CHM 151 Quiz 1a   25 Pts   Spring 2018   Name: ___Key___

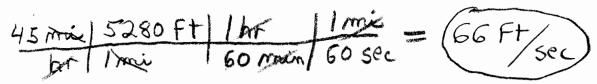**Show All Work To Receive Credit!**   Conversion factors and prefixes:

$G = 10^9$, $M = 10^6$, $k = 10^3$, $c = 10^{-2}$, $m = 10^{-3}$, $\mu = 10^{-6}$, $n = 10^{-9}$, 2.54 cm = 1 in,
12 in = 1 ft, 5280 ft = 1 mile, 3 feet = 1 yd, 60 sec = 1 min, 1 hr = 60 min, 4 quarts = 1 gal, 2 pints = 1 quart

1. (4 Pts) An antelope can run as fast as 45 miles per hour (45mi/hr).   How fast is this in feet per second?

$$\frac{45 \text{ mi}}{\text{hr}} \left| \frac{5280 \text{ Ft}}{1 \text{ mi}} \right| \frac{1 \text{ hr}}{60 \text{ min}} \left| \frac{1 \text{ mi}}{60 \text{ sec}} \right. = \boxed{66 \text{ Ft/sec}}$$

2. (6 Pts)) Perform each of the following conversions. You must show the complete setup.

a. Convert 99 mL to μL
$$\frac{99 \text{ mL}}{} \left| \frac{10^{-3}}{\text{m}} \right| \frac{\mu}{10^{-6}} = \boxed{99 \times 10^3 \, \mu L \text{ or } 9.9 \times 10^4 \\ \text{ or } 99,000 \, \mu L}$$

b. Convert 105 nL to mL.
$$\frac{105 \text{ nL}}{} \left| \frac{10^{-9}}{n} \right| \frac{m}{10^{-3}} = \boxed{105 \times 10^{-6} \text{ mL or } 1.05 \times 10^{-4}}$$

3. (6 Pts)) Assume each of following numbers are measurements. Perform the indicated operations and then report the answer with the **proper number of significant figures.**

a.   32.14 cm + 12.126 cm + 0.12 cm = ___44.39___ cm

$\overset{\text{to this place}}{\underset{\downarrow}{}}$

b. 1.25 cm x 2.41 cm x 1.145 cm = ___3.45___ cm³

3 S.F.

c.   (4.2 + 18.3) / 3.145 = ___7.15___

$\frac{22.5 \leftarrow \text{place}(3 \text{ S.F.})}{3.145}$

4. (4 Pts) Chloroform, CHCl₃, has a density of 1.48 g/mL. How many mL of chloroform are needed to provide 35.0 g?

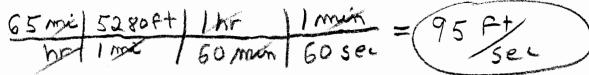$$\frac{35.0 \text{ g}}{} \left| \frac{\text{mL}}{1.48 \text{ g}} \right. = \boxed{23.6 \text{ mL}}$$

5. (5 Pts) A sample of silver ore was found to contain 0.26 % silver by mass. How many **grams** of silver can be recovered 400.0 kg of ore?

$$\frac{400.0 \times 10^3 \text{ g ore}}{} \left| \frac{0.26 \text{ Ag}}{100 \text{ ore}} \right. = \boxed{1040 \text{ g Ag}}$$

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12 in = 1 ft, 5280 ft = 1 mile, 3 feet = 1 yd, 60 sec = 1 min, 1 hr = 60 min, 4 quarts = 1 gal, 2 pints = 1 quart

1. (4 Pts) An cheetah can run as fast as 65 miles per hour (65mi/hr).   How fast is this in feet per second?

$$\frac{65\,mi}{hr}\left|\frac{5280\,ft}{1\,mi}\right|\frac{1\,hr}{60\,min}\left|\frac{1\,min}{60\,sec}\right. = \boxed{95\,\frac{ft}{sec}}$$

2. (6 Pts)) Perform each of the following conversions. You must show the complete setup.

a. Convert 205 mL to nL. $\dfrac{205\,mL}{}\left|\dfrac{10^{-3}}{mL}\right|\dfrac{n}{10^{-9}} = \boxed{\begin{array}{l}205 \times 10^6\,nL \\ 2.05 \times 10^8\,nL\end{array}}$

b. Convert 235 µL to mL. $\dfrac{235\,\mu L}{}\left|\dfrac{10^{-6}}{\mu}\right|\dfrac{m}{10^{-3}} = \boxed{\begin{array}{l}235 \times 10^{-3}\,mL \\ 2.35 \times 10^{-1}\,mL\end{array}}$

3. (6 Pts)) Assume each of following numbers are measurements. Perform the indicated operations and then report the answer with the proper number of significant figures.

Place
↙

a.   112.14 cm + 12.126 cm + 0.12 cm = ___124.39___ cm

b. 1.25 cm x 22.1 cm x 1.145 cm = ___31.6___ cm³

c.   (4.2 + 18.3) / 7.745 = ___2.91   3 S.F.___

$$\begin{array}{r}4.2 \\ 18.3 \\ \hline 22.5\end{array} \div 7.745$$

4. (4 Pts) Chloroform, CHCl₃, has a density of 1.48 g/mL. How many mL of chloroform are needed to provide 228.0 g?

$$\frac{228.0\,g}{}\left|\frac{mL}{1.48\,g}\right. = \boxed{154\,mL}$$

5. (5 Pts) A sample of silver ore was found to contain 0.016 % silver by mass. How many grams of silver can be recovered 500.0 kg of ore?

$$\frac{500.0 \times 10^3\,g\ ore}{}\left|\frac{0.016\,Ag}{100\ ore}\right. = \boxed{80\,g\,Ag}$$