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# APPLICATION OF THE LAWS OF CONSERVATION TO THE PROCESS OF PROBLEM SOLVING

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A R T I C L E I N F O.

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**Abstract**

This article provides information on the application of the laws of conservation in physics, that is, the conservation of charge and mass in the process of solving problems.



In order to increase the efficiency of education, to ensure that the person is at the center of education and to ensure that young people get independent education, they are well prepared for educational institutions and, in addition to having solid knowledge in their field, they know modern pedagogical technologies and interactive methods, training of teachers who know the rules of their use in the organization of educational and educational exercises is of great practical importance. The future of every society is determined by the level of development of the education system, which is an integral part of it and a vital necessity. Today, reforming and improving the continuous education system of our country, which is on the path of independent development, raising it to a new level of quality, introducing advanced pedagogical and information technologies to it, and increasing the effectiveness of education have been raised to the level of state policy. While the Republic of Uzbekistan is on the way to building a democratic, legal and civil society, the main goal and driving force of the reforms implemented in the field of education is to educate a well-rounded person. Until then, in traditional education, students were taught to acquire only ready-made knowledge. Such a method would break students' independent work, creative research, and initiative.

Therefore, the use of innovative technologies in a broad sense has emerged as a concept that means renewal and change of social importance, and today it is more a process of introducing something new into practice, mastering new things. is used in the meanings. In this sense, let's consider the application of conservation laws during problem solving in physics classes.

The law of conservation of electric charge is one of the fundamental laws of nature. According to this law, "In any closed system, the algebraic sum of electric charge does not change regardless of what processes take place inside the system:

$$\sum_{i=1}^{n} q_i = const$$

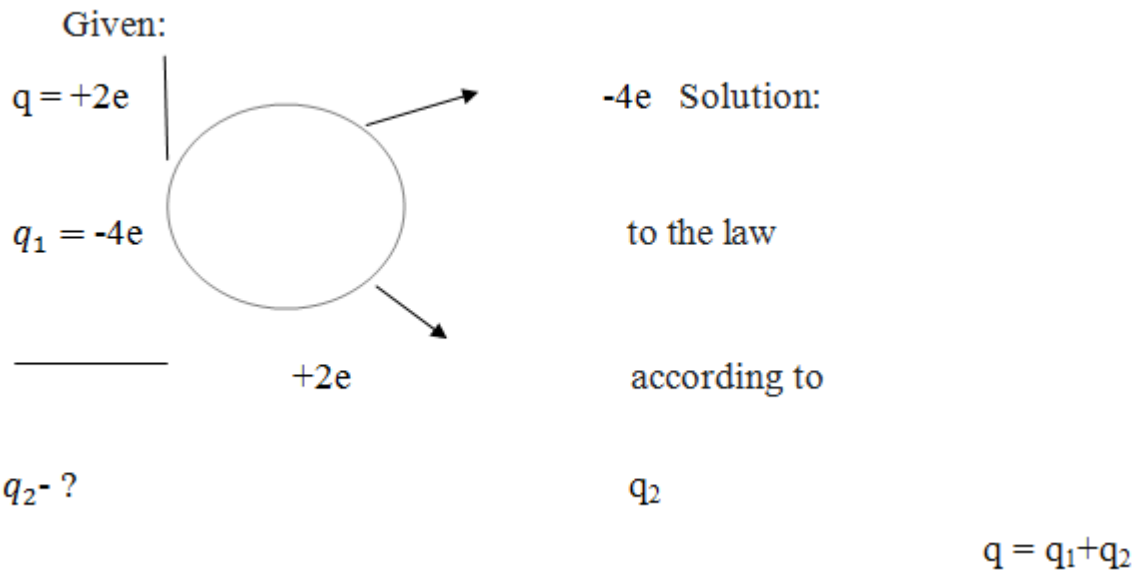
According to this law: "In a closed system, the algebraic sum of electric charges does not change", that is, an electric charge neither appears nor disappears, it is only transferred from one body (particle) to another or redistributed within this system.

When bodies are charged by rubbing against each other, their modules are charged with equal and opposite signs, redistribution of charges when charged bodies are brought into contact with each other, when they are separated from each other, and the algebraic sum of charges does not change, the observations made on the rotations of elementary particles to each other are the laws of this law. confirms that it is correct. In other words, this law represents one of the properties of electric charge.

