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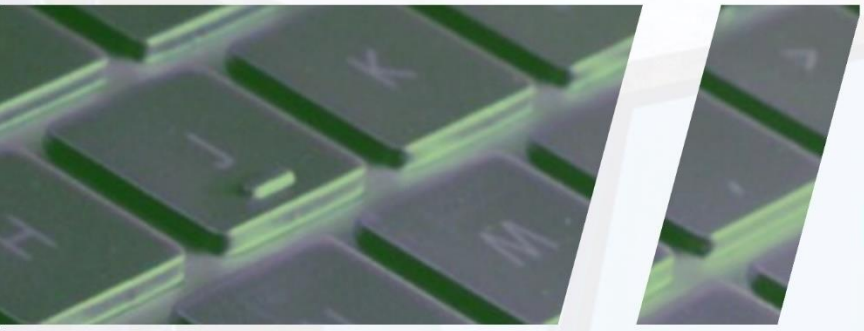

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MOLAR AND NORMAL CONCENTRATION

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Annotion *. In today's era of developing science and technology, education in the system too There are a number of changes. Chemistry is considered a bit more complicated than other sciences, because in order to study this science in depth, both theoretical and mental imagination are required. In chemistry lessons, along with studying theoretical materials, problems that are calculated in various ways are always solved in parallel. This article provides information about the basic concepts of chemistry, such as molar concentration and normal concentrations, and methods for solving various problems related to solutions.*

Keywords*: molar concentration, normal concentration, solution, substance, chemistry, formula, part, mole, percent*

In the 21st century, along with the rapid development of science and technology, chemistry is also becoming more complicated.[1] Therefore, it is now important to further develop students' thinking skills by solving problems in chemistry lessons. We all know that many students have difficulties in mastering chemistry in schools. [2]The main reason for these difficulties is that students do not master mathematics well, so they have difficulty with problems based on equations or simply do not understand proportions. Some students do not know mathematics well, but because of their wide range of thinking, they also work on problems without equations. To create these situations, it would be appropriate for teachers to give students problems in different ways.[3] In this way, students will not have difficulty working on problems in a way that they understand. At the same time, they will form the competencies that they will need throughout their lives. Students begin to apply the knowledge they have gained during the lessons and strive to think independently. We will move on to the concepts of molar and normal concentration from the chemistry course.[4]

1. The amount of solute in 1 liter of solution, expressed in g/moles, is called molar concentration. It is expressed by the following formula. $C_м = \frac{m \cdot 1000}{M \cdot V}$ where: $C_м =$ molar concentration; m is the mass of the solute; M is the molecular mass of the solute;

V is the volume of the solution;

2. The expression of the amount of solute in 1 l of solution in g/eq. is called normal concentration. Its formula is: $C_N = \frac{m \cdot 1000}{Э \cdot V}$ where: C_N = normal concentration; m is the mass of the solute; E is the equivalent of the solute; V is the volume of the solution.

We will explain with examples.

Example 1. If 1,836 g of Al_2O_3 were obtained from 600 ml of a solution of $Al_2(SO_4)_3$ as a result of chemical processes , what would be the molar concentration of the solution?

Solution: Method I : 1) If we find how much $Al_2(SO_4)_3$ is formed from 1,836 g of Al_2O_3, we first find the mass of $Al_2(SO_4)_3$ in 600 ml of solution.

$Al_2(SO_4)_3 \rightarrow Al_2O_3$

342 gr 102 gr

X gr 1,836 gr x=6,156 gr $Al_2(SO_4)_3$

2) The given data is inserted into the formula for finding the molar concentration:

$$C_м = \frac{m \cdot 1000}{M \cdot V} = \frac{6{,}156 \cdot 1000}{342(Al_2(SO_4)_3 \cdot 600} = 0{,}03M.$$

Method II : 1) The amount of solute initially dissolved is found:

$$n = \frac{m}{M} = \frac{6{,}156}{342} = 0{,}018mol.$$

2) Based on the definition, the molar concentration is the amount of solute per liter of solution:

0.6—— 0.018

1 l—— X | X = 0.03 M

Answer: molar concentration 0.03 M

Problem 2. Determine the normality of a H_2SO_4 solution with a titer of 0,735 g/ml .**Solution:** 1) The normal concentration $T = \frac{C_N \cdot Э}{1000} \rightarrow$ is found from the titer concentration formula: $C_N = \frac{T \cdot 1000}{Э}$

$$C_N = \frac{T \cdot 1000}{Э} = \frac{0{,}735 \cdot 1000}{49(H_2SO_4)} = 15.N$$

Answer: The normality of the solution is 15 N.

Problem 3. 1,12 L (equivalent) of HCl was dissolved in 0,75 L of water. Determine the normal concentration of the solution.

(ρ = 1,015 g/ml)

Solution: Method I : 1) First, the mass of HCl is found:

36,5 (HCl)—— 22,4 l

X—— 1,12 | X = 1,825 g

2) 750 g water + 1.825 = 751,825 g solution

3) $C\% = \frac{1,825}{751,825} \cdot 100 = 0,243\%$

| X = 0.243%

4) The normal concentration is determined by the density, % in the solution:

$$C_N = \frac{C\% \cdot \rho \cdot 10}{Э} = \frac{0,243 \cdot 1,015 \cdot 10}{36,5} = 0,067\,N\ li$$

II : 1) First, as shown in Method 1, the masses of the solute (Work 1) and the solution (Work 2) are found.

36.5 (HCl)—— 22.4 l

X —— 1.12 | X = 1,825 g

2) 750 g water + 1.825 = 751.825 g solution

3) The volume of the solution is found using the formula m=ρ· V :

$$V = \frac{m}{p} = \frac{751,825}{1,015} = 740,7.$$

4) Based on the results, a normal concentration is found:

$$C_N = \frac{m \cdot 1000}{Эk \cdot V} = \frac{1,825 \cdot 1000}{36,5 \cdot 740,7} = 0,067.$$

Answer: The normality of the solution is 0.067 N.

In conclusion, it can be said that solutions with molar and normal concentrations are useful not only for chemistry students, but also for students and pupils conducting scientific research in the field of pharmacy. This is because in the pharmaceutical industry, they are used in the preparation of solutions of various drugs.

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