

Name: \_\_\_\_\_

Chapter 6 Study Guide

1. What do you know about a mole? Tell me everything.
2. One mole of oxygen atoms represents how many atoms and grams?
3. Which represents the greatest number of atoms?  
50.0 g Fe      50.0 g Zn      50.0 g Al      50.0 g Cu
4. Which represents the greatest mass?  
1.0 mol Cu      1.0 mol Fe      1.0 mol Al      1.0 mol Zn
5. How many atoms of calcium are present in 80.0 g of calcium?
6. Calculate the mass of 20.0 moles of He.
7. One atom of calcium weighs?
8. How many atoms are there in 58.7 g of nickel?
9. How many moles of Ca atoms are in 801 g Ca?
10. One mole of water weighs?
11. What is the mass of 2.00 moles of  $\text{Ca}(\text{OH})_2$ ?
12. A 20.0-g sample of Ca contains how many calcium atoms?
13. A 1.0-mole sample of  $\text{H}_2\text{O}_2$  weighs?
14. What is the molar mass of nitroglycerin,  $\text{C}_3\text{H}_5(\text{NO}_3)_3$ ?
15. What is the molar mass of NaCl?
16. What is the molar mass of  $\text{K}_2\text{SO}_4$ ?
17. What is the molar mass of  $\text{Al}(\text{OH})_3$ ?
18. What is the molar mass of  $\text{H}_2\text{S}$ ?
19. The molar mass of blood sugar,  $\text{C}_6\text{H}_{12}\text{O}_6$ , also known as glucose and dextrose, is?
20. 16.0 g of oxygen contains how many moles and molecules?
21. The molar mass of  $\text{Na}_3\text{PO}_4$  is?
22. The mass (in grams) of 6.0 mol of hydrogen gas ( $\text{H}_2$ ) is?
23. How many molecules of  $\text{O}_2$  are there in 4.0 mol of  $\text{O}_2$ ?
24. Which of the following contains the smallest number of molecules?  
5.0 g  $\text{O}_2$       5.0 g  $\text{CO}_2$       5.0 g  $\text{N}_2$       5.0 g  $\text{H}_2$
25. The molar mass of  $\text{MgCl}_2$  is?
26. The mass of 0.80 mol of  $\text{H}_2$  is?
27. 1.008 g of hydrogen gas ( $\text{H}_2$ ) contains how many moles and molecules?

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28. Which gas has the lowest molar mass?  
Br<sub>2</sub>            Cl<sub>2</sub>            N<sub>2</sub>            O<sub>2</sub>            Ne
29. The number of moles in 12.0 g of C<sub>2</sub>H<sub>6</sub>O (molar mass = 46.1 g/mol) is?
30. Calculate the number of moles of water molecules in 25.0 g of water.
31. 6.00 g of water contains how many moles of water?
32. 6.00 g of water contains how many molecules of water?
33. Convert 48 g O<sub>2</sub> to mol O<sub>2</sub>.
34. What is the empirical formula of an oxide of bromine which contains 71.4% bromine?
35. What is the percent by mass of carbon in C<sub>2</sub>H<sub>4</sub>?
36. The mass percent of oxygen in CaO is?
37. The mass percent of nitrogen in NH<sub>4</sub>Cl is?
38. What is the percent (by mass) of carbon in glucose, C<sub>6</sub>H<sub>12</sub>O<sub>6</sub>?
39. Which of the following has the empirical formula CH<sub>2</sub>?  
C<sub>6</sub>H<sub>6</sub>            C<sub>6</sub>H<sub>12</sub>            HCO<sub>3</sub>            C<sub>2</sub>H<sub>6</sub>            C<sub>2</sub>H<sub>4</sub>O
40. Choose the pair of compounds with the same empirical formula.  
C<sub>2</sub>H<sub>2</sub> and C<sub>6</sub>H<sub>6</sub>            NaHCO<sub>3</sub> and Na<sub>2</sub>CO<sub>3</sub>            K<sub>2</sub>CrO<sub>4</sub> and K<sub>2</sub>Cr<sub>2</sub>O<sub>7</sub>
41. The empirical formula for the compound having the formula H<sub>2</sub>C<sub>2</sub>O<sub>4</sub> is?
42. Calculate the empirical formula of a compound that is 85.6% C and 14.4% H.
43. A compound is analyzed and found to contain 12.1% carbon, 16.2% oxygen, and 71.7% chlorine (by mass). Calculate the empirical formula.
44. A compound contains 40.0% carbon, 6.7% hydrogen, and 53.3% oxygen (by mass). Calculate the empirical formula.
45. Calculate the molecular formula of a compound with the empirical formula CH<sub>2</sub>O and a molar mass of 150 g/mol.
46. The empirical formula of a compound is CH<sub>2</sub>O and its molar mass is 120g/mol. Calculate its molecular formula.
47. A certain compound has an empirical formula of NH<sub>2</sub>O. Its molar mass is between 55 and 65 g/mol. Its molecular formula is?
48. The empirical formula for acetic acid is CH<sub>2</sub>O. Its molar mass is 60g/mol. The molecular formula is?

