

Honors Chemistry
Math Review

Name KEY
Period _____

1) Circle the unit in each of the following pairs that represents the larger quantity.

- a) millimeter, centimeter d) deciliter, milliliter
 b) picometer, micrometer e) nanopascal, megapascal
 c) kilogram, centigram f) microsecond, decisecond

2) Give the name of the following quantities. For example: 0.1 gram = 1 decigram.

- a) 0.001 m = 1 mm d) 0.000000000001 s = 1 ps
 b) 0.000001 s = 1 μs e) 1000000 L = 1 ML
 c) 0.01 g = 1 cg f) 1000 g = 1 kg

3) Convert the following:

- a) 895 picoseconds to seconds $895 \times 10^{-12} = \boxed{0.000000000895 \text{ s}}$
 $8.95 \times 10^{-10} \text{ s}$
 b) 1.098 km to m $1.098 \times 10^3 = \boxed{1098 \text{ m}}$
 c) 0.924 kilogram to milligrams $\boxed{924,000 \text{ mg}}$
move 6 →
 d) 491 dm³ to liters $\boxed{491 \text{ L}}$
 e) 0.852 m³ to cm³ $0.852 \times 10^6 = \boxed{852,000 \text{ cm}^3}$
 $1 \text{ m}^3 = 100 \times 100 \times 100 = 1,000,000 \text{ cm}^3$

Know
K H D b d c m
μ → × 10⁻⁶
n → × 10⁻⁹

4) Express the following numbers in scientific notation:

- a) 0.00000000003602 3.602×10^{-11} c) 0.021 2.1×10^{-2}
 b) 85,070 8.507×10^4 d) 0.0000026 2.6×10^{-6}

5) How many significant digits in each of the following?

- a) 4006 4 d) 5680 3
 b) 0.00023 2 e) 79.00 4
 c) 100.00 5 f) 4600 2

6) Perform the following operations. Give answers with the proper number of significant digits and unit.

- a) 4.5 ml - 3.56 ml = 0.94 ⇒ 0.9 ml
 b) 5.47 dg + 7.26 dg + 100.02 dg + 14.8 dg = 127.55 ⇒ 127.6 dg
 c) 68.3 km x 18.4 km x 2.2 km = 2764.784 ⇒ 2800 km³
 d) 62.34 mi² / 17.4 mi = 3.58 mi

7) Volume-Density. Perform the following calculations. Show your work. Give answers with the proper number of significant digits and unit.

- a) A block of wood is 6.0 cm long, 4.0 cm wide and 3.0 cm high. What is the volume of this block of wood?

$$V = l \times w \times h = \underset{2}{6.0\text{cm}} \times \underset{2}{4.0\text{cm}} \times \underset{2}{3.0\text{cm}} = \boxed{\underset{2}{72\text{cm}^3}}$$

- b) The water level in a graduated cylinder moves from the 18.0 ml mark to the 24.0 ml mark when a pebble is placed in the water. What is the volume of the pebble?

$$\underset{2}{24.0\text{mL}} - \underset{2}{18.0\text{mL}} = \boxed{\underset{2}{6.0\text{mL}}}$$

- c) A sample of gas has a volume of 201 cubic centimeters and a mass of 0.36 grams. What is the density of the gas sample?

$$D = \frac{m}{V} = \frac{\underset{2}{0.36\text{g}}}{\underset{3}{201\text{cm}^3}} = \boxed{\underset{2}{0.0018\text{g/cm}^3}}$$

- d) What is the area of a sheet of tin foil that is 25.4cm by 3.7dm?

$$a = l \times w \quad \rightarrow 37\text{cm}$$

$$a = \underset{3}{25.4\text{cm}} \times \underset{2}{37\text{cm}} = \boxed{\underset{2}{940\text{cm}^2}} \text{ or } \boxed{\underset{2}{9.4\text{dm}^2}}$$

- e) What is the mass of 12.0 cm³ of water?

$$\underset{3}{12.0\text{cm}^3} \rightarrow \underset{3}{12.0\text{mL}} = \boxed{\underset{3}{12.0\text{g H}_2\text{O}}}$$

- f) 2.5kg of oil was dumped into a rectangular tank that measures 27.0m by 35.4m. The density of oil is 0.750 g/cm³. How thick was the oil at the bottom of the tank?

$$V = \frac{m}{D} = \frac{\underset{2}{2.5\text{kg}}}{\underset{3}{0.750\text{g/cm}^3}} = \frac{\underset{2}{2500\text{g}}}{\underset{3}{0.750\text{g/cm}^3}} = \underset{2}{3333.33\text{cm}^3}$$

$$h = \frac{V}{A} = \frac{\underset{2}{3333.33\text{cm}^3}}{\underset{3}{2700\text{cm}} \times \underset{3}{3540\text{cm}}} = \boxed{\underset{2}{0.00035\text{cm}}}$$