## Introduction to Chemistry, 4e (Russo) Chapter 1 What Is Chemistry?

## 1.1 Multiple-Choice Questions

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1) What is the name given to the element with the symbol "P"?  A) Polonium  B) Protactinium  C) Phosphorus  D) Palladium  Answer: C  Topic: Section 1.2
2) What is the name of the element whose symbol is "Co"?  A) Carbon  B) Chromium  C) Coal  D) Cobalt  Answer: D  Topic: Section 1.2
3) What is the name given to the element with the symbol "K"? A) Kallium B) Potassium C) Phosphorus D) Krypton Answer: B Topic: Section 1.2
4) What is the name given to the element with the symbol "As"? A) silver B) argon C) antimony D) arsenic E) astatine Answer: D Topic: Section 1.2
5) By what chemical symbol do we know the element chromium? A) Cr B) Co C) C D) Cs Answer: A Topic: Section 1.2

6) What chemical symbol has been given to the element sodium? A) S B) K C) Na D) Sr Answer: C Topic: Section 1.2	
7) By what chemical symbol do we know the element magnesium? A) Mn B) Ma C) M D) Mg Answer: D Topic: Section 1.2	
8) Which of the following is a pure, elemental substance?  A) $Br_{2(l)}$ B) $SO_{2(g)}$ C) $H_2O_{(l)}$ D) air  Answer: A  Topic: Section 1.2	
9) Which of the following is a compound?  A) $F_{2(g)}$ B) $O_{2(g)}$ C) $Na_{(s)}$ D) $H_2O_{2(l)}$ Answer: D  Topic: Section 1.2	
10) Which element pair is <b>incorrect</b> ? A) Au - gold B) Pb - iron C) Ag - silver D) Hg - mercury E) Mg - magnesium Answer: B Topic: Section 1.2	
11) Which of the following represents a chemical change? A) sugar dissolving into hot coffee B) ice melting to form liquid water C) water boiling to form steam D) steel turning to rust in salt air Answer: D	

12) Which of the following represents a chemical change? A) sublimation of dry ice B) molding melted silver C) frying an egg D) breaking a piece of glass Answer: C Topic: Section 1.4
13) Which of the following represents a physical change only? A) steel turning to rust in salt air B) liquid water freezing into ice cubes C) milk turning "sour" D) wood burning to form ashes Answer: B Topic: Section 1.4
14) Which of the following represents a physical change only? A) barbecuing a steak B) adding electricity to water to produce hydrogen and oxygen gas C) chopping a piece of wood D) burning a propane camping stove Answer: C Topic: Section 1.4
15) A dilute sugar solution is an example of a(n)  A) homogeneous mixture  B) heterogeneous mixture  C) compound  D) element  Answer: A  Topic: Section 1.3
16) Which of the following is an example of a homogenous mixture? A) sand B) copper C) air D) sugar Answer: C Topic: Section 1.2
17) Which of the following is an example of a heterogeneous mixture? A) seawater B) steel C) milk D) chicken noodle soup Answer: D

18) What is another name for a homogeneous mixture? A) pure substance B) compound C) solution D) element Answer: C Topic: Section 1.2
<ul> <li>19) Which of the following represents a chemical property of a specific metal?</li> <li>A) It has magnetic properties.</li> <li>B) It melts at 800 °C.</li> <li>C) Its density is higher than that of water.</li> <li>D) When in contact with air it corrodes.</li> <li>Answer: D</li> <li>Topic: Section 1.4</li> </ul>
20) Which of the following may <b>not</b> be classified as matter?  A) tooth filling B) sand C) heat D) seawater Answer: C Topic: Section 1.2
21) Which of the following represents a physical property?  A) Sodium metal is extremely reactive with chlorine gas.  B) Mercury is a shiny liquid at room temperature.  C) The tendency of aluminum to "oxidize"  D) The flammability of butane fuel.  E) The unreactive nature of argon gas  Answer: B  Topic: Section 1.3
22) The "disappearance" of mothballs is an example of  A) melting B) evaporation C) condensation D) sublimation Answer: D Topic: Section 1.3
23) The term used to describe the conversion from a gaseous state to a liquid state is  A) melting B) evaporation C) condensation D) sublimation Answer: C Topic: Section 1.3

