

METHODS FOR SOLVING PROBLEMS RELATED TO THE IMPROVEMENT OF INVARIANT AND VARIABLE COMPONENTS OF MOLECULAR PHYSICS

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Annotation: One of the urgent issues of the present day is the improvement of students' thinking ability and thorough knowledge. Based on this, we need to form students the ability to work on physical laws, physical formulas, and solve problems through logical thinking. There are problems that are qualitative problems, and problems are equal to those dimensions that are equal to those that do not contain the quantities. problem solving method, serves as an excellent school of thought.

Keywords: experimental problems, graphic problems, logical problems, quality problems.

INTRODUCTION

The purpose of teaching the technology of solving problems in physics is to include special topics related to such problems as types of physical problems, methods of solving, organizing classes for solving problems, the educational value of solving problems, special attention to the methodology for solving problems during training. learning.meaning focus. In addition to theoretical knowledge, a physics teacher must also be proficient in teaching methods, including problem solving methods. Each teacher of physics can develop an interest in physics among his students and give them deep knowledge only when he is fluent in the methodology for solving physical problems.[1,2]

The task of science is a method for solving physical problems, a general understanding of problems, types of physical problems, educational tasks, their structure and features, the main stages of solving problems, methods of interdisciplinary communication in the process of solving physical problems; Algorithmic method for solving physical problems, creative problems and methods for solving them, analysis of problem conditions, drawing up a plan for solving problems, the importance of solving problems in teaching physics, methods for conducting tests, their goals and objectives, olympiad problems, modern pedagogy in solving problems, description of the use of technical means and innovative technological methods of pedagogical tasks.[3,4]

It is known that in teaching physics there are theoretical and practical methods. Among practical methods, the solution of problems from physics is of great importance. In the process of solving the problem, along with the provision of

knowledge to students, such important issues as the development of students' abilities and the education of students are solved.

In the process of solving problems in physics, the logical thinking of students expands and their creative abilities develop. They have a broader understanding of the basic nature of physical phenomena and a deeper understanding of the practical application of the laws of physics. They get acquainted with the function, device, principles of operation of many physical measuring instruments, acquire skills and qualifications to work with them. The tasks also bring up diligence, courage, will and character in students.[5,6]

According to the analysis of many methodological works, it is customary to call a physical problem a problem that is solved on the basis of logical conclusions, mathematical operations and the laws and methods of physics or with the help of experiments. The solution of a problem posed in a physical problem consists in solving the problem.

Solving problems related to the Department of Molecular Physics in the 9th grade of a general education school is of great importance for students to study in depth the concepts, quantities and laws of the Department of Molecular Physics. According to the curriculum, students of the 9th grade are given 48 hours to study the section of molecular physics, of which 10 hours are classes in solving problems. Chapter IV of the physics textbook for the 9th grade is the section "Molecular Physics". For the molecular physics section, there are 23 exercises consisting of 161 questions. In addition, 90 test questions and 49 problem solving examples are provided at the end of each chapter.

CONCLUSION

Problem Solving Lessons in the Textbook These problem solving examples illustrate the steps and laws of problem solving, helping students solve the problems given in the exercises and understand the meaning of the laws, as well as learn to consolidate mathematical operations and apply their knowledge. simplification of algebraic expressions.[6]

You should start teaching schoolchildren to solve problems in physics from the 1st lesson of physics of the 6th grade. You need to correct but plan to solve problems when studying each topic. Questions should meet the specific purpose of organizing and teaching a specific system, corresponding to the chosen methodology.

Quality matters. Qualitative tasks clearly explain physical phenomena and their laws to students, teach them to apply theoretical knowledge in practice, bring up the correct attitude to calculation problems, teach them to solve any problem, start with an analysis of its physical content. Questions related to quality are given in order to consolidate the material studied in the lesson. For example: Let's study how the second value changes when one of the gas parameters changes on the topic of isoprocesses.

Issue 2. If in an isobaric process the volume of an ideal gas increases by 3 times, how many times will its temperature change.

Solution: We know that when the pressure ($p=\text{const}$) and mass ($m=\text{const}$) of an ideal gas are constant, the process expressing the relationship between volume and temperature is called the isobaric process, and this process was discovered in 1802 by French physicist Gay-Lussac. The volume of a given mass of gas at constant pressure varies in proportion to temperature.[6] Based on this, in order to increase the volume of a given ideal gas by 3 times, its temperature must also increase by 3 times. Answer: It will increase by 3 times.

Experimental tasks. One of the most effective ways to connect theory with practice is to solve experimental problems. A characteristic feature of experimental problems is that laboratory or demonstration experiments are used to solve them. In the process of solving experimental problems, the activity and independence of students increases. Because they get the information they need to solve a problem not from a textbook, from a set of problems, but from the physical measurements they make. Another advantage of experimental problems is that these problems cannot be solved without sufficient thought. That is, students should discuss the events that occur in the experiment. Because in experimental tasks, as in laboratory work, no theory is given, no order of work is shown. It is enough to provide the necessary equipment and materials and ask to find information. As we said above, students learn what physical phenomenon is being discussed in the experiment, what physical law is being expressed, from a series of thoughts and opinions. And, finally, they give the last expression for the physical quantity to be found in the experimental problem. Analyzing the last expression, one obtains the values necessary for solving the problem by direct measurement. Let's see what was said in the following simple experimental problem:

Issue 3. What will be the temperature of the mixture if you mix a volume of 0.2 liters with water at a temperature of 10° and boiling water with a volume of 0.2 liters?

Completion of the task: Pour 0.2 l of water into a glass with a beaker and measure its temperature with a thermometer, then again measure 0.2 l of water with a beaker and place it in an aluminum Dewar vessel and heat the water on the stove. until it boils. Now pour the water from both containers into a larger glass and measure the temperature of the mixture with a thermometer. As a result of the work done, the student will receive the following knowledge and skills: that a liquid does not have a shape, but has a volume, finding mass by volume and density, an idea of temperature and its scale, the temperature of a mixture that takes a value between the temperatures of cold and hot water, have imagination. In addition, with the help of this problem, the heat balance equation is studied and solved, i.e., the amount of heat received by one body is equal to the amount of heat given off by another body.

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