

Chemistry 1  
Test 1 - Review Problems

Perform each of the following conversions:

1. Express the following in grams:

a) 900 mg  $\times \frac{1g}{1000mg}$   
 $= 0.9g$

c) 0.0300 pounds  $\times \frac{454g}{1lb.}$   
 $= 13.6g$

2. Express the following in liters:

a) 367.0 mL  $\times \frac{1L}{1000mL}$   
 $= 0.367L$

c) 0.950 quarts  $\times \frac{1L}{1.06qt}$   
 $= 0.896L$

3. Express the following in meters:

a) 80600  $\mu m$   $\times \frac{1m}{1 \times 10^6 \mu m}$   
 $= 0.0806m$

c) 39.5 inches  $\times \frac{1m}{39.4 in}$   
 $= 1m$

b) 23.0 kg  $\times \frac{1000g}{1kg}$   
 $= 23,000g$

d) 540.0 mg  $\times \frac{1g}{1000mg}$   
 $= 0.54g$

b) 6800 cm<sup>3</sup>  $\times \frac{1L}{1000cm^3}$   
 $= 6.8L$

d) 10701 mL  $\times \frac{1L}{1000mL}$   
 $= 10.701L$

b)  $5.80 \times 10^4$  mm  $\times \frac{1m}{1000mm}$   
 $= 58m$

d) 0.0540 miles  $\times \frac{1km}{0.621m} \times \frac{1m}{.001km}$   
 $= 87m$

4 a) Tell the number of significant figures in the following:

0.04500 4

$9.100 \times 10^{15}$  4

78000 2

10.0090 6

b) Round to three significant figures:

98.660 98.7

$0.6701 \times 10^2$   $0.670 \times 10^2$

3600  $3.60 \times 10^3$

70.0800 70.1

c) Perform each of the following calculations to the correct number of significant figures:

$$86.00 \times 0.0810 = 6.97$$

$$96.20 + 5.1002 + 25.5 = 126.8$$

$$89.900 - 23.6 = 66.3$$

$$56.01 / 0.090 = 620$$

5. A box measures 14.00 cm X 2.01 cm X 6.00 cm. What is its volume in liters?

$$169 \text{ cm}^3 \quad 0.169 \text{ L}$$

6. A piece of metal weighs 5.00 g and it displaces 0.830 mL of water. What is its density in g/cm<sup>3</sup>?

$$d = m/V = \frac{5.00 \text{ g}}{0.830 \text{ mL}} = 6.02 \text{ g/cm}^3$$

7. A student has found the density of lead to be 11.3 g/cm<sup>3</sup>. What is the volume displacement of 35.01 g of lead?

$$V = m/d = \frac{35.01 \text{ g}}{11.3 \text{ g/cm}^3} = 3.10 \text{ cm}^3$$

8. The density of zinc is 7.14 grams per milliliter. What is the mass of 0.090 liters of zinc?

$$m = d \times V = (7.14 \text{ g/mL})(90. \text{ mL}) = 640 \text{ g}$$

9. Calculate the density (in g/mL) of a metal block with a mass of 65.30 grams and dimensions 6.90 cm X 7.20 cm X 1.0 cm.

$$V = 50. \text{ cm}^3$$

$$d = m/V = 65.30 \text{ g} / 50. \text{ mL} = 1.3 \text{ g/mL}$$

10. The mass of an unknown metal is 10.00 grams. The volume reading on a graduated cylinder is 4.00 mL initially and is 6.25 mL after the metal is added to the cylinder. What is the density (in grams/cm<sup>3</sup>) of the metal?

$$V = 6.25 - 4.00 \text{ mL} = 2.25 \text{ mL}$$

$$d = m/V = \frac{10.00 \text{ g}}{2.25 \text{ mL}} = 4.44 \text{ g/cm}^3$$

11. Calculate the mass of a piece of metal that has a density of 6.90 g/mL and a volume of 2.00 cm<sup>3</sup>.

$$m = d \times V = (6.90 \text{ g/mL})(2.00 \text{ mL}) = 13.8 \text{ g}$$

12. Calculate the percent error for an experiment when the density of a metal was found to be 2.54 g/mL. The accepted density of the metal when looked up in a handbook was 2.70 g/mL.

$$\% \text{ error} = \frac{|\text{accepted value} - \text{experimental value}|}{\text{accepted value}} \times 100$$

$$\% \text{ error} = \frac{|2.70 - 2.54|}{2.70} \times 100 = 5.93\%$$

12. Complete the following table

	Symbol	Atomic #	Mass #	Protons	Neutrons	Electrons
A.	<sup>17</sup> O	<u>8</u>	<u>17</u>	<u>8</u>	<u>9</u>	<u>8</u>
B.	<sup>199</sup> Hg	80	199	<u>80</u>	<u>119</u>	<u>80</u>
C.	<sup>200</sup> Hg	<u>80</u>	<u>200</u>	80	120	<u>80</u>
D.	<sup>8</sup> Be	4	<u>8</u>	<u>4</u>	4	<u>4</u>
E.	<sup>32</sup> P	<u>15</u>	<u>32</u>	<u>15</u>	<u>17</u>	<u>15</u>
F.	<sup>29</sup> Si	14	29	<u>14</u>	<u>15</u>	<u>14</u>
G.	<sup>123</sup> Sb	<u>51</u>	123	51	<u>72</u>	<u>51</u>
H.	<sup>104</sup> Ru	<u>44</u>	<u>104</u>	44	60	<u>44</u>