24) The term used to describe the conversion from a solid state to a gaseous state is  A) melting B) evaporation C) condensation D) sublimation Answer: D Topic: Section 1.3
<ul><li>25) What is the correct statement about an atom?</li><li>A) It is always pure.</li><li>B) It is the smallest particle of an element.</li><li>C) It is the smallest particle of a molecule.</li><li>D) It can be isolated.</li><li>Answer: B</li><li>Topic: Section 1.2</li></ul>
<ul><li>26) Which of the following is <b>not</b> a chemical property of carbon dioxide?</li><li>A) It is a critical component in photosynthesis.</li><li>B) It is used in fire extinguishers because it does not support combustion.</li><li>C) It is used to pump up bicycle tires.</li><li>D) It is soluble in blood.</li><li>Answer: C</li><li>Topic: Section 1.4</li></ul>
27) The only way one can change an element to another is via  A) a chemical reaction B) a physical reaction C) a nuclear reaction D) applying heat Answer: C Topic: Section 1.2
28) Which term best completes this definition?  An attempt to explain why a law exists is a(n)  A) experiment  B) law  C) theory  D) model  Answer: C  Topic: Section 1.5
29) Which of the following can be classified as matter? A) ice B) sugar C) graphite D) All of the above are matter. Answer: D

- 30) Which of the following is a pure substance?
- A) blood
- B) block of aluminum

C) air

D) orange juice

Answer: B

Topic: Section 1.2

- 31) Which of the following **cannot** be classified as matter?
- A) air
- B) temperature
- C) fog
- D) oxygen molecule

Answer: B

Topic: Section 1.2

## 1.2 True/False Questions

1) The earth, taken together as a unit, may be considered one very large piece of heterogeneous matter.

Answer: TRUE Topic: Section 1.2

2) The smallest possible piece of gold which still retains all the properties of gold is a cube shape containing eight gold atoms.

Answer: FALSE Topic: Section 1.2

3) Water is heterogeneous matter because it is made from twice as much hydrogen as oxygen (H<sub>2</sub>O).

Answer: FALSE Topic: Section 1.2

4) Iced tea, with sugar completely dissolved in it, is an example of homogeneous matter.

Answer: TRUE Topic: Section 1.2

5) When milk goes "sour," only a physical change has occurred.

Answer: FALSE Topic: Section 1.4

6) An atom is the smallest possible single piece of an element that still retains all the properties of that element.

Answer: TRUE Topic: Section 1.2

7) The chemical compounds CO and CO<sub>2</sub> have exactly the same properties, because both are made from carbon and oxygen.

Answer: FALSE Topic: Section 1.4

8) It is scientifically proper to construct a theory without then doing any experiments to test it.

Answer: FALSE Topic: Section 1.5

9) A theory summarizes facts in general statements.

Answer: FALSE Topic: Section 1.5

10) A physical picture used to illustrate a theory is a model.

Answer: TRUE Topic: Section 1.5

11) Air is a homogeneous mixture of nitrogen, oxygen and hydrogen.

Answer: FALSE Topic: Section 1.2

12) Evaporated ethanol can be isolated by cooling, without changing its disinfectant properties.

Answer: TRUE Topic: Section 1.3

13) Tap water is a homogeneous mixture, while freshly distilled water is a compound.

Answer: TRUE Topic: Section 1.3

14) Cooking vegetables with steam is a chemical process.

Answer: TRUE Topic: Section 1.2

15) If 1 gram of ice needs a certain amount of heat to melt, the same amount of energy must be removed to convert it back to ice at its melting point.

Answer: TRUE Topic: Section 1.3

## 1.3 Matching Questions

Match the event with the name of the process from the list below.

- A) sublimation
- B) evaporation
- C) freezing
- D) condensation
- E) melting
- 1) The pond ices in winter.

Topic: Section 1.3

2) Mothballs disappear when placed between clothes.

Topic: Section 1.3

3) An ice cube disappears when left in a freezer for a year

Topic: Section 1.3

4) Water droplets form on the mirror of the medicine cabinet while taking a shower.

