General Chemistry
Mr. MacGillivray
Test, Chs. 1 & 2

Possibly useful formulas:

$K = {}^{\circ}C + 273$ $\qquad D = \frac{m}{V}$

A. Matching

Match each description in Column B with the correct term in Column A. Write the letter of the correct description in the blank provided.

C **1.** theory
J **2.** observations
I **3.** experiment
B **4.** precision
K **5.** 1 liter
G **6.** temperature
E **7.** volume
A **8.** weight
D **9.** 1 kilogram
H **10.** accuracy
F **11.** density

a. a measure of the force of gravity on an object
b. a measure of the reproducibility of a measurement
c. an explanation of events based upon the results of experiments
d. the basic unit of mass in the metric system
e. the amount of space that something occupies
f. the ratio of a mass of an object to its volume ($= \frac{m}{V}$)
g. a measure of the average kinetic energy of a substance; the degree of hotness or coldness of an object
h. the closeness of a measurement to the accepted value
i. a test of a hypothesis
j. a scientist's descriptions of some phenomenon
k. the volume of a cube that is 10 cm on each edge $10\,cm \times 10cm \times 10cm = V = 1000cm^3 = 1000ml = 1\,L$

B. Multiple Choice

Choose the best answer and write its letter in the blank.

D **12.** How many significant figures are in the measurement 2103.2 g?

a. 2
b. 3
c. 4
d. 5

D **13.** Which of these equalities is ***NOT*** correct?

a. 100 cg = 1 g
c. 1 cm^3 = 1 ml
b. 1000 mm = 1m
d. 10 kg = 1 g

B **14.** How many of the zeros in the measurement 0.000040200 m are significant?

a. 2
c. 7
b. 3
d. 8

A **15.** How many milligrams are in 2.5 kg?

a. 2.5 x 10^6 mg
c. 2.5 x 10^{-4} mg
b. 25 mg
d. 2.5 x 10^2 mg

C **16.** The closeness of a measurement to its true value is a measure of its:

a. usefulness
c. accuracy
b. precision
d. reproducibility

B **17.** Which of these measurements is expressed to three significant figures?

a. 0.070 mm
c. 7077 mg
b. 7.30 x 10^{-7} km
d. 0.007 m

A **18.** A metric unit of volume is the

a. L
c. km
b. mg
d. K

D **19.** The temperature at which the molecules in a substance would stop completely is

a. absolute zero
c. -273°C
b. 0 Kelvins
d. all of these are correct

B **20.** The metric prefix *kilo-* means

a. 100 times smaller
c. 1000 times smaller
b. 1000 times larger
d. 100 times larger

(21) $D = \frac{m}{V} \Rightarrow 0.70\,g/ml = \frac{60.0\,g}{V} \Rightarrow V = \frac{60.0\,g}{0.70\,g/ml} = 86\,ml$

A **21.** What is the volume of 60.0 g of ether if the density of ether is 0.70 g/ml?

a. 86 ml
c. 2.4×10^{-2} ml
b. 1.2×10^{-2} ml
d. 42 ml

D **22.** The temperature reading of -14°C corresponds to a Kelvin reading of:

$K = °C + 273$

a. 296.7 K
c. 287 K
b. -287 K
d. 259 K

B **23.** Concentrated hydrochloric acid has a density of 1.19 g/ml. What is the mass, in grams, of 2.00 ***liters*** of this acid?

$D = \frac{m}{V}$ "m" "V" "D"

$2.00\,L \times \frac{1000\,ml}{1\,L} = 2000\,ml$

$1.19\,g/ml = \frac{m}{2000\,ml}$

$m = 2380\,g$

a. 2.38×10^{-3} g
c. 4.20×10^{-4} g
b. 2.38×10^{3} g
d. 4.20×10^{4} g

A **24.** What is the mass, in grams, of a cubic centimeter of balsa wood if the density of balsa wood is 0.02 g/ml?

$\approx 1\,cm^3 = V$

$D = \frac{m}{V}$ $0.02\,g/ml = \frac{m}{1.00\,ml}$

$m = 0.02\,g$

a. 2.0×10^{-2} g
c. 2.0×10^{3} g
b. 2.0×10^{5} g
d. 2.0×10^{-1} g

D **25.** Chlorine boils at 239 K. What is the boiling point of chlorine expressed in degrees Celsius?

$K = °C + 273$

$239\,K = °C + 273$

$°C = -34°C$

a. 93°C
c. -61°C
b. 34°C
d. -34°C

B **26.** A student measures the density of metal ball bearings (BBs) 6 times. The density that was determined was the exact same each time. From this information alone, it can be said that the student's measurements showed a high degree of

a. error
c. accuracy
b. precision
d. none of these answers

C. Problems

Solve the following problems. Show your work for #27 & # 28. Circle or put a box around your final answer.

27. A cube of gold-colored metal with a volume of 64 cm^3 has a mass of 980 g. The density of pure gold is 19.3 g/cm^3. (a) Is the metal pure gold? (b) Why or why not?

Work: $D = \frac{m}{V} = \frac{980g}{64cm^3} = 15.3 g/cm^3$

(a) Answer: NO

(b) Reason: The D of the metal ≠ D of gold.

28. (a) Calculate the density of a mystery liquid that has a mass of 14.0 g and a volume of 18.0 cm^3.

(b) Assuming that the density of water is 1.00g/cm^3, will this mystery liquid float or sink in water?

(c) Why?

(a) Work and answer:

$D = \frac{14.0g}{18.0cm^3} = 0.778 g/cm^3$

(b) Will it sink or float in water?

FLOAT

(c) What is your reason for your answer to (b)?

The D of the liquid is less than that of water.

29. Perform the following operations, giving the answers to the correct number of significant figures. No work needs to be shown.

(a) 36.47 cm + 2.721 cm + 15.1 cm = ~~54.291~~ 54.3 cm

2 to the right; 3 to the right; 1 to the right → 1 to the right

(b) (5.6 x 10^3 m) x (3.60 x 10^{-2} m) = ~~20.16~~ 2.0×10^2 m^2

"200" is incorrect.

"200" does not have the correct # of sig figs

2 total; 3 total → 2 sig figs total