

Stoich Study Guide (Note: Molar Volume @ STP = 22.4L/mol)

Use a separate sheet of paper to show your work!

1. Define mole.
2. How many particles are present in one mole of a substance?
3. What are the substances to the left of the arrow called? To the right? What do the coefficients mean?
4. Given the following equation: $2 \text{C}_4\text{H}_{10} + 13 \text{O}_2 \rightarrow 8 \text{CO}_2 + 10 \text{H}_2\text{O}$, what are the mole-to-mole ratios for the following?
 - a. $\text{C}_4\text{H}_{10} / \text{O}_2$ (2:13 because there are two moles of C_4H_{10} for every 13 moles of O_2)
 - b. O_2 / CO_2
 - c. $\text{O}_2 / \text{H}_2\text{O}$
 - d. $\text{C}_4\text{H}_{10} / \text{CO}_2$
 - e. $\text{C}_4\text{H}_{10} / \text{H}_2\text{O}$
5. Balance the following equation: $\text{KClO}_3 \rightarrow \text{KCl} + \text{O}_2$
 How many moles of O_2 can be produced by letting 12 moles of KClO_3 react? (18 mol O_2)
6. Balance the following equation: $\text{K} + \text{Cl}_2 \rightarrow \text{KCl}$
 How many grams of K is needed to produce from 10.0 g of KCl in excess Cl_2 ? (5.24g K)
 How many grams of KCl is produced from 1.00 g of Cl_2 and excess K? (2.10g KCl)
7. Balance the following equation: $\text{Na}_2\text{O} + \text{H}_2\text{O} \rightarrow \text{NaOH}$
 How many moles of NaOH is produced from 120. grams of Na_2O ? (3.87 mol NaOH)
 How many grams of Na_2O are required to produce 3.000 moles of NaOH? (92.97 g Na_2O)
8. Balance the following equation: $\text{Fe} + \text{S}_8 \rightarrow \text{FeS}$
 What mass of iron is needed to react with 16.00 grams of sulfur? (223.4 g Fe)
 How many moles of FeS are produced when 16.0 grams of sulfur reacts in excess iron? (4.00 mol FeS)
9. Balance the following equation: $\text{NaClO}_3 \rightarrow \text{NaCl} + \text{O}_2$
 12.0 moles of NaClO_3 will produce how many grams of O_2 ? (576 g O_2)
10. Balance the following equation: $\text{Cu} + \text{AgNO}_3 \rightarrow \text{Cu}(\text{NO}_3)_2 + \text{Ag}$
 How many moles of Cu are needed to react with 3.50 moles of AgNO_3 ? (1.75 mol Cu)
 If 89.5 grams of Ag were produced, how many grams of Cu reacted? (26.4 g Cu)
11. Balance the reaction: $\text{NH}_3 + \text{O}_2 \rightarrow \text{NO} + \text{H}_2\text{O}$
 When 1.20 mole of ammonia reacts, what is the **total** number of moles of products formed? (3.00 moles total)
12. How many atoms are there is 2.1mol of CaS?
13. How many molecules does a 35.4g sample of CO have?
14. 1.63×10^{24} molecules of ammonia (NH_3) make up how many moles?
15. How much mass does 3.5 mol of HNO_3 have?
16. How much mass does 4.68×10^{23} formula units of $\text{Cu}(\text{NO}_3)_2$ have?
17. How many formula units make up 116g of $\text{Fe}_2(\text{SO}_4)_3$?
18. How many liters will 3.44 mol of O_2 occupy at STP?
19. How many moles of N_2 are there in a 2.04L balloon at STP?

