

**Ch.3 AP Chem REVIEW**

**Name:**

**Date:**

**Hour:**

1.Roundup, an herbicide manufactured by Monsanto, has the formula  $C_3H_8NO_5P$ . How many moles of molecules are there in a 295.1-g sample of Roundup?

$$\frac{295.1 \text{ g } C_3H_8NO_5P}{169.09 \text{ g } C_3H_8NO_5P} \times 1 \text{ mol } C_3H_8NO_5P = 1.745 \text{ mol } C_3H_8NO_5P$$

- A) 0.5729
- B) 2.137
- C) 1.745
- D) 16.39
- E) none of these

2.Each molecule of testosterone contains 19 atoms of carbon (plus other atoms). The mass percent of carbon in testosterone is 79.12%. What is the molar mass of testosterone?

- A) 576.8 g/mol
- B) 180.5 g/mol
- C) 228.2 g/mol
- D) 240.1 g/mol
- E) 288.4 g/mol

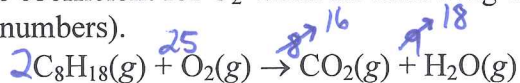
$$\frac{\text{part}}{\text{whole}} \times 100 = \% \quad \text{whole} = \frac{(19 \times 12.01)}{(.7912)} = 288.8 \text{ g/mol}$$

2.Hydrocortisone valerate is an ingredient in hydrocortisone cream, prescribed for skin problems. Its molecular formula is  $C_{26}H_{38}O_6$ . What is the percent by mass of carbon in hydrocortisone valerate?

- A) 69.9%
- B) 43.6%
- C) 54.2%
- D) 76.9%
- E) 60.1%

$$\frac{\text{part}}{\text{whole}} \times 100 = \frac{(312.26)}{(446.64)} \times 100 = 69.9\%$$

4.Determine the coefficient for  $O_2$  when the following equation is balanced in standard form (smallest whole numbers).



- A) 8
- B) 17
- C) 18
- D) 25
- E) 16

5. In the balanced equation for the reaction:

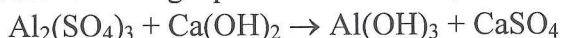


if  $x$  equals 2, the coefficient  $z$  equals:

- A) 2
- B) 4
- C) 6
- D) 10
- E) none of these**



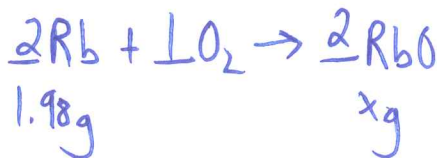
6. When the following equation is balanced, what is the sum of the coefficients?



- A) 4
- B) 9**
- C) 8
- D) 7
- E) 10



7. When rubidium metal is exposed to air, two atoms of rubidium, Rb, combine with one atom of oxygen. If 1.98 grams of rubidium is exposed to air, what will be the mass of the product in grams?



- A) 17.98 g
- B) 2.17 g
- C) 9.98 g
- D) 8.66 g
- E) 4.33 g

$$\frac{1.98 \text{ g Rb}}{85.47 \text{ g Rb}} \times \frac{1 \text{ mol Rb}}{2 \text{ mol Rb}} \times \frac{2 \text{ mol RbO}}{1 \text{ mol RbO}} \times \frac{101.47 \text{ g RbO}}{1 \text{ mol RbO}} = \boxed{2.35 \text{ g RbO}}$$

8. Nitric oxide, NO, is made from the oxidation of  $\text{NH}_3$ , and the reaction is represented by the equation:



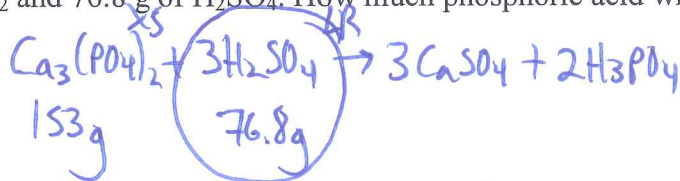
What mass of  $\text{O}_2$  would be required to react completely with 6.85 g of  $\text{NH}_3$ ?

$$6.85 \text{ g } \times \text{g}$$

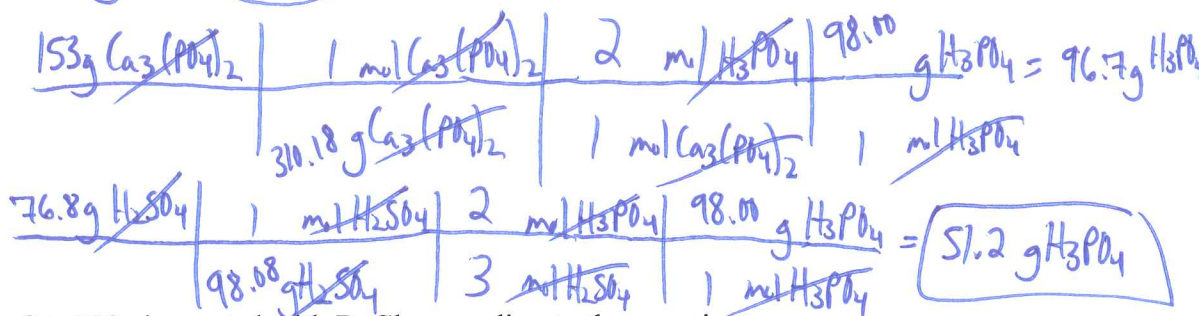
- A) 4.56 g  $\text{O}_2$
- B) 10.3 g  $\text{O}_2$
- C) 8.04 g  $\text{O}_2$
- D) 16.1 g  $\text{O}_2$**
- E) 12.9 g  $\text{O}_2$

