

**Chemistry 101**  
**Homework Problem Set # 1**  
**Due Monday, September 8**

These questions are based on chapter 1 of the textbook: Timberlake, K. *General, Organic and Biological Chemistry: Structures of Life (Platinum Edition)*

1. Write the following numbers in standard notation:

(a)  $1.25 \times 10^{-4}$

(e)  $6.2 \times 10^{-3}$

(b)  $5.213 \times 10^2$

(f)  $7.4 \times 10^2$

(c)  $8.2 \times 10^4$

(g)  $1.5 \times 10^{-6}$

(d)  $9.39 \times 10^{-1}$

2. For each measurement, indicate if the zeros are significant figures or not.

(a) 12.00 km

(d)  $1.02 \times 10^4$  L

(b) 500.06 cg

(e) 75000 years

(c) 0.0003 L

3. How many significant figures are in each of the following measured quantities?

(a) 1205.0 mL

(d) 50.3 °C

(b) 106.3 kg

(e) 102,000 m

(c) 5.00 cm

(f)  $8.0 \times 10^{-1}$

4. Write each of the following measured numbers in scientific notation with the correct number of significant figures.

(a) 0.0451

(f) 0.000082

(b) 230,000

(g) 5,100,000

(c) 750.

(h) 260

(d) 0.000193

(i) 5000.

(e) 617.23

(j) 0.000730

5. Read *Timberlake*, section 1.5, and answer the following questions from page 15:

(a) Question 1.26 Why do we sometimes add a zero to a number in a calculator display?

(b) Question 1.32 For the following problems, give answers with the correct number of significant figures:

a.  $400 \times 185$

b.  $\frac{2.40}{(4)(125)}$

c.  $0.825 \times 3.6 \times 5.1$

d.  $\frac{3.5 \times 0.261}{8.24 \times 20.0}$

(c) Question 1.34 For the following problems, give answers with the correct number of decimal places:

a.  $5.08 \text{ g} + 25.1 \text{ g}$

b.  $85.66 \text{ cm} + 104.10 \text{ cm} + 0.025 \text{ cm}$

c.  $24.568 \text{ mL} - 14.25 \text{ mL}$

d.  $0.2654 \text{ L} - 0.2585 \text{ L}$

6. Review Sections 1.6-1.7 in the text and complete the following problems:

(a) Convert 137 eggs into dozens.

(b) Convert 55 miles per hour into meters per second.

(c) At a speed of 12 miles per hour, how many minutes will it take to run 5 kilometers?

7. Review Section 1.8 in the text and complete the following problems:

(a) Would the following substances sink or float in olive oil? Explain your reasoning. (see section 1.8) (a) cork (b) aluminum (c) water (d) wood (e) lead

(b) What is the density (in g/mL) of a substance that has a mass of 322 g and a volume of 0.410 L?

(c) What is the mass of a glucose solution that fills a 0.500 L intravenous bottle if the density of the glucose solution is 1.15 g/mL?

8. From page 41 in the text, answer the following questions that utilize many of the ideas covered in chapter 1. Be sure to report your values to the correct number of significant figures.

(a) Question 1.101 (a) Some athletes have as little as 3.0% body fat. If such a person has a body mass of 45 kg, how much body fat does that person have? (b) In a process called liposuction, a doctor removes some adipose tissue from a person's body. If body fat has a density of 0.94 g/mL and 3.0 liters of fat are removed, how many pounds of fat were removed? (be sure to show all your work)

(b) Question 1.92 Celeste's diet restricts her intake of protein to 24 g per day. If she eats an 8.0 oz burger that is 15.0% protein, has she exceeded her protein limit for the day? How many ounces of a burger would be allowed for Celeste?