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Research Article

IMPROVEMENT OF METHODOLOGY OF SOLVING DIFFERENT TYPES OF PROBLEMS FROM PHYSICS IN SECONDARY SCHOOLS

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ABSTRACT

The article describes the methodology for improving the methodology for solving various types of problems related to isothermal processes in physics in secondary schools.

KEYWORDS

School, isothermal, isobaric, isochoric, adiabatic, practical, skill, matter, type, experimental, qualitative, quantitative.

INTRODUCTION

It is advisable for general secondary school students to develop theoretical knowledge, practical skills and competencies in the process of physics education on problems related to isothermal processes.

The use of different types of quantitative problems in the teaching of physics on the basis of the ideal gas state equation helps students to understand the physical nature of the phenomena associated with the isothermal process and to apply them in practice and develop skills.

General secondary schools should be closely acquainted with the scientific basis of physical phenomena, processes and laws that occur in the

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isothermal processes of physical, mechanical, biological, chemical properties.

In view of the above, the following objectives are set for the lessons designed to select and solve quantitative problems related to isothermal processes in the teaching of physics:

1. Selection issues expand students 'knowledge of isothermal processes in terms of content.

2. The use of different types of physics problems on isothermal processes in the classroom helps students to master the material thoroughly and in depth.

3. Selecting and solving quantitative problems in isothermal processes from physics helps students learn the essence of the laws of physics.

Selecting and solving a variety of problems based on the ideal gas equation will help students apply their theoretical knowledge of physics in practice.

Solving experimental problems related to isothermal processes in physics allows students to study the laws of nature in depth, to form and develop skills and abilities, to work independently, to consciously apply theoretical knowledge in practice, that is, in production work. By selecting and solving experimental problems from physics on isothermal processes, students 'interest in pursuing a career in medicine will increase as they remain in their future daily choices, as the skills and competencies they acquire will be needed in production activities.

Students face a challenge in selecting and solving different types of problems related to isothermal processes in physics. In solving such problems, students may encounter quantities encountered in quantitative, qualitative, graphical, experimental, problem-solving problems. In this case, they can use several methods to solve the problem. In the process of solving mixed problems, students' problem-solving skills and competencies increase.

Issue 1. The average pressure in a gas cylinder of a car running on gas is 4 • 105 Pa and its volume is 0.02 m3. Determine the volume of the gas that pollutes the atmosphere when its combustion pressure is 2 • 105 Pa.

Given:

$p_1 = 4 \cdot 10^5$ Па

$p_2 = 2 \cdot 10^5$ Па

$V_1 = 0{,}02\ м^3$

$V_2 = ?$

Formula:

$p_2 = \frac{p_1}{2}$ (1)from

$V_2 = \frac{V_1}{2}$ (2)

Solution:

$$V_2 = \frac{V_1}{2} = \frac{0{,}02\ м^3}{2} = 0{,}01\ м^3.$$

Answer: V2 = 0.01 m^3 of exhaust gas pollutes the atmosphere.

Issue 2. The gas volume in the gas cylinder of a gas engine car is 0.03 m3,

its temperature is 110 C. the gas temperature in the cylinder remained at 60 C due to fuel consumption. Find the volume of exhaust gas emitted from the car.

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Given:	Si:	Formula:
V_1 = 0,03 m^3	0,03 m^3	$\frac{V_1}{V2} = \frac{T_1}{T_2}$ (1) From
$t_1 = 11^o$ C	248 K	$V_2 = \frac{V_1}{\frac{T_1}{T_2}} = \frac{V_1T_2}{T_1}$ (2)
$t_2 = 6^o$ C	279 K	$V = V_1 - V_2$ (3)
V_2 = ?		

Solution.

$$V_2 = \frac{V_1T_2}{T_1} = \frac{0{,}03\ м^3 \cdot 279\ K}{284\ K} = 0{,}028\ м^3.$$

$V = V_1 - V_2 = 0{,}03\ м^3 - 0{,}028\ м^3 = 0{,}002\ м^3$.

Issue 3. The temperature of the molten metal during the operation of the aluminum plant is 9430 C, which pollutes about 5 m3 of air. How much air does the solution contaminate when it reaches 18000 C?

Given:	SI:	Formula:
$t_1 = 943^o$ C	1216 K	$\frac{V_1}{V_2} = \frac{T_1}{T_2}$ (1) from
t_2 = 1800° C	2073 K	$V_2 = \frac{V_1}{\frac{T_1}{T_2}} = \frac{V_1T_2}{T_1}$ (2)
$V_1 = 5\ m^3$	5 m^3	
V_2 = ?		

Solution.

$$V_2 = \frac{V_1T_2}{T_1} = \frac{5\ м^3 \cdot 2073\ K}{1216\ K} = 8{,}52\ м^3.$$

Answer: V2 = 8.52 m^2 pollutes the air.

The above-mentioned issues The selection and solution of quantitative problems of "isothermal processes" are important for students to apply their theoretical knowledge of physics in practice, to acquire a profession in the national economy.

In the course of the study, numerical, qualitative, graphical, experimental, mixed issues on the topic of isotherm were solved in the traditional way. The content of issues related to the curriculum and syllabus of the school physics course was also given.

From molecular physics, methods for selecting and solving different types of problems related to isograms have been sought.

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