$$\frac{6.85 \text{ g NH}_3}{17.04 \text{ g NH}_3} \times \frac{1 \text{ mol NH}_3}{4 \text{ mol NH}_3} \times \frac{5 \text{ mol O}_2}{4 \text{ mol NH}_3} \times \frac{32.00 \text{ g O}_2}{1 \text{ mol O}_2} = \boxed{16.1 \text{ g O}_2}$$

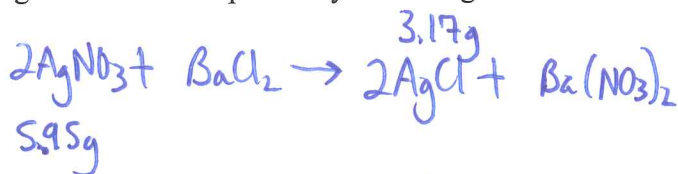
9. Suppose the reaction  $\text{Ca}_3(\text{PO}_4)_2 + 3\text{H}_2\text{SO}_4 \rightarrow 3\text{CaSO}_4 + 2\text{H}_3\text{PO}_4$  is carried out starting with 153 g of  $\text{Ca}_3(\text{PO}_4)_2$  and 76.8 g of  $\text{H}_2\text{SO}_4$ . How much phosphoric acid will be produced?



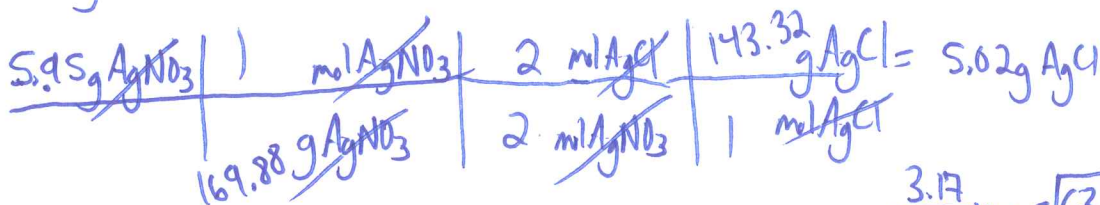
- A) 76.7 g  
 B) 51.1 g  
 C) 229.8 g  
 D) 115.1 g  
 E) 96.7 g



10. A 5.95-g sample of  $\text{AgNO}_3$  is reacted with  $\text{BaCl}_2$  according to the equation  $2\text{AgNO}_3(\text{aq}) + \text{BaCl}_2(\text{aq}) \rightarrow 2\text{AgCl}(\text{s}) + \text{Ba}(\text{NO}_3)_2(\text{aq})$  to give 3.17 g of  $\text{AgCl}$ . What is the percent yield of  $\text{AgCl}$ ?

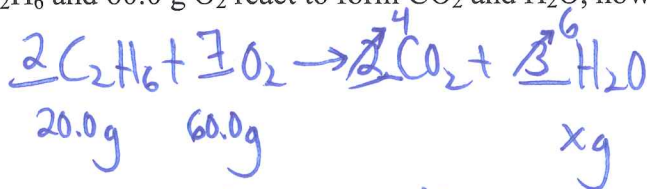


- A) 45.0%  
 B) 53.3%  
 C) 31.6%  
 D) 63.1%  
 E) 100%

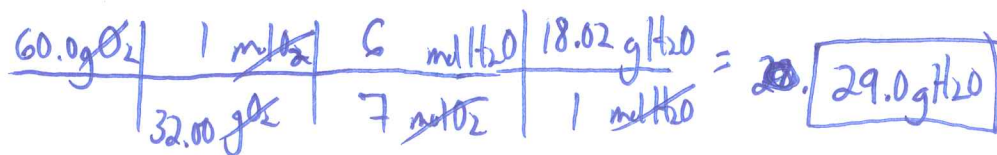
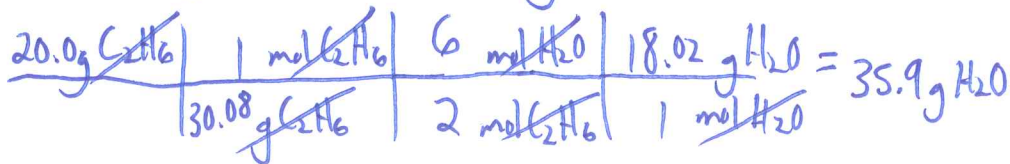


$$\frac{3.17}{5.02} \times 100 = 63.1\%$$

11. When 20.0 g  $\text{C}_2\text{H}_6$  and 60.0 g  $\text{O}_2$  react to form  $\text{CO}_2$  and  $\text{H}_2\text{O}$ , how many grams of water are formed?



