

Name _____

1. True or False. [4 pts]

a) The melting of aluminum (Al) metal is an example of a chemical change.

FALSE, the melting of Al is a physical change.

b) ^{35}Cl and ^{35}S are isotopes.

FALSE, by definition, isotopes are atoms that have the same atomic number but different mass numbers.

c) Ice floats on liquid water; therefore, the density of ice is less than the density of liquid water.

TRUE

d) Precision is a measure of how closely two or more measurements of the same quantity agree with one another.

TRUE

2. What is the number of significant figures in each of the following measured quantities? [4 pts]

a) 0.00030 kg 2

b) 1002 s 4

c) 200 mm 1, 2, or 3

d) 1.0000×10^{-4} cm 5

3. Carry out the following operations and express the answer with the appropriate number of significant figures. [6 pts]

a) $4.64 + 5.80 = \underline{10.44}$

b) $2001 \div 7.5 = \underline{2.7 \times 10^2}$

c) $320.88 - (6104.5 \div 20.14) = 320.88 - 303.1 = \underline{17.8}$

4. Fill in the blank with the scientist's name. [3 pts]
- Rutherford** postulated that an atom is mostly empty space.
 - Thomson** determined that electrons are negatively charged.
 - Millikan** determined the mass of an electron.

5. Complete the following table of metric prefixes. [3 pts]

Prefix	Symbol	Meaning (Number)
centi-	c	10^{-2}
nano-	n	10^{-9}
pico-	p	10^{-12}

6. For each of the following species, determine the number of protons, neutrons, and electrons in the atom. [5 pts]

	protons	neutrons	electrons
a) ^{16}O	8	8	8
b) ^{81}Br	35	46	35
c) $^{238}_{92}\text{U}$	92	146	92

7. Convert $5.6 \times 10^{-7} \text{ mm}^2$ to units of m^2 . Circle the correct answer below. [3 pts]

- $5.6 \times 10^{-10} \text{ m}^2$
- $5.6 \times 10^{-4} \text{ m}^2$
- $5.6 \times 10^{-13} \text{ m}^2$
- $5.6 \times 10^{-1} \text{ m}^2$
- $5.6 \times 10^{-11} \text{ m}^2$

$$5.6 \times 10^{-7} \text{ mm}^2 \times \left(\frac{1 \times 10^{-3} \text{ m}}{1 \text{ mm}} \right)^2 = 5.6 \times 10^{-13} \text{ m}^2$$

8. What is the **mass** (in kg) of 35.0 mL of a gas with a density of 1.22 g/L? [4 pts]

$$35.0 \text{ mL} \times \frac{1 \text{ L}}{1000 \text{ mL}} \times \frac{1.22 \text{ g}}{1 \text{ L}} \times \frac{1 \text{ kg}}{1000 \text{ g}} = 4.27 \times 10^{-5} \text{ kg}$$

9. In Canada, gasoline costs 1.05 Canadian Dollars per liter. Given that there are 3.785 L per gallon and the exchange rate is 1.385 Canadian Dollars per US Dollar, what is the price per gallon in US Dollars?

Homework Problem [3 pts]

$$\frac{1.05 \text{ CD}}{1 \text{ L}} \times \frac{3.785 \text{ L}}{1 \text{ gal}} \times \frac{\$1}{1.385 \text{ CD}} = \$2.87/\text{gal}$$