

- What is the percent composition by mass of sulfur in the compound  $\text{MgSO}_4$  (gram-formula mass = 120. grams per mole)?  
A) 20% B) 27% C) 46% D) 53%
- The percent composition by mass of nitrogen in  $\text{NH}_4\text{OH}$  (gram-formula mass = 35 grams/mole) is equal to  
A)  $\frac{4}{35} \times 100$  B)  $\frac{14}{35} \times 100$   
C)  $\frac{35}{14} \times 100$  D)  $\frac{35}{4} \times 100$
- What is the percent composition by mass of hydrogen in  $\text{NH}_4\text{HCO}_3$  (gram-formula mass = 79 grams/mole)?  
A) 5.1% B) 6.3% C) 10.% D) 50.%
- The percent composition by mass of magnesium in  $\text{MgBr}_2$  (gram-formula mass = 184 grams/mole) is equal to  
A)  $\frac{24}{184} \times 100$  B)  $\frac{160}{184} \times 100$   
C)  $\frac{184}{24} \times 100$  D)  $\frac{184}{160} \times 100$
- What is the percent composition by mass of nitrogen in  $\text{NH}_4\text{NO}_3$  (gram-formula mass = 80.0 grams/mole)?  
A) 17.5% B) 35.0%  
C) 52.5% D) 60.0%
- A sample of a substance containing only magnesium and chlorine was tested in the laboratory and was found to be composed of 74.5% chlorine by mass. If the total mass of the sample was 190.2 grams, what was the mass of the magnesium?  
A) 24.3 g B) 48.5 g  
C) 70.9 g D) 142 g
- What is the percent by mass of oxygen in propanal,  $\text{CH}_3\text{CH}_2\text{CHO}$ ?  
A) 10.0% B) 27.6%  
C) 38.1% D) 62.1%
- The percent by mass of calcium in the compound calcium sulfate ( $\text{CaSO}_4$ ) is approximately  
A) 15% B) 29% C) 34% D) 47%
- Which compound has the greatest percent composition by mass of sulfur?  
A)  $\text{BaS}$  B)  $\text{CaS}$  C)  $\text{MgS}$  D)  $\text{SrS}$
- Which quantity can be calculated for a solid compound, given only the formula of the compound and the Periodic Table of the Elements?  
A) the density of the compound  
B) the heat of fusion of the compound  
C) the melting point of each element in the compound  
D) the percent composition by mass of each element in the compound
- Which compound has the *smallest* percent composition by mass of chlorine?  
A)  $\text{HCl}$  B)  $\text{KCl}$  C)  $\text{LiCl}$  D)  $\text{NaCl}$
- In which compound is the percent by mass of oxygen greatest?  
A)  $\text{BeO}$  B)  $\text{MgO}$  C)  $\text{CaO}$  D)  $\text{SrO}$
- The percent by mass of carbon in  $\text{CO}_2$  is equal to  
A)  $\frac{44}{12} \times 100$  B)  $\frac{12}{44} \times 100$   
C)  $\frac{28}{12} \times 100$  D)  $\frac{12}{28} \times 100$
- What is the percent by mass of carbon in  $\text{CO}_2$ ?  
A) 12 B) 27 C) 44 D) 73
- What is the percent by mass of water present in 1.0 mole of  $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$ ?  
A) 10.% B) 12% C) 21% D) 79%
- The percent by mass of water in the hydrate  $\text{Na}_2\text{SO}_4 \cdot 10\text{H}_2\text{O}$  is closest to  
A) 18% B) 44% C) 56% D) 76%
- A hydrate is a compound that includes water molecules within its crystal structure. During an experiment to determine the percent by mass of water in a hydrated crystal, a student found the mass of the hydrated crystal to be 4.10 grams. After heating to constant mass, the mass was 3.70 grams. What is the percent by mass of water in this crystal?  
A) 90.% B) 11%  
C) 9.8% D) 0.40%

18. 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%

19. A hydrate is a compound with water molecules incorporated into its crystal structure. In an experiment to find the percent by mass of water in a hydrated compound, the following data were recorded:

Mass of crucible + hydrated crystals before heating	7.50 grams
Mass of crucible	6.90 grams
Mass of crucible + anhydrous crystals after heating	7.20 grams

What is the percent by mass of water in the hydrate?

- A) 8.0 %                      B) 50. %  
C) 72. %                      D) 96. %
20. A 4.4 gram sample of a hydrate was heated until the water of hydration was driven off. The anhydrous compound remaining had a mass of 3.3 grams. What is the percentage by mass of water in the hydrate?
- A) 25%   B) 33%   C) 67%   D) 75%