- A) 14.5 g  
 B) 18.0 g  
 C) 58.0 g  
 D) 20.0 g  
 E) none of these



12. Nitric oxide, NO, is made from the oxidation of NH<sub>3</sub>, and the reaction is represented by the equation:  
 $4\text{NH}_3 + 5\text{O}_2 \rightarrow 4\text{NO} + 6\text{H}_2\text{O}$   
 An 8.7-g sample of NH<sub>3</sub> gives 12.0 g of NO. The percent yield of NO is

8.7g

12.0g

- A) 73%  
 B) 63%  
 C) 41%  
 D) 78%  
 E) 20%

$$\frac{8.7\text{g NH}_3}{17.04\text{g NH}_3} \times \frac{1\text{ mol NH}_3}{1\text{ mol NH}_3} \times \frac{4\text{ mol NO}}{4\text{ mol NH}_3} \times \frac{30.01\text{g NO}}{1\text{ mol NO}} = 15.3\text{g NO}$$

$$\frac{12.0\text{g}}{15.3\text{g}} \times 100 = \boxed{78.4\%}$$

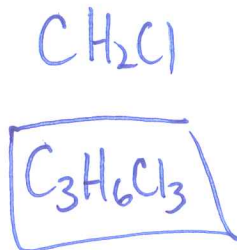
13. An unknown molecule is found to consist of 24.2% carbon by mass, 4.0% hydrogen by mass and the remaining mass is due to chlorine. What is the molecular formula of the molecule given that the molar mass is found to be approximately 150?

- A) CH<sub>2</sub>Cl  
 B) C<sub>2</sub>H<sub>4</sub>Cl<sub>2</sub>  
 C) CH<sub>2</sub>Cl<sub>4</sub>  
 D) C<sub>3</sub>H<sub>6</sub>Cl<sub>3</sub>  
 E) C<sub>6</sub>H<sub>10</sub>Cl<sub>2</sub>

$$\frac{24.2\text{g C}}{12.01\text{g C}} \times \frac{1\text{ mol C}}{1\text{ mol C}} = 2.01\text{ mol} \approx 2$$

$$\frac{4.0\text{g H}}{1.01\text{g H}} \times \frac{1\text{ mol H}}{1\text{ mol H}} = 3.96\text{ mol} \approx 4$$

$$\frac{71.8\text{g Cl}}{35.45\text{g Cl}} \times \frac{1\text{ mol Cl}}{1\text{ mol Cl}} = 2.03\text{ mol} \approx 2$$



14. What is the molar mass of ethanol (C<sub>2</sub>H<sub>5</sub>OH)?

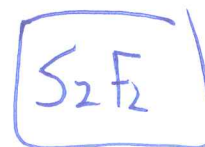
- A) 45.06 g/mol  
 B) 34.06 g/mol  
 C) 46.07 g/mol  
 D) 30.03 g/mol  
 E) 105.03 g/mol

15. A compound composed of sulfur and fluorine is found to contain 62.79% by mass of sulfur. If the molar mass of the compound is 102.13 g/mol, what is its molecular formula?

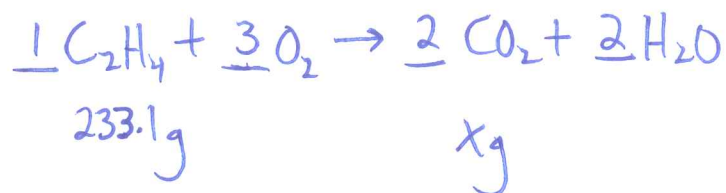
- A) S<sub>3</sub>F  
 B) S<sub>2</sub>F<sub>4</sub>  
 C) SF  
 D) S<sub>2</sub>F  
 E) S<sub>2</sub>F<sub>2</sub>

$$\frac{62.79\text{g S}}{32.06\text{g S}} \times \frac{1\text{ mol S}}{1\text{ mol S}} = 1.96\text{ mol} \approx 2$$

$$\frac{37.21\text{g F}}{19.00\text{g F}} \times \frac{1\text{ mol F}}{1\text{ mol F}} = 1.96\text{ mol} \approx 2$$



16. When 233.1 g of ethylene (C<sub>2</sub>H<sub>4</sub>) burns in oxygen to give carbon dioxide and water, how many grams of CO<sub>2</sub> are formed?



- A) 731.4 g
- B) 365.7 g
- C) 182.9 g
- D) 8.31 g
- E) 299.4 g

$$\frac{233.1 \text{ g C}_2\text{H}_4}{28.06 \text{ g C}_2\text{H}_4} \times \frac{1 \text{ mol C}_2\text{H}_4}{1 \text{ mol C}_2\text{H}_4} \times \frac{2 \text{ mol CO}_2}{1 \text{ mol C}_2\text{H}_4} \times \frac{44.01 \text{ g CO}_2}{1 \text{ mol CO}_2} = \boxed{731.2 \text{ g CO}_2}$$