

Review of Chapter 1

1) Identify a liquid.

- A) definite volume and definite shape
- B) definite volume and no definite shape
- C) no definite shape and no definite volume

2) Identify a solid.

- A) copper
- B) oxygen
- C) water
- D) nitrogen
- E) air

3) Identify a liquid.

- A) oxygen
- B) copper
- C) salt
- D) mercury
- E) sugar

4) Draw each of the three main phases of matter such that it is clear what the differences are in (i) spacing, (ii) order and (iii) speed of particles.

5) Choose the pure substance from the list below.

- A) sea water
- B) sugar
- C) air
- D) lemonade
- E) milk

6) Choose the element from the list below.

- A) sodium chloride
- B) water
- C) carbon dioxide
- D) helium
- E) rust

7) If a solution has a temperature of 355 K, what is its temperature in degrees celsius?

- 8) Determine the density of an object that has a mass of 149.8 g and displaces 12.1 mL of water when placed in a graduated cylinder.
- 9) The outside air temperature is 30.°F, what is the temperature in Kelvin?
- 10) How many mL are in 2.54 L?
- 11) How many mm are in 3.20 cm?
- 12) A person is 64.00 inches tall. How tall is she in cm?
- 13) If the walls in a room are 955 square feet in area, and a gallon of paint covers 15 square yards, how many gallons of paint are needed for the room? (3 ft = 1 yd)

- 14) A piece of metal ore weighs 8.25 g. When a student places it into a graduated cylinder containing water, the liquid level rises from 21.25 mL to 26.47 mL. What is the density of the ore?
- 15) The diameter of an atom is approximately 1×10^{-10} m. What is the diameter in millimeters?
- 16) Because of the high heat and low humidity in the summer in Death Valley, California, a visitor requires about one quart of water for every two miles traveled on foot. Calculate the approximate number of liters required for a person to walk 10. kilometers in Death Valley.
- 17) The recommended adult dose of Elixophyllin[®], a drug used to treat asthma, is 6.00 mg/kg of body mass. Calculate the dose in milligrams for a 115-lb person. 1 lb = 453.59 g.

18) Which of the following measurements has three significant figures?

- A) 1,207 g
- B) 4.250 g
- C) 0.006 g
- D) 0.0250 g
- E) 0.03750 g

19) A laboratory technician reports that the mass of a growth removed from a patient is 274.06 g. How many significant figures does this measurement contain?

- A) 2
- B) 3
- C) 4
- D) 5
- E) none of the above

20) Which of the following numbers contains **four** significant figures?

- A) 230,110
- B) 23,011.0
- C) 0.23010
- D) 0.0230100
- E) 0.002301

21) What is the total length of two pieces of tubing which measure 4.5 cm and 3.222 cm? Express the answer to the correct number of significant figures.

- A) 3.722 cm
- B) 4.722 cm
- C) 7.722 cm
- D) 7.7 cm
- E) 8 cm

22) The volume of a gas sample is recorded as 0.0970 L. How many significant figures is this?

- A) 2
- B) 3
- C) 4
- D) 5
- E) none because this is an exact number

Review of Chapter 2

- 1) In a chemical reaction, matter is neither created or destroyed. Which law does this refer to?
- A) Law of Definite Proportions
 - B) Law of the Conservation of Mass
 - C) Law of Modern Atomic Theory
 - D) Law of Multiple Proportions
 - E) First Law of Thermodynamics
- 2) Identify the description of an atom.
- A) neutrons and electrons in nucleus; protons in orbitals
 - B) neutrons in nucleus; protons and electrons in orbitals
 - C) protons and neutrons in nucleus; electrons in orbitals
 - D) protons and electrons in nucleus; neutrons in orbitals
 - E) electrons in nucleus; protons and neutrons in orbitals
- 3) Isotopes differ in the number of what particle?
- A) beta particles
 - B) protons
 - C) electrons
 - D) neutrons
 - E) gamma particles
- 4) Identify the element that has an atomic number of 40.
- 5) What element does "X" represent in the following symbol?
- $${}_{35}^{80}\text{X}$$
- 6) Determine the number of protons, neutrons and electrons in the following:
- $${}_{12}^{25}\text{X}$$
- 7) What element is defined by the following information?
- $$p^+ = 17 \quad n^0 = 20 \quad e^- = 17$$
- 8) Which of the following statements about subatomic particles is TRUE?
- A) A neutral atom contains the same number of protons and electrons.
 - B) Protons have about the same mass as electrons.
 - C) Electrons make up most of the mass of an atom.
 - D) Protons and neutrons have opposite, but equal in magnitude, charges.
 - E) Neutrons and electrons are found in the nucleus of an atom.

