

Chapter 1 Study Questions

1. Indicate the metric unit for: a) mass, b) length, and c) volume
2. The time is recorded from three different clocks as indicated below. The “true” time is exactly 8:30 A.M.
 - a) Which of the three clocks is the most precise? b) Which clock is the most accurate?

<u>Measurement</u>	<u>Clock A</u>	<u>Clock B</u>	<u>Clock C</u>
1	8:25.20 AM	8:29 AM	8:36 AM
2	8:25.00 AM	8:31 AM	8:36 AM
3	8:25.10 AM	8:30 AM	8:36 AM

- c) Which clock(s) show a systematic error?
3. Indicate the number of significant figures in the following numbers:
 - a) 2,348
 - b) 7.0001
 - c) 0.0023
 - d) 24,500
 - e) 0.1060
 4. Perform the following operations and express the answers in significant figures:
 - a) $1.24 \times 8.2 =$
 - b) $6.78 - 3.3 =$
 - c) $9.999 + 0.22 =$
 - d) $(5.67 \times 10^3) \times (2.1 \times 10^{-2})$
 5. Express the following numbers in scientific notation:
 - a) 650 (2 sig fig)
 - b) 0.0005 (1 sig fig)
 - c) 207,000 (3 sig fig)
 6. Bozo determined the density of a sample of aluminum. For his sample, he found the volume was 0.350 cm^3 and the mass was 0.822 g. Given that the density of aluminum is 2.70 g/cm^3 , calculate Bozo’s percent accuracy error.

NOTE: Use *dimensional analysis* (conversion factors) to answer the problems below. Answers must be in significant figures, include units and show work. Use the table on the inside cover of the back of the text as needed.

7. Find the mass in pounds (lbs) of a 275-gram sample of sugar.
8. Find the number of cm in 0.286 miles.
9. Find the volume in quarts of 10.7 kg of iron. The density of iron is 7.87 g/cm^3 .
10. Convert the density of ethanol (0.789 g/cm^3) into units of pounds/liter.
11. Give two common examples of each of the following: a pure substance, a mixture, a solution, an element, a compound. Are your mixtures homogeneous or heterogeneous?

12. List two chemical properties and two physical properties of the element magnesium. (You may use your textbook.)
13. (OPTIONAL) Assuming each ant is 5.0 mm long, how many ants would it take to make a line, single file, from one end to the other of a 100-yard football field? (2 sig fig)

Summary of Chapter 1: Chemical Foundations

scientific method

observations vs. interpretations

qualitative vs. quantitative observations

meniscus

SI units: meters, liters, grams

metric prefixes: kilo, centi, milli, micro, nano

precision

accuracy

random and systematic error

percent accuracy error (formula)

significant figures: counting & in calculations

exponential notation

dimensional analysis (conversion factors)

density

classification of matter: pure substances, mixtures, solutions, elements, compounds

separation of mixtures: filtration, distillation, chromatography

physical & chemical changes

physical & chemical properties