Homework Chemistry Chapter 1 Number:_____ Name:_____

Choice the right answer:

1. ( ) 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)
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 gravity**
   D. law of multiple proportions **E. law of conservation of matter**
3. ( ) 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**
4. ( ) Which of the following is **not** an intensive property of matter?
   A. Color **B. density** **C. melting point** **D. weight** **E. boiling point**
5. ( ) Which of the following changes in water represents **chemical** a change?
   A. Melting of ice. **B. Sublimation of solid ice directly to gaseous water.**
   C. Boiling water. **D. Calcium reacting with water to produce calcium hydroxide.**
   E. Heating water from 25°C to 60°C.
6. ( ) The element whose symbol is Ca is
   A. carbon. **B. cadmium** **C. calcium** **D. californium** **E. none of these**
7. ( ) Identify which of the following statements about elements and their abundance is **false**?
   A. Each element has its own unique symbol. **B. Oxygen and silicon are very common.**
   C. More than 99% of the Earth's mass is made up of only 10 of the naturally occurring elements.
   D. Most elements occur in nature as free elements, not in compounds. **E. Gold is very uncommon.**
8. ( ) Water is always 11.1% hydrogen and 88.9% oxygen by mass. This is a statement of the
   A. Law of Conservation of Matter. **B. Law of Definite Proportions.** **C. Law of Multiple Proportions.**
   D. Law of Conservation of Matter and Energy. **E. none of these.**
9. ( ) One of the following is a reasonable approximation of the **diameter** of a quarter (U.S. coin). Which one?
   A. 24 Mm **B. 0.24 m** **C. 24 mm** **D. 24 cm** **E. 0.0024 km**
10. ( ) The sum 2.834 + 5.71520 + 2.12 + 178.1 + 250.2619 expressed to the proper number of significant figures is:
    A. 439 **B. 439.0** **C. 439.03** **D. 439.031** **E. 439.0311**
11. ( ) Perform the indicated mathematical operations and express the answer in scientific notation rounded off to the proper number of significant figures: $(8.001 \times 10^2) \times (2.88 \times 10^3 / 2.4 \times 10^{-3})$
    A. 9.6×10^2 **B. 9.60×10^8** **C. 9.601×10^8** **D. 9.6×10^8** **E. 9.6×10^{-2}**
12. ( ) Convert 175 milliliters to gallons.
    A. 0.0462 gal **B. 0.0414 gal** **C. 0.740 gal** **D. 0.164 gal** **E. 0.660 gal**
13. ( ) What is the area (in mm^2) of a rectangular surface that is 0.640 inch wide and 1.14 inches long?
    A. 471 mm^2 **B. 328 mm^2** **C. 84.2 mm^2** **D. 242 mm^2** **E. 680 mm^2**

14. ( ) Assuming a magnesium atom is spherical, calculate its volume in nm^3. The **diameter** of a magnesium atom is 3.20 Å. The volume of a sphere is $V= (4/3)\pi r^3$.
1 Å= $1x\ 10^{-10}$ m and 1 nm= $1x\ 10^{-9}$ m (Both of these relationships are exact.) π= 3.14
A. $5.57x\ 10^3\ nm^3$ B. $2.34x10^{-22}\ nm^3$ C. $5.57\ x10^{-24}\ nm^3$ D. $1.71x10^{-2}\ nm^3$ E. $1.37x10^{-3}\ nm^3$

15. ( ) Dark dental 22 carat gold is an alloy consisting of 92% Au, 4.9% Ag, and 3.1% Cu. If a patient leaves the dentist's office with 3.25 g of dark dental gold in her mouth, what mass of each element does she have in her mouth? (Note: round off may result in total mass not quite equaling 3.25 g.)
A. 2.8 g Au 0.25 g Ag 0.15 g Cu B. 2.9 g Au 0.10 g Ag 0.16 g Cu
C. 2.3 g Au 0.75 g Ag 0.20 g Cu D. 3.0 g Au 0.16 g Ag 0.10 g Cu
E. 2.9 g Au 0.25 g Ag 0.10 g Cu

16. ( ) A metal cube having a mass of 112 grams is dropped into a graduated cylinder containing 30.00 mL of water. This causes the water level to rise to 39.50 mL. What is the density of the cube?
A. 2.86 g/mL B. 11.8 g/mL C. 10.8 g/mL D. 3.74 g/mL E. 10.6 g/mL

17. ( ) What is the specific gravity of nickel if 2.35 cm^3 of nickel has the same mass as 20.9 mL of water at room temperature?
A. 0.112 B. 2.14 C. 8.89 D. 19.7 E. 49.2

18. ( ) If normal body temperature is 98.6°F, what is normal body temperature in °C?
A. 45.0°C B. 37.0°C C. 20.0°C D. 52.6°C E. 25.6°C

19. ( ) Heptane melts at 182 K, and it boils at 371K. Which statement below is **incorrect**?
A. Heptane will be a liquid at room temperature. B. The melting point of heptane is -132°F.
C. The melting point of heptane is lower than the melting point of water.
D. Heptane would be a solid in a 200 K room. E. Heptane would be a solid at 100 K

20. ( ) The specific heat of aluminum is 0.900 J/g•°C. How many joules of heat are absorbed by 15.0 g of Al if it is heated from 20.0°C to 60.0°C?
A. 540 J B. 270 J C. 812 J D. 2.40 J E. 1.17×10^4 J

21. ( ) An endothermic reaction
A. evolves heat. B. is also called exothermic. C. is not possible.
D. would have its heat transferred measured in Joules. E. would be described by all of the above.

22. ( ) The same amount of heat is added to a 25-g sample of each of the following metals. If each of the metals was initially at 20.0°C, which metal will reach the highest temperature (compare with the specific heat)?
A. Beryllium 1.82 J/g•°C B. Calcium 0.653 J/g•°C C. Copper 0.385 J/g•°C
D. gold 0.129 J/g•°C E. nickel 0.444 J/g•°C

23. ( ) Which one of the following processes is an example of a **physical change**?
A. the rusting of an iron nail B. the digestion of food
C. the burning of natural gas D. the freezing of water

24. ( ) How many **significant figures** are there in the measured number **0.0020**?
A. 1 B. 2 C. 3 D. 4