

Stoichiometry Practice Test Questions

1. The formula weight of the compound, $\text{Al}_2(\text{CO}_3)_3$ is:
 - a) 137.994 g/mol
 - b) 233.988 g/mol
 - c) 112.618 g/mol
 - d) 86.990 g/mol
2. The formula weight of the compound, $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$ is:
 - a) 256.609 g/mol
 - b) 201.55 g/mol
 - c) 249.682 g/mol
 - d) 181.43 g/mol
3. The mass % of F in the compound CaF_2 is _____ (round to 2 decimal places)
 - a) 48.23%
 - b) 24.11%
 - c) 46.57%
 - d) 50.88%
4. Calculate the percent, by mass, of carbon in 160 g of $\text{C}_6\text{H}_{12}\text{O}_6$
 - a) 40%
 - b) 30%
 - c) 45%
 - d) 50%
5. There are _____ molecules of methane in 0.180 mol of methane (CH_4).
 - a) 1.25×10^{23} molecules
 - b) 3.35×10^{22} molecules
 - c) 1.08×10^{23} molecules
 - d) 5.43×10^{24} molecules
6. How many moles of carbon monoxide are there in 42.5 g of carbon monoxide?
 - a) 1.25 moles
 - b) 1.52 moles
 - c) 2.00 moles
 - d) 3.14 moles
7. How many molecules of CH_4 are in 64.0 g of this compound?
 - a) 1.20×10^{24}
 - b) 2.40×10^{24}
 - c) 3.00×10^{24}

- d) 4.80×10^{24}
8. How many carbon atoms are contained in 2.80 g of C_4H_{10} ?
- 6.02×10^{22} carbon atoms
 - 3.01×10^{23} carbon atoms
 - 2.32×10^{23} carbon atoms
 - 1.16×10^{23} carbon atoms
9. A 100.0 g sample of which of the following compounds contains the most molecules?
- CO_2
 - SO_2
 - H_2O
 - CH_4
10. How many total atoms are in one mole of C_2H_5OH ?
- 9
 - 5.4×10^{24}
 - 1.5×10^{-23}
 - 6.0×10^{23}
11. How many oxygen atoms are contained in 5.00 g of $Mg(NO_3)_2$?
- 6
 - 2.03×10^{22}
 - 1.22×10^{23}
 - 3.38×10^{21}
12. What is the mass of atomic oxygen in 148 grams of calcium hydroxide $Ca(OH)_2$?
- 24 grams
 - 48 grams
 - 64 grams
 - 32 grams
13. How many molecules of carbon dioxide are contained in 8.4 L of carbon dioxide gas at STP?
- 8.4×10^{23}
 - 5.1×10^{24}
 - 2.3×10^{24}
 - 2.3×10^{23}
14. A sample of a pure compound is found to contain approximately 70% Oxygen and 30% Nitrogen by mass. Find the empirical formula for the compound
- NO_2

- b) NO
- c) N₂O
- d) N₂O₂

15. A sample of an iron oxide compound weighs 6.50 g. After complete reduction, the iron weighs 4.55 g. What is the empirical formula of the iron oxide?

- a) FeO
- b) Fe₂O₃
- c) Fe₂O₃
- d) Fe₂O

16. An 11.5g sample of a compound contains 6.0 g of C, 1.5 g of H, and 4.0 g of O. Which of the following is the empirical formula of the compound?

- a) CH₃O
- b) C₂H₆O
- c) C₃H₉O₂
- d) C₄H₁₂O₂

17. A compound that is composed of carbon, hydrogen, and oxygen is found to contain 70.6% C, 5.9% H, and 23.5% O by mass. Its molecular weight is 136 amu. What is the molecular formula of the compound?

- a) C₄H₄O
- b) C₅H₆O₂
- c) C₈H₄O
- d) C₉H₁₂O
- e) C₈H₈O₂

18. A compound contains, by mass, 40.0% carbon, 6.71% hydrogen, and 53.3% oxygen. A 0.640 mole sample of this compound weighs 57.6 g. The molecular formula of this compound is:

- a) C₂H₄O₂
- b) C₃H₆O₃
- c) C₂H₄O
- d) CH₂O
- e) C₄H₇O₂

19. A 5.00 g sample of a hydrate of magnesium sulfate, MgSO₄·x H₂O, is heated until all the water is driven off, leaving 2.44 g of anhydrous magnesium sulfate (MgSO₄). What is the value of x, the number of water molecules per formula unit in the hydrate?

- a) x = 2
- b) x = 5
- c) x = 7
- d) x = 10

20. A 10.00 g sample of a hydrate of sodium carbonate, $\text{Na}_2\text{CO}_3 \cdot x \text{H}_2\text{O}$, is heated to remove all the water, leaving 3.71 g of anhydrous sodium carbonate (Na_2CO_3). What is the value of x , the number of water molecules per formula unit in the hydrate?

- a) $x = 10$
- b) $x = 7$
- c) $x = 3$
- d) $x = 5$

21. A 14.20 g sample of a compound composed of carbon, hydrogen, and oxygen undergoes combustion analysis, producing 27.2 g of CO_2 and 7.8 g of H_2O . What is the empirical formula of the compound?

- a) $\text{C}_3\text{H}_8\text{O}$
- b) $\text{C}_5\text{H}_6\text{O}_2$
- c) $\text{C}_2\text{H}_4\text{O}$
- d) $\text{C}_5\text{H}_7\text{O}_3$

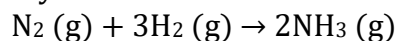
22. What is the *molecular* formula of an alcohol containing only C, H and O if the combustion of a 0.510 g sample produces 1.122 g of CO_2 and 0.612 g of H_2O ? The molar mass of the alcohol is approximately 120 g/mol.

