1. Which state of matter is the most condensed and has no movement of molecules past one another?

A. gas
B. liquid
C. solid
D. mixture

2. Which of the following is a **homogeneous mixture**?

A. sulfur
B. sulfur dioxide
C. wooden block
D. salt water

3. Which of the following **cannot** be broken down by chemical or physical means into simpler substances?

A. compound
B. homogeneous mixture
C. heterogeneous mixture
D. element

4. Which one of the following is a **chemical** change?

A. boiling water
B. salt dissolving in water
C. combustion of charcoal
D. melting of iron

5. Thermal energy is a type of _____ energy.

A. potential
B. kinetic
C. chemical
D. angular

6. What is the relationship between km and nm?

A. 1 km = 10^{12} nm
B. 1 km = 10^{9} nm
C. 1 km = 10^{6} nm
D. 1 km = 10^{-12} nm

7. What is the result of the following calculation?

$$2.32 \times 10^{-3} + 9.49 \times 10^{-4} =$$

A. 3.27×10^{-3}

B. 1.18×10^{-3}

C. 3.27×10^{-4}

D. 1.18×10^{-7}

8. What is the volume, in cm^3, of a cube that can hold 3 mL of water?

A. 9 cm^3

B. 3 cm^3

C. 1 cm^3

D. 1×10^{-3} cm^3

9. If the density of titanium is 4.51 g/cm^3, what is the mass of a titanium sphere with radius of 2.0 inches? For a sphere, $V = \frac{4}{3}\pi r^3$.

A. 2.5 kg

B. 2380 g

C. 2000 g

D. 0.38 kg

10. Identify the **intensive** property.

A. mass

B. density

C. volume

D. moles

11. Using the correct number of significant figures, what is the solution to

$$11.3 + 17 - 2.46 = ?$$

A. 25.8

B. 25.84

C. 26

D. 30

12. What is the result with the correct number of significant figures?

$$11.5 \times 1.78 \div 0.025 =$$

A. 8.2×10^2

B. 819

C. 8.188×10^2

D. 818.80

13. What is the volume of an aluminum sphere with a mass of 1.93 kg? The density of aluminum is 2.70 g/cm^3.

A. 521 cm^3

B. 715 cm^3

C. 140 cm^3

D. 192 cm^3

14. How many µL are in 1.5 nm^3?

A. 1.5×10^{32}

B. 1.5×10^{22}

C. 1.5×10^{-4}

D. 1.5×10^{-18}

15. Which of the following is **not** consistent with Dalton's atomic theory?

A. In a chemical reaction, atoms of Au will not change into atoms of another element.

B. All atoms of Cu have identical properties.

C. An oxygen atom can be broken into smaller parts that still have the properties of oxygen.

D. A carbon monoxide molecule is always composed of one C and one O atom.

16. Can matter be created in a chemical reaction? Why or why not?

A. No. Chemical reactions consume matter.

B. Yes. Chemical reactions create matter.

C. No. In a chemical reaction, matter can be neither created nor destroyed.

D. Sometimes. It depends on the reaction.

17. Rutherford's gold foil experiment

A. determined the charge on an electron.

B. proved that neutrons are contained in an atom's nucleus.

C. proved that atoms contain electrons.

D. proved that most of the mass and all of the positive charge is contained in an atom's nucleus.

18. Which of the following statements is **true**?

A. Protons and electrons have nearly the same mass.

B. Protons and neutrons have nearly the same mass.

C. Neutrons and protons have one unit of electrical charge.

D. Electrons and neutrons have one unit of electrical charge.

19. Determine the number of protons, neutrons, and electrons in a neutral ^{46}Ti atom.

A. 22 protons, 24 neutrons, 22 electrons

B. 24 protons, 22 neutrons, 24 electrons

C. 22 protons, 26 neutrons, 22 electrons

D. 26 protons, 22 neutrons, 22 electrons

20. How many electrons are in a Cl^- ion?

A. 16

B. 17

C. 18

D. 35

21. Which group of elements on the periodic table tends to form anions with a charge of −1?

A. alkali metals

B. halogens

C. noble gases

D. transition metals

22. Potassium has three naturally occurring isotopes, ^{39}K, ^{40}K, and ^{41}K. The atomic mass and natural abundance for ^{40}K are 39.9640 amu and 0.0117%; for ^{41}K, the values are 40.9618 amu and 6.7302%. What is the atomic mass of ^{39}K?

A. 38.4673 amu
B. 38.5984 amu
C. 38.9637 amu
D. 39.0983 amu

23. What is the symbol, including atomic number (*Z*) and atomic mass (*A*), of an iron atom with 30 neutrons and 26 electrons?

A. $^{56}_{26}Fe$
B. $^{56}_{30}Fe$
C. $^{56}_{26}Fe^{4+}$
D. $^{30}_{26}Ir$

24. Which of the following is **true** concerning the mole?

A. It is **not** an SI base unit.
B. It is a unit of mass.
C. It is an amount containing Avogadro's number of items.
D. Its definition gives a relationship between mass and atomic number (*Z*).

25. How many atoms are in a 2.34 g sample of carbon?

A. 1.17×10^{23} atoms
B. 3.09×10^{24} atoms
C. 1.69×10^{25} atoms
D. 3.23×10^{25} atoms

26. A compound has an empirical formula of CH and a molecular mass of 91.13 amu. What is its molecular formula?

A. C_7H_7
B. C_6H_8
C. C_5H_5
D. CH

27. Which of the following is an **ionic** compound?

A. NO
B. CO_2
C. PCl_3
D. LiCl

28. What is the formula for calcium hydroxide?

A. CaH_2
B. CaOH
C. CaO_2
D. $Ca(OH)_2$

29. What is the name of aqueous HBr?

A. hydrogen bromide
B. hydrobromic acid
C. hydrogen bromate
D. bromic acid

30. Which compound contains the metal ion with the **greatest** number of electrons?

A. Co_2O_3
B. FeO
C. Fe_2O_3
D. CoO

CHE 105 Exam 1 Spring 2015 Key

1. C
2. D
3. D
4. C
5. B
6. A
7. A
8. B
9. A
10. B
11. C
12. A
13. B
14. D
15. C
16. C
17. D
18. B
19. A
20. C
21. B
22. C
23. A
24. C
25. A
26. A
27. D
28. D
29. B
30. D