1 Page Ref: Sec. 1.2

LO: 1.1

GO: G2

8) Which states of matter are significantly compressible?

- A) gases only
- B) liquids only
- C) solids only
- D) liquids and gases
- E) solids and liquids

Answer: A

Diff: 1 Var: 1 Page Ref: Sec. 1.2

LO: 1.2

GO: G2

9) For which of the following, can the composition vary?

- A) pure substance
- B) element
- C) both homogeneous and heterogeneous mixtures
- D) homogeneous mixture
- E) heterogeneous mixture

Answer: C

Diff: 2 Var: 1 Page Ref: Sec. 1.2

LO: 1.1

GO: G2

10) If matter is uniform throughout and cannot be separated into other substances by physical means, it is \_\_\_\_\_.

- A) a compound
- B) either an element or a compound
- C) a homogeneous mixture
- D) a heterogeneous mixture
- E) an element

Answer: B

Diff: 2 Var: 1 Page Ref: Sec. 1.2

LO: 1.1

GO: G2

11) An element cannot \_\_\_\_\_.

- A) be part of a heterogeneous mixture
- B) be part of a homogeneous mixture
- C) be separated into other substances by chemical means
- D) interact with other elements to form compounds
- E) be a pure substance

Answer: C

Diff: 2 Var: 1 Page Ref: Sec. 1.2

LO: 1.1

GO: G2

12) Homogeneous mixtures are also known as \_\_\_\_\_.

- A) solids
- B) compounds
- C) elements
- D) substances
- E) solutions

Answer: E

Diff: 1 Var: 1 Page Ref: Sec. 1.2

LO: 1.1

GO: G2

13) The law of constant composition says \_\_\_\_\_.

- A) that the composition of a compound is always the same
- B) that all substances have the same composition
- C) that the composition of an element is always the same
- D) that the composition of a homogeneous mixture is always the same
- E) that the composition of a heterogeneous mixture is always the same

Answer: A

Diff: 1 Var: 1 Page Ref: Sec. 1.2

LO: 1.2

GO: G2

14) Which of the following is an illustration of the law of constant composition?

- A) Water boils at 100 °C at 1 atm pressure.
- B) Water is 11% hydrogen and 89% oxygen by mass.
- C) Water can be separated into other substances by a chemical process.
- D) Water and salt have different boiling points.
- E) Water is a compound.

Answer: B

Diff: 2 Var: 1 Page Ref: Sec. 1.2

LO: 1.2

GO: G2

15) In the following list, only \_\_\_\_\_ is not an example of a chemical reaction.

- A) dissolution of a penny in nitric acid
- B) the condensation of water vapor
- C) a burning candle
- D) the formation of polyethylene from ethylene
- E) the rusting of iron

Answer: B

Diff: 2 Var: 1 Page Ref: Sec. 1.3

LO: 1.3

GO: G2

16) Gases and liquids share the property of \_\_\_\_\_.

- A) compressibility
- B) definite volume
- C) incompressibility
- D) indefinite shape
- E) definite shape

Answer: D

Diff: 1 Var: 1 Page Ref: Sec. 1.2

LO: 1.2

GO: G2

17) Of the following, only \_\_\_\_\_ is a chemical reaction.

- A) melting of lead
- B) dissolving sugar in water
- C) tarnishing of silver
- D) crushing of stone
- E) dropping a penny into a glass of water

Answer: C

Diff: 2 Var: 1 Page Ref: Sec. 1.3

LO: 1.3

GO: G2

18) Which one of the following is not an intensive property?

- A) density
- B) temperature
- C) melting point
- D) mass
- E) boiling point

Answer: D

Diff: 2 Var: 1 Page Ref: Sec. 1.3

LO: 1.3

GO: G2

19) Which one of the following is an intensive property?

- A) mass
- B) temperature
- C) length
- D) volume
- E) amount

Answer: B

Diff: 2 Var: 1 Page Ref: Sec. 1.3

LO: 1.3

GO: G2

20) Of the following, only \_\_\_\_\_ is an extensive property.

- A) density
- B) volume
- C) boiling point
- D) freezing point
- E) temperature

Answer: B

Diff: 2 Var: 1 Page Ref: Sec. 1.3

LO: 1.3

GO: G2

21) Which of the following are chemical processes?

1. rusting of a nail
2. freezing of water
3. decomposition of water into hydrogen and oxygen gases
4. compression of oxygen gas

A) 2, 3, 4

B) 1, 3, 4

C) 1, 3

D) 1, 2

E) 1, 4

Answer: C

Diff: 3 Var: 1 Page Ref: Sec. 1.3

LO: 1.3

GO: G2

22) In the following list, only \_\_\_\_\_ is not an example of a chemical reaction.

- A) burning a plastic water bottle
- B) the production of hydrogen gas from water
- C) the tarnishing of a copper penny
- D) chopping a log into sawdust
- E) charging a cellular phone

Answer: D

Diff: 2 Var: 1 Page Ref: Sec. 1.3

LO: 1.3

GO: G2

23) Of the following, \_\_\_\_\_ is the largest mass.

- A) 25 kg
- B)  $2.5 \times 10^{-2}$  mg
- C)  $2.5 \times 10^{15}$  pg
- D)  $2.5 \times 10^9$  fg
- E)  $2.5 \times 10^{10}$  ng

Answer: A

Diff: 2 Var: 1 Page Ref: Sec 1.5

LO: 1.6

GO: G2

24) Which one of the following is the highest temperature?

- A) 38 °C
- B) 96 °F
- C) 302 K
- D) none of the above
- E) the freezing point of water

Answer: A

Diff: 3 Var: 1 Page Ref: Sec 1.5

LO: 1.6

GO: G2

25) Which of the following is (are) the lowest temperature?

- A) The freezing point of water
- B) 5 °C
- C) 30 °F
- D) 280 K
- E) A and D

Answer: C

Diff: 3 Var: 1 Page Ref: Sec 1.5

LO: 1.6

GO: G2

26) Which one of the following is true about the liter?

- A) It is the SI base unit for volume.
- B) It is equivalent to a cubic decimeter.
- C) It is slightly smaller than a quart.
- D) It contains  $10^6$  cubic centimeters.
- E) It is slightly smaller than a gallon.

Answer: B

Diff: 4 Var: 1 Page Ref: Sec 1.5

LO: 1.6

GO: G2

27) Which of the items below would be considered the most dense?

- A) a piece of wood with a volume of 2.5 L and a mass of 12.5 kg
- B) a ball with a volume of 139 mL and a mass of 93 g
- C) a tire with a volume of 2.12 L and a mass of  $4.22 \times 10^4$  mg
- D) a wire with a volume of  $3.91 \times 10^{-7}$  L and a mass of  $7.93 \times 10^{-1}$  ng
- E) a block of metal with a volume of 1350 mL and a mass of  $1.29 \times 10^3$  g

Answer: A

Diff: 4 Var: 1 Page Ref: Sec. 1.5, 1.7

LO: 1.8

GO: G4