

Stoichiometry Test Review



1. How many moles of oxygen are made if 12.0 moles of potassium chlorate react?

$$\frac{2 \text{ mol KClO}_3}{12 \text{ mol}} = \frac{3 \text{ mol O}_2}{x} \quad \boxed{18 \text{ mol O}_2}$$

2. Copper(II) chloride reacts with sodium nitrate to produce copper(II) nitrate and sodium chloride. a) Write the balanced equation for the reaction.



- b) If 20.0 g of copper(II) chloride react with 20.0 g of sodium nitrate, what mass of sodium chloride is formed?

$$\text{CuCl}_2: \frac{134.45}{20} = \frac{116.9}{x}$$

$$17.4 \text{ g NaCl}$$

$$\text{NaNO}_3: \frac{170.02}{20} = \frac{116.9}{x}$$

$$\boxed{13.8 \text{ g NaCl}}$$

- c) What is the limiting reactant? d) How many moles of copper(II) nitrate are formed?

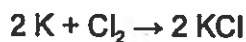
$$\boxed{\text{LR} = \text{NaNO}_3}$$

$$\frac{13.8 \text{ g}}{116.9 \text{ g}} = 0.12 \text{ mol NaCl}$$

$$\boxed{0.06 \text{ mol Cu(NO}_3)_2}$$

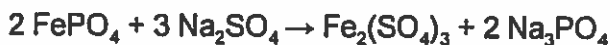
$$\frac{2 \text{ mol NaCl}}{0.12 \text{ mol}} = \frac{1 \text{ mol Cu(NO}_3)_2}{x}$$

3. How many grams of potassium chloride are produced from 2.50 g of potassium and excess chlorine?



$$\frac{78.2 \text{ g}}{2.50 \text{ g}} = \frac{149.1 \text{ g}}{x}$$

$$\boxed{4.77 \text{ g KCl}}$$



4. a) If 25.0 g of iron(III) phosphate react with excess sodium sulfate, how many grams of iron(III) sulfate can be made?

$$400.07 \text{ g}$$

$$\frac{301.8 \text{ g}}{25.0 \text{ g}} = \frac{400.07 \text{ g}}{x}$$

$$\boxed{33.1 \text{ g Fe}_2(\text{SO}_4)_3}$$

- b) If 18.5 grams of iron(III) sulfate are actually produced in Q4A, what is the percent yield?

$$\% \text{ Yield} = \left(\frac{\text{experimental}}{\text{theoretical}} \right) \times 100$$

$$\left(\frac{18.5 \text{ g}}{33.1 \text{ g}} \right) \times 100 = \boxed{55.9\%}$$

c) Now, a different trial of the reaction is done, starting with 15.0 grams of sodium sulfate and excess iron(III) phosphate. If that trial achieves a 65.0% yield, how many grams of sodium phosphate were made?

$$\frac{426.21}{15} = \frac{281.94}{x}$$

$$0.65(9.92g) = \boxed{6.45g}$$

9.92g Na₂PO₄



5. a) What volume of oxygen is produced from 19.4 moles of sodium chlorate?

$$\frac{2 \text{ mol NaClO}_3}{19.4 \text{ mol}} = \frac{3 \text{ mol O}_2}{x}$$

29.1 mol O₂
1 mol = 22.4 L so $\frac{29.1 \text{ mol} \times 22.4 \text{ L}}{1 \text{ mol}} = \boxed{651.84 \text{ L}}$

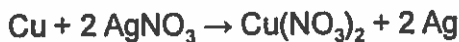
b) How many molecules of oxygen are produced when 80.0 grams of sodium chloride are produced?

$$1 \text{ mol NaCl} = 58.45 \text{ g}$$

$$\frac{80.0 \text{ g}}{58.45 \text{ g}} = 1.37 \text{ mol NaCl}$$

$$\frac{2 \text{ mol NaCl}}{1.37 \text{ mol NaCl}} = \frac{3 \text{ mol O}_2}{x}$$

$$2.05 \text{ mol O}_2 = 2.05 (6.02 \times 10^{23}) = \boxed{1.23 \times 10^{24} \text{ molecules}}$$



6. a) How many moles of copper react with 3.50 moles of silver nitrate?

$$\frac{2 \text{ mol AgNO}_3}{3.5 \text{ mol}} = \frac{1 \text{ mol Cu}}{x}$$

$$\boxed{1.75 \text{ mol Cu}}$$

b) If 89.5 grams of silver were produced, how many grams of copper reacted?

$$1 \text{ mol Ag} = 107.87 \text{ g}$$

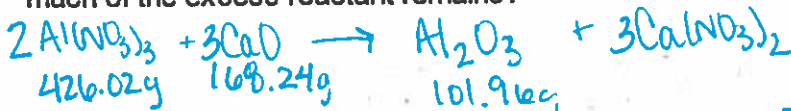
$$\frac{89.5 \text{ g}}{107.87 \text{ g}} = 0.83 \text{ mol Ag}$$

$$0.41 \text{ mol} (63.55 \text{ g}) = \boxed{26.1 \text{ g}}$$

$$\frac{2 \text{ mol Ag}}{0.83 \text{ mol}} = \frac{1 \text{ mol Cu}}{x}$$

$$0.41 \text{ mol Cu}$$

7. If 284.7g of Al(NO₃)₃ react with 162.8g of CaO in a double replacement reaction, how much of the excess reactant remains?