Students will be exposed to the fundamental nature of the physical law by solving problems.

Problem 1: A droplet with a charge of -4e was separated from a droplet with a charge equal to +2e. Determine the charge of the remaining 2nd droplet.

Given:




q – initial droplet charges

$q_1$, $q_2$- each subsequent drop charge

+2e= -4e+ $q_2$ $q_2$= +6e

Answer: $q_2$=6e

2- matter:

Two identical spheres with charges -q and 3q are separated by touching and brought back to their original position. How do their forces change?

Given: Solution: initial forces of interaction of spheres – $F_1$

$q_1$= -q

$q_2$=3q $\quad F_1=k\frac{|q_1||q_2|}{r^2}=3k\frac{q^2}{r^2}$

$\frac{F_2}{F_1}$ - ? According to the law of conservation of charge, the subsequent charges of the spheres $q_1^{'}$ *and* $q_2^{'}$

$$q_1^{'} + q_2^{'} = q_1 + q_2$$

and since the spheres are equal, these charges are equally distributed, i.e.;

$$q_1^{'} = q_2^{'} = \frac{q_1+q_2}{2} = \frac{-q+3q}{2} = q$$

and the forces of interaction between the spheres – $F_2$

$$F_1 = k\frac{|q_1^{'}||q_2^{'}|}{r^2} = k\frac{q^2}{r^2}$$

So, $\frac{F_2}{F_1} = \frac{1}{3}$ yoki $F_2 = \frac{F_1}{3}$. Power is reduced by 3 times

Issue 3

What will be the charges and potentials of the spheres after their radii R and 2R and charges q and 3q, respectively, are separated. When the spheres are aligned with each other, the charge passes from the ball with a higher potential to the ball with a lower potential until the potential is equal. So, from the equality of potentials of spheres:

Given:

| | |
|---|---|
| $R_1 = R$ | $R_2 = 2R$ |
| $Q_1 = q$ | |
| $Q_2 = 3q$ | $\varphi_1^{'} = \varphi_2^{'}$ $\quad k\frac{q_1^{'}}{R_1} = k\frac{q_2^{'}}{R_2}$ $\quad q_2^{'} = \frac{R_2}{R_1}q_1^{'}$ |

$q_1^{'} - ? \quad q_2^{'} - ?$

From the law of conservation of charge:

$$q_1 + q_2 = q_1^{'} + q_2^{'} \qquad q_1 + q_2 = (1 + \frac{R_2}{R_1})q_1^{'}$$

$$q_1^{'} = \frac{q_1+q_2}{R_1+R_2}R_1 \qquad q_2^{'} = \frac{q_1+q_2}{R_1+R_2}R_1$$ we form the expression

The following potentials of the spheres are

$$\varphi^{'} = k\frac{q_1^{'}}{R_1} = k\frac{q_1+q_2}{R_1+R_2}$$

This formula can be used for spheres with arbitrary given radius and arbitrary given charge. In our problem

$q_1^{'} = \frac{q+3q}{R+2R}R = \frac{4}{3}$q $q_1^{'} = \frac{4}{3}$2q=$\frac{8}{3}q$ and

$\varphi^{'} = k\frac{4q}{3R} = \frac{4}{3}k\frac{q}{R} = \frac{4}{3}\varphi_1$ it is

Issue 4

$^{232}_{90}Th$ isotope 4 $\alpha$ — decay and 2 ta β- which element turns into isotope after decay

Let's write the radioactive decay reaction

$^{232}_{90}Th$ 4 ta $\alpha$ va 2 ta β- decay $^{232}_{90}Th \rightarrow 4\,^{4}_{2}\alpha + 2\,^{0}_{-1}\beta + {}^{A}_{z}X$

According to the law of conservation of mass

232=4x4+2x0+A A=216

According to the law of conservation of charge

90=4x2+2x(-1) + Z Z=84

Unknown element $^{216}_{84}Po$ isotope.

Conservation laws are physical laws according to which the numerical values of some physical quantities do not change over time in any process. The most important conservation laws are the conservation laws of mass, energy, momentum, angular momentum, electric and baryonic charges. In addition to such strict conservation laws, there are also approximate conservation laws.

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