

Name: _____

Section: _____ Date: _____

Exponential Notation & Significant Figures

Problem Set 1: Scientific or Exponential Notation

Directions: Use all digits provided. Do not apply rules for significant figures to this assignment. Use the space provided for the answers.

1. Some numbers of interest to chemists are given below. Express each number in proper exponential notation.

a. 0.00094781 Btu (*number of British thermal units equal to 1 joule*)

b. 101,325 Pa (*number of Pascals equal to 1 atm*)

c. 0.08205821 L · atm / mole · K (*R, gas law constant*)

d. 0.000000000268 m (*radius of a zinc atom*)

2. Solve the following problems and express your answer in proper exponential notation. Try doing the problems without a calculator first; then, double check them with a calculator.

a. $(4.20 \times 10^5) + (6 \times 10^3)$

b. $(3.95 \times 10^{-4}) - (2.7 \times 10^{-6})$

c. $(5.40 \times 10^9) \times (9.00 \times 10^{-12})$

d. $\frac{1.80 \times 10^8}{7.2 \times 10^{-2}}$

3. Predict* the mass of one neutral carbon-13 atom, given the following masses:

mass of a proton	$m_p = 1.00727647$ amu
mass of a neutron	$m_n = 1.00866492$ amu
mass of an electron	$m_e = 0.000548579909$ amu

**This is only a prediction because it does not take into account binding energy.*

NOTE: Remember to keep all digits provided.

a. Determine the number of protons in a neutral carbon-13 atom.

b. Determine the number of neutrons in a neutral carbon-13 atom.

c. Determine the number of electrons in a neutral carbon-13 atom.

d. Calculate the mass of the protons in a neutral carbon-13 atom.

e. Calculate the mass of the neutrons in a neutral carbon-13 atom.

f. Calculate the mass of the electrons in a neutral carbon-13 atom.

g. Calculate the total mass of one neutral carbon-13 atom.

Problem Set 2: Significant Figures

Directions: Write the answers in the blanks provided.

Review the rules in Section B (pp. 44-46).

1. How many significant figures are contained in each of the following numbers?

a. 1.6606×10^{-24} g _____

b. 5000 lb _____

c. 0.000345 km _____

d. 5.00×10^6 ml _____

e. 0.0023901 cal _____

Review the rules in Section C (pp. 46-47)

2. Round off each of the following number to four significant figures.

a. 245.35147 _____

b. 20.6825 _____

c. 9.64853383 _____

d. 0.126435 _____

e. 0.0060708 _____

Directions: Use the spaces provided for the answers. Review the rules in Section D (pp. 47-48)

3. Complete the following calculations, then apply rules for rounding to determine the proper number of significant figures.

a. $5.284 + 0.9568 + 12.3$

b. $684.9547 - 19.72$

c. $(1.2794 \times 10^6) \times (40)$

d. $(1.0887 \times 10^{-2}) \div 3.0$

e. $\frac{3.289 \times 1.746}{9.507 \times 0.021}$