12) How many molecules are in 2.50 moles of CO₂?

13) What mass (in kg) does 5.84 moles of titanium (Ti) have?

14) How many moles of Kr are contained in 398 mg of Kr?

15) How many Li atoms are contained in 97.9 g of Li?

16) Calculate the mass (in g) of 1.9×10^{24} atoms of Pb.

17) Calculate the mass (in kg) of 4.87×10^{25} atoms of Zn.

Chapter 3

Nomenclature

1) **Elements:** If the chemical symbol is given, please write the name of the element. If the name of the element is given, please write the chemical symbol.

- | | | | |
|-------------|-----------|---------|-------------|
| A. Br | B. copper | C. iron | D. Hg |
| E. Na | F. oxygen | G. H | H. P |
| I. aluminum | J. Ba | K. C | L. chromium |
| M. fluorine | N. Li | O. Pb | P. S |

2) **Ions:** If the chemical symbol/formula is given, please write the name of the ion. If the name of the ion is given, please write the chemical symbol/formula.

- | | | | |
|---------------------|--------------------|---------------------|--------------------------------------------------------------------|
| A. potassium ion | B. copper (I) ion | C. aluminum ion | D. ammonium ion |
| E. sulfide ion | F. nitrite ion | G. fluoride ion | H. phosphate ion |
| I. Mg^{2+} | J. P^{3-} | K. NO_3^- | L. Fe^{2+} |
| M. HCO_3^- | N. Ag^+ | O. Be^{2+} | P. $\text{C}_2\text{H}_3\text{O}_2^-$ or CH_3COO^- |

3) **Ionic Compounds:** If the chemical formula is given, please write the name of the compound. If the name of the compound is given, please write the chemical formula.

- | | | | |
|----------------------|------------------------------------------------|-------------------------------|-----------------------|
| A. aluminum fluoride | B. iron(III) sulfide | C. zinc nitrate | D. barium bicarbonate |
| E. CuI | F. $\text{NH}_4\text{C}_2\text{H}_3\text{O}_2$ | G. $\text{Sn}(\text{SO}_4)_2$ | H. silver phosphide |

4) **Acids:** If the chemical formula is given, please write the name of the acid. If the name of the acid is given, please write the chemical formula.

A. nitric acid

B. HCl (aq)

C. sulfuric acid

D. HC₂H₃O₂ (aq)

5) **Molecular Compounds:** If the chemical formula is given, please write the name of the compound. If the name of the compound is given, please write the chemical formula.

A. water

B. NH₃

C. carbon dioxide

D. hydrogen peroxide

E. N₂O₅

F. Cl₃F₅

G. P₄O₁₀

H. NO

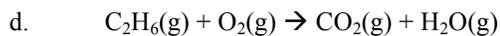
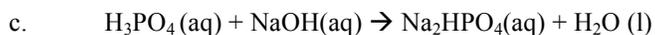
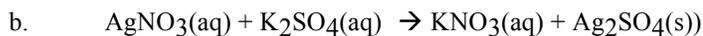
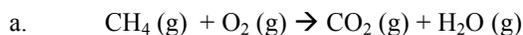
I. N₂O

K. CCl₄

L. S₂F₁₀

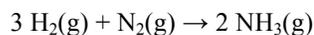
M. PCl₅

6) **Balancing Equations:** Use coefficients to balance the equations below.



Chapter 4: Stoichiometry and Limiting Reactant Problems

1. Ammonia is produced by the reaction

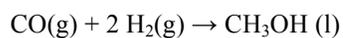


A. How many grams of ammonia can be produced from 22.7g of hydrogen with excess nitrogen present?

B. How many grams of ammonia can be formed from 36.3g of nitrogen with excess hydrogen present?

C. This is a limiting reactant problem: How many grams of ammonia can be produced from 22.7 g of hydrogen and 36.3 g of nitrogen?

2. Methyl alcohol (wood alcohol), CH_3OH , is produced via the reaction



A. How many grams of methyl alcohol can be produced from 147 g of CO with excess hydrogen present?

B. How many grams of methyl alcohol can be produced from 22.1 g of hydrogen with excess CO present?

C. How many grams of methyl alcohol can be produced from 147 g of CO and 22.1 g of hydrogen?