

Name: _____

Homework was checked against the key with wrong answers corrected.

Parent Signature: _____

Chapter 4: Problem Solving in Chemistry

Each numbered question is worth 1 point except as noted. Total possible = 32 points

Section 4.1

1. The density of silicon is 2.33 g/cm^3 . What is the volume of a piece of silicon that has a mass of 62.9 g?

2. Helium has a boiling point of 4 K. This is the lowest boiling point of any liquid. Express this temperature in degrees Celsius.

4. State in your own words the three suggested steps for solving word problems.

5. Identify the statements that correctly complete the sentence: Good problem solvers

- a. read a problem only once.
- b. check their work.
- c. break complex problems down into one or more simpler problems.
- d. look for relationships among pieces of information.

7. Calculate normal body temperature (37°C) on the Kelvin scale.

Section 4.2

9. An experiment requires that each student use an 8.5-cm length of magnesium ribbon. How many students can perform the experiment if there is a 570-cm length of magnesium ribbon available?

10. A 1.00-degree increase on the Celsius scale is equivalent to a 1.80-degree increase on the Fahrenheit scale. If a temperature increases by 48.0 °C, what is the corresponding temperature increase on the Fahrenheit scale?

11. Using tables from Chapter 3, convert the following. (2 pts.)

a. 0.044 km to meters

b. 4.6 mg to grams

c. 8.9 m to decimeters

d. 0.107 g to centigrams

12. Convert the following. (2 pts.)

a. 15 cm³ to liters

b. 7.38 g to kilograms

c. 0.67 s to milliseconds

d. 94.5 g to micrograms

13. Use dimensional analysis and the given densities to make the following conversions. (2 pts.)

a. 14.8 g of boron to cubic centimeters of boron. The density of boron is 2.34 g/cm^3 .

b. 2.8 L of argon to grams of argon. The density of argon is 1.78 g/L

c. 4.62 g of mercury to cubic centimeters of mercury. The density of mercury is 13.5 g/cm^3 .

14. Check your answers to question 13 by applying the equation: Density = mass/ volume.

a.

b.

c.

Section Review 4.2

15. What conversion factor would you use to convert between these pairs of units?

a. minutes to hours

b. grams of water to cubic centimeters of water

c. grams to milligrams

d. cubic decimeters to milliliters

16. Make the following conversions. Express your answers in scientific notation. (3 pts.)

a. 36 cm to meters

b. 14.8 g to micrograms

c. 1.44 kL to liters

d. 68.9 m to decimeters

e. 3.72×10^{-3} kg to grams

f. 66.3 L to cubic centimeters

17. A 2.00-kg sample of bituminous coal is composed of 1.30 kg of carbon, 0.20 kg of ash, 0.15 kg of water, and 0.35 kg of volatile (gas-forming) material. Using this information, determine how many kilograms of carbon are in 125 kg of this coal.

19. An atom of gold has a mass of 3.271×10^{-22} g. How many atoms of gold are in 5.00 g of gold?

Section 4.3

22. How many minutes are there in exactly one week?

23. How many seconds are there in exactly a 40-hour work week?

24. Gold has a density of 19.3 g/cm^3 . What is the density in kilograms per cubic meter?

25. There are 7.0×10^6 red blood cells (RBC) in 1.0 mm^3 of blood. How many red blood cells are in 1.0 L of blood?

28. Convert the following. Express your answers in scientific notation. (2 pts.)

a. $7.5 \times 10^4 \text{ nm}$ to kilometers

b. $3.9 \times 10^5 \text{ mg}$ to decigrams

c. 0.764 km to centimeters

d. $2.21 \times 10^{-4} \text{ dL}$ to microliters

29. Light travels at a speed of $3.00 \times 10^{10} \text{ cm/s}$. What is the speed of light in kilometers per hour?

Chapter 4 Review

33. A volume of 5.00 mL of mercury is added to a beaker that has a mass of 87.3 g. What is the mass of the beaker with the added mercury? 4.1

34. What is the name given to a ratio of two equivalent measurements? 4.2

38. One of the first mixtures of metal used by dentists for tooth fillings consisted of 26.0 g of silver, 10.8 g of tin, 2.4 g of copper, and 0.8 g of zinc. How much silver is in a 25.0 g sample of this amalgam? 4.2

40. The density of dry air measured at 25 °C is $1.19 \times 10^{-3} \text{ g/cm}^3$. What is the volume of 50.0 g of air? 4.2

67. Sea water contains $8.0 \times 10^{-1} \text{ cg}$ of the element strontium per kilogram of sea water. Assuming that all the strontium could be recovered, how many grams of strontium could be obtained from one cubic meter of sea water? Assume the density of sea water is 1.0 g/mL.