$$\frac{101.96}{68.14} = \frac{168.24}{x}$$

$$\frac{426.02}{284.7} = \frac{101.96}{x}$$

$$\boxed{68.14 \text{ g Al}_2\text{O}_3}$$

$$\frac{168.24}{162.8} = \frac{101.96}{x}$$

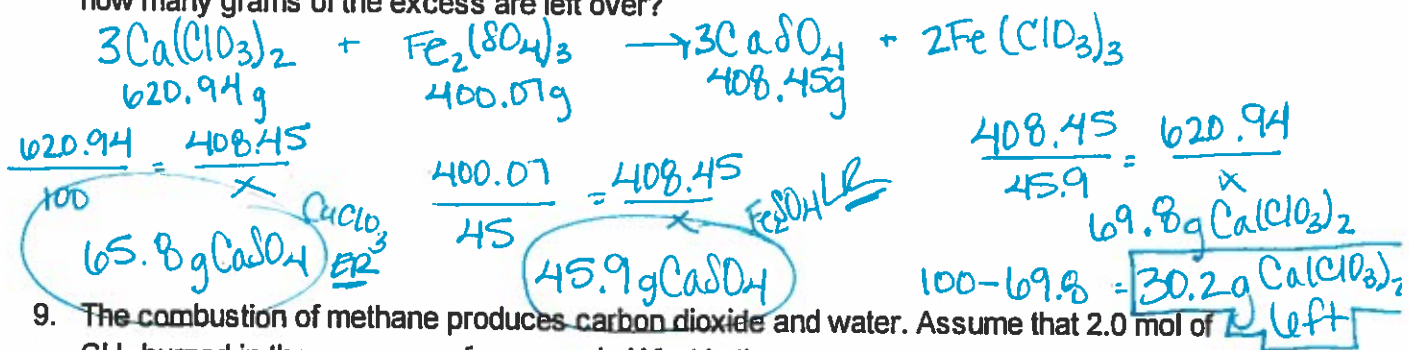
$$98.66 \text{ g Al}_2\text{O}_3$$

ER: CaO

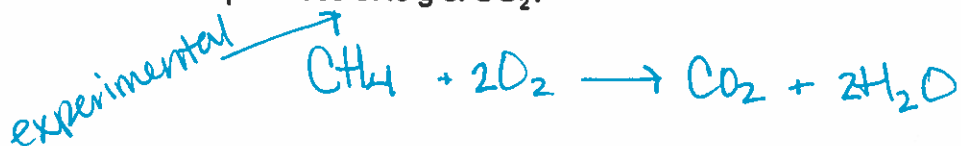
$$112.44 \text{ g}$$

$$112.44 - 44 = \boxed{50.36 \text{ g CaO}}$$

8. Assuming we start with 100 grams of calcium chlorate and 45 grams of iron (III) sulfate, how many grams of the excess are left over?



9. The combustion of methane produces carbon dioxide and water. Assume that 2.0 mol of CH_4 burned in the presence of excess air. What is the percentage yield if the reaction produces 87.0 g of CO_2 ?



$$\frac{2 \text{ mol CH}_4}{2 \text{ mol}} = \frac{1 \text{ mol CO}_2}{x}$$

$$2 \text{ mol CO}_2$$

$$1 \text{ mol CO}_2 = 44.01 \text{ g}$$

$$\frac{2 \text{ mol} \times 44.01 \text{ g}}{1 \text{ mol}} = 88.02 \text{ g CO}_2 \text{ produced}$$

theoretical \swarrow

$$\left(\frac{87}{88.02} \right) \times 100 = 98.8\%$$

1. The first part of the document discusses the importance of maintaining accurate records of all transactions. It emphasizes that every entry should be supported by a valid receipt or invoice to ensure transparency and accountability.

2. The second part outlines the procedures for handling discrepancies between the recorded amounts and the actual cash received. It states that any such variance must be investigated immediately and reported to the appropriate authority.

3. The third part details the process for reconciling the accounts at the end of each month. It requires that the total recorded income matches the bank statements and the physical cash on hand.

4. The fourth part describes the requirements for the storage and security of all financial documents. It mandates that all records be kept in a secure, fireproof location for a minimum of seven years.

5. The fifth part discusses the role of the internal audit department in monitoring the financial controls and ensuring compliance with all applicable laws and regulations.

6. The sixth part provides information on the consequences of non-compliance, including potential fines and legal action against the responsible parties.

7. The seventh part offers guidance on how to report any suspected irregularities or fraud to the internal audit team or the external auditors.

8. The eighth part concludes with a statement of commitment to the highest standards of financial integrity and ethical conduct.

9. The ninth part of the document provides a detailed overview of the company's financial performance over the past year. It includes a summary of the key financial indicators, such as revenue, profit, and cash flow, and compares them to the targets set at the beginning of the year.

10. The tenth part discusses the challenges faced by the company during the year and the strategies implemented to overcome them. It highlights the areas where the company has made significant progress and the areas that still require attention.

11. The eleventh part outlines the financial outlook for the coming year, based on the current market conditions and the company's strategic plan. It provides a forecast of the expected revenue and profit, and identifies the key risks that could impact the performance.

12. The twelfth part discusses the company's commitment to sustainable and responsible financial practices. It highlights the initiatives taken to reduce the carbon footprint, improve the efficiency of operations, and support the local community.

13. The thirteenth part provides information on the company's financial reporting and the availability of the full financial statements to the shareholders and the public.

14. The fourteenth part concludes with a message of appreciation to the shareholders and the management team for their hard work and dedication throughout the year.

15. The fifteenth part provides contact information for the company's financial department and the external auditors.