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### Chapter 6 Study Guide

1. What do you know about a mole? Tell me everything.
2. One mole of oxygen atoms represents how many atoms and grams?  $6.02 \times 10^{23}$  atoms 16.00g
3. Which represents the greatest number of atoms?  
50.0 g Fe    50.0 g Zn    50.0 g Al    50.0 g Cu    Al
4. Which represents the greatest mass?  
1.0 mol Cu    1.0 mol Fe    1.0 mol Al    1.0 mol Zn    Zn
5. How many atoms of calcium are present in 80.0 g of calcium?  $1.20 \times 10^{24}$
6. Calculate the mass of 20.0 moles of He. 80.0 g
7. One atom of calcium weighs? 40.08 amu
8. How many atoms are there in 58.7 g of nickel?  $6.02 \times 10^{23}$
9. How many moles of Ca atoms are in 801 g Ca? 20.0
10. One mole of water weighs? 18.02 g/mol
11. What is the mass of 2.00 moles of  $\text{Ca}(\text{OH})_2$ ? 74.1 g
12. A 20.0-g sample of Ca contains how many calcium atoms?  $3.00 \times 10^{23}$
13. A 1.0-mole sample of  $\text{H}_2\text{O}_2$  weighs? 34 g
14. What is the molar mass of nitroglycerin,  $\text{C}_3\text{H}_5(\text{NO}_3)_3$ ? 227
15. What is the molar mass of NaCl? 58.44
16. What is the molar mass of  $\text{K}_2\text{SO}_4$ ? 174.27
17. What is the molar mass of  $\text{Al}(\text{OH})_3$ ? 78.01
18. What is the molar mass of  $\text{H}_2\text{S}$ ? 34.09
19. The molar mass of blood sugar,  $\text{C}_6\text{H}_{12}\text{O}_6$ , also known as glucose and dextrose, is? 180
20. 16.0 g of oxygen contains how many moles and molecules?  $16\text{g O}_2 = .5\text{ mol} = 3.01 \times 10^{23}$
21. The molar mass of  $\text{Na}_3\text{PO}_4$  is? ~~162.07~~ 163.94
22. The mass (in grams) of 6.0 mol of hydrogen gas ( $\text{H}_2$ ) is? 12 g
23. How many molecules of  $\text{O}_2$  are there in 4.0 mol of  $\text{O}_2$ ?  $2.4 \times 10^{24}$
24. Which of the following contains the smallest number of molecules?  
5.0 g  $\text{O}_2$     5.0 g  $\text{CO}_2$     5.0 g  $\text{N}_2$     5.0 g  $\text{H}_2$      $\text{CO}_2$
25. The molar mass of  $\text{MgCl}_2$  is? 95.21
26. The mass of 0.80 mol of  $\text{H}_2$  is? 1.6 g
27. 1.008 g of hydrogen gas ( $\text{H}_2$ ) contains how many moles and molecules?  
 $0.5\text{ mol} = 3.01 \times 10^{23}$  molecules

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28. Which gas has the lowest molar mass?

Br<sub>2</sub>      Cl<sub>2</sub>      N<sub>2</sub>      O<sub>2</sub>      Ne      ~~Ne~~

29. The number of moles in 12.0 g of C<sub>2</sub>H<sub>6</sub>O (molar mass = 46.1 g/mol) is? **0.260**

30. Calculate the number of moles of water molecules in 25.0 g of water. **1.39**

31. 6.00 g of water contains how many moles of water? **0.333**

32. 6.00 g of water contains how many molecules of water?  **$2.0 \times 10^{23}$**

33. Convert 48 g O<sub>2</sub> to mol O<sub>2</sub>. **1.5 mol**

34. What is the empirical formula of an oxide of bromine which contains 71.4% bromine? **BrO<sub>2</sub>**

35. What is the percent by mass of carbon in C<sub>2</sub>H<sub>4</sub>? **85.7%**

36. The mass percent of oxygen in CaO is? **28.5%**

37. The mass percent of nitrogen in NH<sub>4</sub>Cl is? **26.17**

38. What is the percent (by mass) of carbon in glucose, C<sub>6</sub>H<sub>12</sub>O<sub>6</sub>? **40%**

39. Which of the following has the empirical formula CH<sub>2</sub>?

C<sub>6</sub>H<sub>6</sub>      C<sub>6</sub>H<sub>12</sub>      HCO<sub>3</sub>      C<sub>2</sub>H<sub>6</sub>      C<sub>2</sub>H<sub>4</sub>O      **C<sub>6</sub>H<sub>12</sub>**

40. Choose the pair of compounds with the same empirical formula.

**C<sub>2</sub>H<sub>2</sub> and C<sub>6</sub>H<sub>6</sub>**      NaHCO<sub>3</sub> and Na<sub>2</sub>CO<sub>3</sub>      K<sub>2</sub>CrO<sub>4</sub> and K<sub>2</sub>Cr<sub>2</sub>O<sub>7</sub>

41. The empirical formula for the compound having the formula H<sub>2</sub>C<sub>2</sub>O<sub>4</sub> is? **HCO<sub>2</sub>**

42. Calculate the empirical formula of a compound that is 85.6% C and 14.4% H. **CH<sub>2</sub>**

43. A compound is analyzed and found to contain 12.1% carbon, 16.2% oxygen, and 71.7% chlorine (by mass). Calculate the empirical formula. **COCl<sub>2</sub>**

44. A compound contains 40.0% carbon, 6.7% hydrogen, and 53.3% oxygen (by mass). Calculate the empirical formula. **CH<sub>2</sub>O**

45. Calculate the molecular formula of a compound with the empirical formula CH<sub>2</sub>O and a molar mass of 150 g/mol. **C<sub>5</sub>H<sub>10</sub>O<sub>5</sub>**

46. The empirical formula of a compound is CH<sub>2</sub>O and its molar mass is 120g/mol. Calculate its molecular formula. **C<sub>4</sub>H<sub>8</sub>O<sub>4</sub>**

47. A certain compound has an empirical formula of NH<sub>2</sub>O. Its molar mass is between 55 and 65 g/mol. Its molecular formula is? **N<sub>2</sub>H<sub>4</sub>O<sub>2</sub>**

48. The empirical formula for acetic acid is CH<sub>2</sub>O. Its molar mass is 60g/mol. The molecular formula is? **C<sub>2</sub>H<sub>4</sub>O<sub>2</sub>**