Topic: Section 1.3

5) While heating water in a tea kettle, part of it disappears.

Topic: Section 1.3

6) Ice cream liquefies on a hot day.

Topic: Section 1.3

7) The block of dry ice in an ice cream parlor starts smoking once the store attendant opens the ice cream freezer.

Topic: Section 1.3

8) Margarine is transformed into a liquid while frying an egg.

Topic: Section 1.3

9) Liquid nitrogen is transformed into a colorless gas.

Topic: Section 1.3

10) Water is collected in the gas tank of a car in a humid day.

Topic: Section 1.3

Answers: 1) C 2) A 3) A 4) D 5) B 6) E 7) A 8) E 9) B 10) D

Match the substances with its classification from the list below.

- A) compound
- B) element
- C) homogeneous mixture
- D) heterogeneous mixture
- 11) Lemonade (without pulp)

Topic: Section 1.2

12) Fully rusted nail Topic: Section 1.2

13) Distilled water Topic: Section 1.2

14) Table salt Topic: Section 1.2

15) Intravenous liquid Topic: Section 1.2

16) Diamond Topic: Section 1.2

17) Chlorine gas Topic: Section 1.2

18) Air in a smog-free environment

Topic: Section 1.2

19) Oil-vinegar salad dressing

Topic: Section 1.2

20) Breakfast cereal Topic: Section 1.2

21) Oxidized wine Topic: Section 1.2

22) 24-karat golden bracelet

Topic: Section 1.2

23) 14-karat golden bracelet

Topic: Section 1.2

24) Gasoline

25) Sand

Topic: Section 1.2

26) Brass

Topic: Section 1.2

27) Steel

Topic: Section 1.2

28) Vitamin C tablet Topic: Section 1.2

29) Contents of a helium balloon

Topic: Section 1.2

30) Golden nugget Topic: Section 1.2

31) Graphite

Topic: Section 1.2

Answers: 11) C 12) A 13) A 14) A 15) C 16) B 17) B 18) C 19) D 20) D 21) C 22) B 23) C 24) C 25) A 26) C 27) C 28) A 29) B 30) B 31) B

Match the event with the type of process involved from the list below.

- A) physical process
- B) chemical process
- 32) Mixing salt and water

Topic: Section 1.4

33) Iron rusting Topic: Section 1.4

34) Paper burning Topic: Section 1.4

35) Mixing ammonia and bleach

Topic: Section 1.4

36) Mothballs subliming

Topic: Section 1.4

37) Cooking of an egg

Topic: Section 1.4

38) Molding iron Topic: Section 1.4

39) Diluting orange juice

Topic: Section 1.4

40) Digesting a sandwich

Topic: Section 1.4

41) Separating iron filings from sand with a magnet

Topic: Section 1.4

42) Using gasoline to drive a car

Topic: Section 1.4

43) Filtering a liquid to remove suspended material

Topic: Section 1.4

44) Molded cheese Topic: Section 1.4

Answers: 32) A 33) B 34) B 35) B 36) A 37) B 38) A 39) A 40) B 41) A 42) B 43) A 44) B

Match the element with the symbol from the list below.

- A) Pu
- B) Po
- C) P
- D) K
- E) Pt
- F) Pd
- G) Pa
- 45) Potassium
- Topic: Section 1.2
- 46) Polonium
- Topic: Section 1.2
- 47) Phosphorus
- Topic: Section 1.2
- 48) Plutonium
- Topic: Section 1.2
- 49) Platinum
- Topic: Section 1.2
- 50) Palladium
- Topic: Section 1.2
- 51) Protactinium
- Topic: Section 1.2

Answers: 45) D 46) B 47) C 48) A 49) E 50) F 51) G

Match the element with the symbol from the list below.

- A) N
- B) No
- C) Ne
- D) Nd
- E) Ni
- 52) Nitrogen

Topic: Section 1.2

53) Neodymium

Topic: Section 1.2

54) Nobelium

Topic: Section 1.2

55) Neon

Topic: Section 1.2

56) Nickel

Topic: Section 1.2

Answers: 52) A 53) D 54) B 55) C 56) E