

- Which compound has the empirical formula CH?
A) CH₄ B) C₂H₄ C) **C₆H₆** D) C₃H₈
- What is the empirical formula of the compound whose molecular formula is P₄O₁₀?
A) PO B) PO₂ C) **P₂O₅** D) P₈O₂₀
- What is the total number of moles of atoms contained in 1 mole of NH₃?
A) 1 mole B) 2 moles
C) 3 moles D) **4 moles**
- The molecular formula of a compound is represented by X₃Y₆. What is the empirical formula of this compound?
A) X₃Y B) X₂Y C) **XY₂** D) XY₃
- What is the empirical formula of a compound that has a carbon-to-hydrogen ratio of 2 to 6?
A) **CH₃** B) C₂H₆ C) C₃H D) C₆H₂
- The empirical formula of a compound is CH₂. The molecular formula of this compound could be
A) CH₄ B) C₂H₂ C) **C₂H₄** D) C₂H₆
- A compound whose empirical formula is NO₂ could have a molecular mass of
A) 23 B) 39 C) **92** D) 120
- Which chemical formula is both an empirical formula and a molecular formula?
A) **CH₄** B) C₂H₆
C) CH₃COOH D) CH₃CH₂COOCH₃
- What is the gram formula mass of K₂CO₃?
A) **138 g** B) 106 g C) 99 g D) 67 g
- What is the gram formula mass of Mg(ClO₃)₂?
A) 107 g B) 142 g
C) 174 g D) **191 g**
- How many moles of water are contained in 0.250 mole of CuSO₄ • 5H₂O?
A) **1.25** B) 4.50 C) 40.0 D) 62.5
- What is the total number of oxygen atoms in the formula MgSO₄ • 7 H₂O? [The • represents seven units of H₂O attached to one unit of MgSO₄ .]
A) **11** B) 7 C) 5 D) 4
- Which represents the greatest mass of chlorine?
A) **1 mole of chlorine**
B) 1 atom of chlorine
C) 1 gram of chlorine
D) 1 molecule of chlorine
- One mole of O₂ has approximately the same mass as one mole of
A) CH₄ B) **S** C) LiH D) Cl₂
- What is the mass in grams of 2.0 moles of NO₂?
A) **92** B) 60. C) 46 D) 30.
- The total number of moles represented by 20 grams of CaCO₃ is
A) 1 B) 2 C) 0.1 D) **0.2**
- What is the gram-molecular mass of a compound if 5 moles of the compound has a mass of 100 grams?
A) 5 g B) **20 g**
C) 100 g D) 500 g
- What is the mass in grams of 1.00 mole of O₂ gas?
A) 11.2 B) 16.0 C) 22.4 D) **32.0**
- What is the total mass of oxygen in 1.00 mole of Al₂(CrO₄)₃?
A) **192 g** B) 112 g
C) 64.0 g D) 48.0 g
- What is the molecular formula of a compound with the empirical formula P₂O₅ and a gram-molecular mass of 284 grams?
A) P₂O₅ B) P₅O₂
C) P₁₀O₄ D) **P₄O₁₀**
- If the empirical formula for an organic compound is CH₂O, then the molecular mass of the compound could be
A) 135 B) **60** C) 45 D) 15

Moles

22. Which of the following gases has the greatest density at STP?
A) SO₂ B) CO₂ C) Cl₂ D) N₂
23. What is the gram molecular mass of a gas that has a density of 5.00 grams per liter at STP?
A) 27.4 g B) 56.0 g
C) **112 g** D) 223 g
24. A compound consists of 25.9% nitrogen and 74.1% oxygen by mass. What is the empirical formula of the compound?
A) NO B) NO₂
C) N₂O D) **N₂O₅**
25. A compound contains 57% sulfur and 43% oxygen by mass. What is the empirical formula of this compound?
A) SO B) SO₂ C) SO₃ D) **S₂O₃**
26. A hydrated salt is a solid that includes water molecules within its crystal structure. A student heated a 9.10-gram sample of a hydrated salt to a constant mass of 5.41 grams. What percent by mass of water did the salt contain?
A) 3.69% B) 16.8%
C) **40.5%** D) 59.5%
27. Which compound has the greatest percent composition by mass of sulfur?
A) BaS B) CaS C) **MgS** D) SrS
28. The percentage by mass of hydrogen in H₃PO₄ is equal to
A) $\frac{1 \times 100}{98}$ B) $\frac{3 \times 100}{98}$
C) $\frac{98 \times 100}{3}$ D) $\frac{98 \times 100}{1}$
29. What is the percent composition by mass of aluminum in Al₂(SO₄)₃ (gram-formula mass = 342 grams/mole)?
A) 7.89% B) **15.8%**
C) 20.8% D) 36.0%
30. A student determining the percent by mass of water in a hydrated crystal obtained the following data.
Mass of crystal before heating.....5.0 g
Mass of crystal after 1st heating.....4.0 g
Mass of crystal after 2nd heating.....4.0 g
What is the percent by mass of water in the hydrate?
A) 0.80% B) 0.20%
C) 80.% D) **20.%**
31. What is the total number of neon atoms contained in 20.2 grams of neon gas?
A) 1.01×10^{24} B) 2.02×10^{24}
C) 3.01×10^{23} D) **6.02×10^{23}**
32. What is the total number of atoms contained in 80. grams of neon?
A) 6.0×10^{23} B) 1.2×10^{24}
C) **2.4×10^{24}** D) 4.8×10^{24}
33. What is the total number of atoms in 1.0 mole of CO₂?
A) 1.5×10^{23} B) 12×10^{23}
C) 3.0×10^{23} D) **18×10^{23}**
34. What is the total number of nitrogen atoms in 0.25 mole of NO₂ gas?
A) **1.5×10^{23}** B) 6.0×10^{23}
C) 3.0×10^{23} D) 1.2×10^{24}
35. Which sample contains a total of 6.0×10^{23} atoms?
A) **23 g Na** B) 24 g C
C) 42 g Kr D) 78 g K
36. What is the volume of 1.50 moles of an ideal gas at STP?
A) 11.2 L B) 22.4 L
C) **33.6 L** D) 44.8 L
37. At standard temperature, 1.0 liter of O₂(g) at 760 torr contains the same number of molecules as
A) **2.0 L of O₂(g) at 380 torr**
B) 2.0 L of O₂(g) at 760 torr
C) 0.50 L of O₂(g) at 380 torr
D) 0.50 L of O₂(g) at 760 torr

Moles

38. At STP, what is the total volume occupied by a 2.00-gram sample of $\text{H}_2(\text{g})$?

A) 1.00 L

B) 2.00 L

C) 11.2 L

D) 22.4 L

39. At STP, which sample contains the same number of molecules as 11.2 liters of $\text{CO}_2(\text{g})$ at STP?

A) 5.6L of $\text{NO}_2(\text{g})$

B) 7.5 L of $\text{H}_2(\text{g})$

C) 11.2 L of $\text{N}_2(\text{g})$

D) 22.4 L of $\text{CO}(\text{g})$

Answer Key
moles practice test

1. C
2. C
3. D
4. C
5. A
6. C
7. C
8. A
9. A
10. D
11. A
12. A
13. A
14. B
15. A
16. D
17. B
18. D
19. A
20. D
21. B
22. C
23. C
24. D
25. D
26. C
27. C
28. B
29. B
30. D
31. D
32. C
33. D
34. A
35. A
36. C

37. A
 38. D
 39. C
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