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METHODOLOGY OF INCREASING STUDENTS' INTEREST IN THE SCIENCE OF PHYSICS BY SOLVING OLYMPIC PROBLEMS IN SPECIALIZED SCHOOLS

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ABSTRACT

The article discusses the features of Olympiad problems in physics in specialized schools, necessary for preparing students of specialized schools for the Olympiad, analyzes knowledge of mathematics and provides examples of methods for solving several Olympiad problems.

Keywords: physics, specialized school, Olympiad problems, problem solving methods.

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ANNOTATION

The article discusses the features of Olympiad problems in physics in specialized schools, necessary for the preparation of students of specialized schools for the Olympiad, analyzes the knowledge of mathematics and gives examples of methods for solving several Olympiad problems.

KEY WORDS: physics, specialized school, Olympiad problems, methods of problem solving.

INTRODUCTION

Solving complex problems in physics or Olympiad problems in specialized schools is the first step for students to enter the scientific world. Each question is a small scientific task that must be solved independently.
Olympiad problems are a type of scientific problem that arises in the research activities of scientists.
The current progress of science and technology requires the training of highly qualified specialists more in the natural and technical fields.
To do this, it is necessary to increase the effectiveness of scientific education in physics, to identify talented young people and their development of creative abilities is one of the urgent problems of our time. If you organize circles in an educational institution, if you hold Olympiads in physics among students, organize correspondence Olympiads in subjects, then students' interest in science will increase, their abilities will be formed and self-confidence will increase.

MATERIALS AND METHODS OF RESEARCH

The tasks of the Olympiad for different stages differ significantly in their level of complexity. Students study the laws of physics, creative skills of practical application of physical phenomena, develop associative thinking necessary when solving complex tasks at the final stage of the Olympiad.
Olympiad problems are a set of the most interesting problems in elementary physics. Olympiad tasks make the student think deeply, work on himself, he is determined to improve his talent and skills, have a rich imagination,

teaches to be a person and be able to make decisions. Currently, in our country there are specialized schools in the presence of presidential educational institutions. It is known that only talented young men and women, young people who want to study and receive education after passing the control exams are admitted to these schools. It is known that Olympiad tasks encourage students to logical thinking and substantiation of their conclusions. When solving problems, students repeat theoretical knowledge and acquire the skills of their practical application.

There is one difference between Olympiad problems and ordinary problems in general physics: Olympic problems simultaneously cover several physical processes and physical laws. That is, the student, possessing knowledge on a given topic, will not be enough to solve the problem of the Olympiad, he will also need to know other physical laws, and it will also be necessary to fully represent this process in the conditions of the problem and reflect it on the drawing, based on deep logical thinking. Moreover, a sufficient level of mathematical knowledge is needed to solve Olympiad problems, in particular, in addition to simple arithmetic calculations, from derivative, differential, integral themes and, of course, it is necessary to thoroughly know geometry.

When preparing a student for the Olympiad, first of all, the teacher should pay attention to the level of knowledge of the student in physics and mathematics, as well as his ability to logical thinking.

Choosing a gifted student for the Olympiad and taking into account the age of the student, you can achieve high results by selectively solving problems from simple to complex, thereby increasing his level of knowledge.

RESULTS AND THEIR ANALYSIS

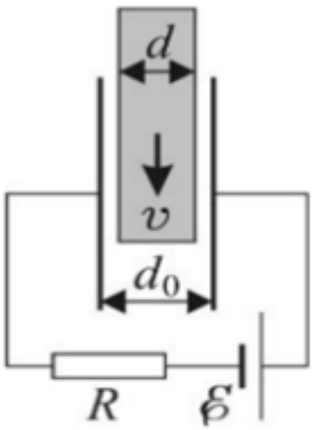
There are no clear instructions on the criteria for choosing questions for the Scientific Olympiad, the responsibility falls on the organizers of the Olympiad. The level of complexity of the tasks corresponds to the stage of the scientific Olympiad and

are selected in accordance with the purpose and age of the participants. One of the main differences between the Republican and International Olympiads is the multi-stage state of the problems, the set of unknown quantities that need to be calculated.

Below are some unique ways to solve Olympiad problems.

Let's look at examples.

1. A flat capacitor, EMF E and resistance R are connected in series in the circuit. Between the plates of the capacitor, a metal plate with a thickness of d moves parallel to them at a speed *v (*Fig. 1).



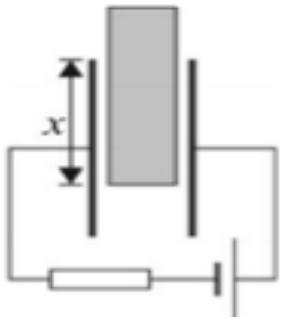
rice. 1

The transverse dimensions of the metal plate and the capacitor plate are suitable in size, the distance between the covers is$_{d0}$. Find the current strength in the circuit without taking into account the internal resistance of the source. Electrical constant ε_0.

Дано: e, r, d, v, ι × ι , d 0, ε_0
Найти: I-?
Solution: Capacity
A capacitor with an X-sized portion of a metal plate placed between the plates of the capacitor is equal to the following:
In this case, the charge of the capacitor is:

$$I = \frac{\Delta q}{\Delta t} = \frac{\varepsilon_0 lvd}{d_0(d_0 - d)}U$$

$$I = \frac{\varepsilon_0 lvdE}{d_0(d_0 - d) + \varepsilon_0 lvdR}$$



rice. 2

Here U is the voltage between the capacitor plates.
The initial charging current of the capacitor with uniform movement of the metal plate is zero and, quickly reaching a certain value, remains unchanged. In this case, the current is:

Given that the voltage on the capacitor is U=E-IR, we find the value of the currenta, which is:

Answer:

$$C(x) = \frac{\varepsilon_0 lx}{d_0 - d} + \frac{\varepsilon_0 l(l - x)}{d_0} = \frac{\varepsilon_0 l(l(d_0 - d) + xd)}{d_0(d_0 - d)}$$

$$I = \frac{\varepsilon_0 lvdE}{d_0(d_0 - d) + \varepsilon_0 lvdR}$$

$$q(x) = \frac{\varepsilon_0 l(l(d_0 - d) + xd)}{d_0(d_0 - d)}U$$

Summing up the above task, it is possible to achieve that in the process of solving the problem, the student will look for a solution, turn to various sources, and think creatively. In total, their thinking abilities expand, the

level of knowledge increases, and interest in pre-meth increases. After all, the task and goal of every teacher is to develop the abilities and skills ofthe younger generation, the ability to identify, to open up opportunities for self-development.

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