NAME: _____ Chemistry: Chapter 3 Review for Test

A) Temperature – degree of hotness or coldness of an object

B) Density – the ratio of the mass of an object to its volume

a. Labels: g/ml, g/cm^3, g/L, kg/ml, kg/cm^3, kg/L

b. Formulas: Density = mass / volume; Mass = Density x Volume; Volume = mass / Density

1) A rock has a mass of 127 g and a volume of 32.1 mL of water.
What is the density of the rock?

$D = \frac{m}{V} = \frac{127\ g}{32.1\ mL} = 3.956386293$

3.96 g/mL
3 digits

2) A 5.0 L container of air has a density of 1.20 g/L at 20.° C
What is the mass of the air?

$m = D \cdot V = \left(\frac{1.20\ g}{L}\right)(5.0\ L) = 6$

6.0 g
2 digits

3) A copper penny has a mass of 3.10 g and a density of 8.90 g/cm^3.
What is the volume of the penny in cm^3?

$V = \frac{m}{D} = \frac{3.10\ g}{8.90\ g/cm^3} = 0.348314606741573$

0.348 cm^3
3 digits

C) Weight – a measure of the pull on a given mass by Earth's gravity

D) Precision – how close several measurements are to each other

E) Accuracy – how close a single measurement comes to the actual value of whatever is being measured

F) SI or metric unit for volume is the Liter (L)

G) SI base unit for length is the meter (m)

H) Determining Significant Digits:

a. Numbers *without* a decimal, draw an arrow from the right until you hit a nonzero number; then start counting the digits that follow.

b. Numbers with a decimal, draw an arrow from the left until you hit a nonzero number; then start counting the digits that follow.

4) 3.85×10^{-3} dm — 3
5) 17.30 cm^3 — 4
6) 0.0037 mm — 2
7) 1 235 000 L — 4
8) 0.05730 m — 4
9) 0.00073 g — 2
10) 8 765 m — 4
11) 40.007 kg — 5
12) 8.750×10^{-2} g — 4
13) 1.0720 L — 5
14) 410 L — 2

I) Addition and Subtraction – look at how many digits are after the decimal of the numbers you were given in the problem. Your answer must have the same number of digits after the decimal as the LEAST amount in the original numbers.

J) Multiplication and Division – look at how many significant digits are in each of the numbers you were given in the problem. Your answer must have the same number of total significant digits as the LEAST amount in the original numbers.

15) 37.2 mL + 18.0 mL + 380 mL = 435 mL

435.2 ↑ nothing after decimal

16) 0.57 cm × 0.86 cm × 17.1 cm = 8.4 cm^3

2 digits ← 8.38242

17) $(8.13 \times 10^4\ g) \div (3.8 \times 10^2\ mL)$ = 210 g/mL or 2.1×10^2 g/mL

↖ 2 digits

213.947368421 05

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K) Temperature Conversions (K = C + 273, C = K – 273) Use addition / subtraction rules for Significant Digits

18) If hydrogen boils at 20K, what is the boiling point of hydrogen in °C? **-253 °C**

$C = K - 273 = (20\ K) - 273 = -253$

19) A chemical reaction takes place at 20°C. What is this temperature in Kelvins? **293 K**

$K = C + 273 = (20\ °C) + 273 = 293$

L) **Unit Conversions** Use multiplication / division rules for Significant Digits

20) 125 g to kilograms

$125\ g \cdot \frac{1\ kg}{1000\ g} = .125$

.125 kg — 3 digits

21) 0.12 L to mL

$0.12\ L \cdot \frac{1000\ mL}{1\ L} = 120$

120 mL — 2 digits

22) 456 000 g to kg

$456000\ g \cdot \frac{1\ kg}{1000\ g} = 456$

456 kg — 3 digits

23) 5.19 L to mL

$5.19\ L \cdot \frac{1000\ mL}{1\ L} = 5190$

5190 mL — 3 digits

24) 35.7 ft to meters

$35.7\ ft. \frac{0.3048\ m}{1\ ft} = 10.88136$

10.9 m — 3 digits

25) 135 000 kg to metric tons

$135\ 000\ kg \cdot \frac{1\ metric\ ton}{1000\ kg} = 135$

135 metric tons — 3 digits

26) 1.057 km to cm

$1.057\ km \cdot \frac{1000\ m}{1\ km} \cdot \frac{100\ cm}{1\ m} = 105700$

105,700 cm — 4 digits

M) Convert these numbers from Scientific Notation to Standard Notation Round to 3 digits

27) 2.45×10^{-7} .000 000 245 — 3 digits — **.000 000 245**

28) 3.109×10^{5} 310 900 — 3 digits — **311 000**

29) 5.080×10^{3} 5080 — 3 digits — **5080**

30) 4.1823×10^{-4} .000 418 23 — 3 digits — **.000 418**

N) Convert these numbers from Standard Notation to Scientific Notation

31) 0.000 450 4.50×10^{-4} — **4.50×10^{-4}**

32) 1 298 000 000 1.298×10^{9} — **1.30×10^{9}**

33) 0.002 703 2.703×10^{-3} — **2.70×10^{-3}**

34) 1 750 1.75×10^{3} — **1.75×10^{3}**

35) 0.013 1.3×10^{-2} — **1.30×10^{-2}**