- a) $\text{C}_3\text{H}_8\text{O}$
- b) $\text{C}_3\text{H}_8\text{O}_2$
- c) $\text{C}_6\text{H}_{16}\text{O}_2$
- d) $\text{C}_3\text{H}_{16}\text{O}_2$

23. A student prepares a solution by dissolving 5.00 g of sodium chloride (NaCl) in enough water to make a total volume of 250.0 mL. What is the molarity of the sodium chloride solution?

- a) 0.342 M
- b) 0.0214 M
- c) 0.214 M
- d) 0.0856 M

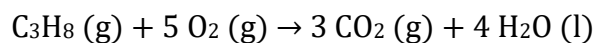
24. Under appropriate conditions, nitrogen and hydrogen undergo a combination reaction to yield ammonia:



Determine the mass of N_2 (g) required to completely react with 18.5 g of H_2 .

- a) 256.3 g
- b) 85.5 g
- c) 768.6 g
- d) 27.5 g

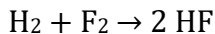
25. Given the reaction:



what is the total number of moles of reactants consumed when 1.00 mole of CO_2 (g) is produced?

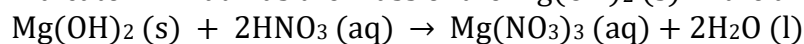
- a) 0.33 mol
- b) 1.33 mol
- c) 1.50 mol
- d) 2.00 mol

26. In the reaction below what mass of HF is produced by the reaction of 3.0×10^{23} molecules of H_2 with excess F_2 ? (Assume the reaction goes to completion.)



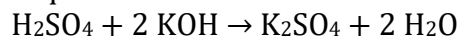
- a) 1.0 g
- b) 4.0 g
- c) 10. g
- d) 20. g

27. An antacid tablet containing $\text{Mg}(\text{OH})_2$ (s) (molar mass 58.3 g/mol) is titrated with 20.0 mL of a 0.100 M solution of HNO_3 (aq). The end point is determined by using an indicator. What was the mass of the $\text{Mg}(\text{OH})_2$ (s) in the antacid tablet?



- a) 0.0583 g
- b) 0.583 g
- c) 5.83 g
- d) 58.3 g

28. In a titration of 35.0 mL of 0.737 M H_2SO_4 , _____ mL of a 0.827 M KOH solution is required for neutralization.



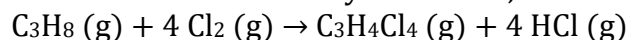
- a) 35.0
- b) 62.4
- c) 31.2
- d) 39.3
- e) 25.8

29. What is the percent yield if 12.3 g of KClO_3 (molar mass 123 g/mol) is decomposed to produce 3.20 g of O_2 (molar mass 32 g/mol) according to the equation below?



- a) 100%
- b) 66.7%
- c) 50.0%
- d) 33.3%

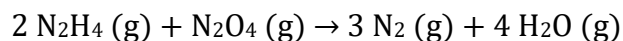
30. A 6.0 mol sample of C_3H_8 (g) and a 20. mol sample of Cl_2 (g) are placed in a previously evacuated vessel, where they react according to the equation below. After one of the reactants has been totally consumed, how many moles of HCl (g) have been produced?



- a) 4.0 mol

- b) 8.0 mol
- c) 20. mol
- d) 24 mol

31. When 8.0 g of N_2H_4 (32 g / mol) and 92 g of N_2O_4 (92 g / mol) are mixed together and react according to the equation below, what is the maximum mass of H_2O that can be produced?



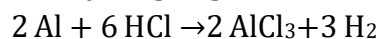
- a) 9.0 g
- b) 18 g
- c) 36 g
- d) 72 g

32. The reaction of silver metal and dilute nitric acid proceeds according to the equation below. If 0.10 mole of powdered silver is added to 10. milliliters of 6.0 molar nitric acid, what is the number of moles of NO gas that can be produced?



- a) 0.015 mole
- b) 0.020 mole
- c) 0.030 mole
- d) 0.045 mole

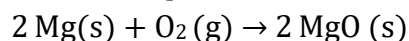
33. In the reaction between aluminum and hydrochloric acid to produce aluminum chloride and hydrogen gas, the balanced equation is:



If you start with 10.0 g of aluminum and 20.0 g of hydrochloric acid, how many grams of the excess reactant (hydrochloric acid) will be left over after the reaction is complete?

- a) 15 g
- b) 60. g
- c) 4.9 g
- d) 5.1 g

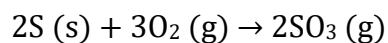
34. In the reaction between magnesium and oxygen to form magnesium oxide, the balanced equation is:



If you start with 12.0 g of magnesium and 8.00 g of oxygen, how many grams of the excess reactant will be left over after the reaction is complete?

- a) 0.90 g
- b) 0.10 g
- c) 4.0 g
- d) 6.0 g

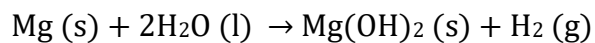
35. Sulfur and oxygen react in a combination reaction to produce sulfur trioxide, an environmental pollutant:



In a particular experiment, the reaction of 1.0 g S with 1.0 g O₂ produced 0.80 g of SO₃. The % yield in this experiment is:

- a) 32%
- b) 21%
- c) 47%
- d) 64%

36. If the reaction yield is 88.2%, what mass in grams of hydrogen is produced by the reaction of 7.73 g of magnesium with 1.31 g of water?



- a) 0.0323 g
- b) 0.0733 g
- c) 0.641 g
- d) 0.0646 g