

METHODOLOGY FOR STUDYING THE TOPIC “FUNDAMENTALS OF THERMODYNAMICS”

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ABSTRACT: The article provides basic guidelines for studying the topic “Fundamentals of Thermodynamics”, discusses the content of the educational material on the topic.

KEYWORDS: Thermodynamics, internal energy, amount of heat, heat balance equation, work in thermodynamics, irreversibility of thermal processes, operating principle of heat engines and their efficiency.

INTRODUCTION

Thermodynamics is a branch of physics that studies the most general properties of macroscopic systems in a state of thermodynamic equilibrium, and the processes of transition between these states. The main concepts that students need to learn include internal energy and how to change it, the amount of heat, the heat balance equation, work in thermodynamics, the irreversibility of thermal processes, the operating principle of heat engines, and their efficiency.

In the topic “Fundamentals of Thermodynamics,” students receive further development of the energy concept, generalize the law of conservation of energy for thermal processes study the first law of thermodynamics and consider how to apply it to analyze isoprocesses in gases.

The most important laws studied in this topic include the first law of thermodynamics, as well as an introduction to the second law of thermodynamics and the adiabatic process. The study of one of the basic principles of thermodynamics has enormous cognitive and ideological significance.

It is useful for students to be given the opportunity to trace the development of the doctrine of heat from a historical perspective. Before using internal energy, it was necessary to understand thermal processes; the laws describing them were discovered.

An important issue in this topic is the principles of operation of heat engines, the consideration of which makes it possible to show the application of the laws of thermodynamics in specific technical devices and thereby familiarize students with the physical foundations of thermal power engineering. Even S. Carnot wrote: “The study of these machines is extremely interesting. Because their importance is very great and their distribution is growing every day.” The presentation of questions about heat engines should acquaint students with the scientific foundations and principles of their operation, with the physical laws of energy conversion with the help of these machines and justify further directions for their improvement.

Difficulties in students mastering the theoretical foundations of the operation of heat engines are caused not only by the complexity of the material, which is characterized by abstractness , and the imperfection of the methodology for presenting this material.

It should be noted that students experience significant difficulties and difficulties when solving problems involving drawing up a heat balance equation and using the first law of thermodynamics. Problem solving plays a huge role in teaching physics because the most important goal of teaching physics is for students to master methods for solving various problems. On the one hand, students must solve problems to fully achieve all the goals of teaching physics. On the other hand, problem solving is a goal in itself. Solving problems in physics acts both as a goal and as a means of learning.

A learning task is usually a model of a real-life system. A physical problem can be described as a mathematical model on the one hand, and as a complex system built on a physical-biological hierarchy on the other. In physics education, both types of problem models are used to solve problems.

After completing the study of the topic, it is advisable to hold a conference on the topic 'Heat engines in the service of man.' Holding such a conference provides an opportunity to show the role of heat engines in the development of the country's energy sector and national economy.

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