

SHOW ALL WORK TO RECEIVE CREDITG = 10^9 , M = 10^6 , k = 10^3 , c = 10^{-2} , m = 10^{-3} , μ = 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, 454 g = 1 lb. Avogadro's number = 6.02×10^{23} .

***Molar Masses: H 1.008, O 16.00, Na 22.99, Mg 24.31, P 30.97, Cl 34.45, Ca 40.08

1. (6 Pts) a. Determine the molar mass of
- $\text{Mg}_3(\text{PO}_4)_2$

$$\begin{array}{l} 3 \times 24.31 \\ 2 \times 30.97 \\ 8 \times 16.00 \end{array} = 262.87 \frac{\text{g}}{\text{mol}}$$

- b. Determine the percentage of Mg in
- $\text{Mg}_3(\text{PO}_4)_2$
- .

$$\frac{3(24.31)}{262.87} \times 100 = 27.74\%$$

2. (4 Pts) Chloroform,
- CHCl_3
- , has a density of 1.48 g/mL. Determine the mass of 237 mL of chloroform.

$$237 \text{ mL} \times 1.48 \frac{\text{g}}{\text{mL}} = 350.78 \Rightarrow 351 \text{ g}$$

3. (8 Pts) Complete the following table:

Element or ion name	Element or ion symbol	Number of Protons	Number of Electrons	Number of Neutrons
Calcium-40	Ca-40	20	20	20
aluminum-27	Al-27	13	13	14
A sodium-23 <u>cation</u>	Na_{23}^+	11	10	12
An fluorine-19 <u>anion</u>	F_{19}^-	9	10	10

4. (3 Pts) How many moles are in 27.3 g of NaOH?

$$\frac{27.3 \text{ g}}{40.0 \frac{\text{g}}{\text{mol}}} = 0.683 \text{ mol}$$

5. (4 Pts) The recommended adult dose of Elixophyllin
- [®]
- , a drug used to treat asthma, is 6 mg/kg of body mass. Calculate the dose in milligrams for a 185 lb person.

$$\frac{185 \text{ lb}}{2.2} \times \frac{454 \text{ g}}{1 \text{ kg}} \times \frac{6 \text{ mg}}{1 \text{ kg}} = 504 \text{ mg}$$

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***Molar Masses: H 1.008, O 16.00, Na 22.99, Mg 24.31, P 30.97, Cl 34.45, Ca 40.08

1. (4 Pts) Chloroform,
- CHCl_3
- , has a density of 1.48 g/mL. Determine the mass of 612 mL of chloroform.

$$\frac{612 \text{ mL}}{1} \times \frac{1.48 \text{ g}}{\text{mL}} = 905.8 \Rightarrow \boxed{906 \text{ g}}$$

2. (6 Pts) a. Determine the molar mass of
- $\text{Ca}_3(\text{PO}_4)_2$

$$\begin{array}{l} 3 \times 40.08 \\ 2 \times 30.97 \\ 8 \times 16.00 \end{array}$$

$$\boxed{310.18 \frac{\text{g}}{\text{mol}}}$$

- b. Determine the percentage of Ca in
- $\text{Ca}_3(\text{PO}_4)_2$
- .

$$\frac{3(40.08)}{310.18} \times 100 = \boxed{38.76\%}$$

3. (8 Pts) Complete the following table:

Element or ion name	Element or ion symbol	Number of Protons	Number of Electrons	Number of Neutrons
Sodium-23	Na-23	11	11	12
iodine-136	I-136	53	53	83
An chlorine-35 anion	Cl_{35}^-	17	18	18
A magnesium-23 cation	Mg_{23}^{2+}	12	10	11

4. (3 Pts) How many moles are in 57.3 g of NaCl?

$$\frac{57.3 \text{ g}}{57.44 \text{ g/mol}} = \boxed{0.998 \text{ mol}}$$

5. (4 Pts) The recommended adult dose of Elixophyllin
- [®]
- , a drug used to treat asthma, is 6 mg/kg of body mass. Calculate the dose in milligrams for a 135 lb person.

$$\frac{135 \text{ lb}}{2.2} \times \frac{454 \text{ g}}{1 \text{ kg}} \times \frac{6 \text{ mg}}{1 \text{ kg}} = \boxed{357 \text{ mg}}$$