METHODOLOGY FOR HELIOTECHNICAL PROBLEMS IN SCHOOL

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ABSTRACT

This article provides an overview of the issues and methods for solving problems in the calculation of heliotechnical devices and their physical parameters.

Keywords: Solar technology, solar panels, physical parameters.

INTRODUCTION, LITERATURE REVIEW AND DISCUSSION

While the integration of education, science and industry is of vital importance in our country, it is no secret that the formation of a growing generation of modern scientists is dependent on the effective organization of the educational process in this area.

During the school physics course, it is important to address issues that include a small amount of heliotechnic equipment and physical quantities that characterize them during extra-curricular activities, especially in the circle. This process can also be organized as an excursion. For example, it can also be carried out in small facilities covered by small solar panels. In the following, we will analyze some of the physical issues associated with this section.

Issue 1. A 20 W solar panel is connected to the consumer as in the chain shown in Figure 1. If the voltage on the circuit is 1.5 A and the voltage is 6 V, determine the lamp's power, resistance, and internal solar power.

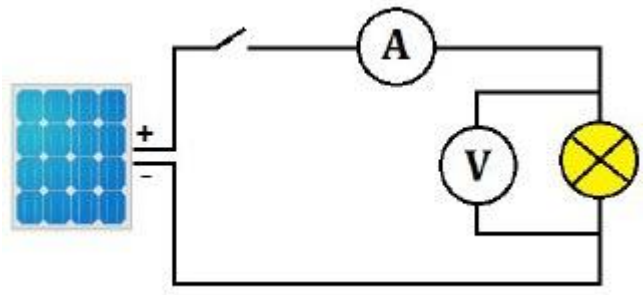

Figure 1.

In this issue, students are briefed on the use of solar panels in place of the current in the electrical circuits, summarizing the problem and summarizing the basic formulas and calculating the results based on these formulas. The formulas used should be used by students throughout the lesson.

Given

$P = 20W$

$I = 1,5A$

$U = 6V$

Formula and solution.

$P_0 = IU = 1,5A \cdot 6V = 9W$

$R = \frac{U}{I} = \frac{6V}{1,5A} = 4\Omega$

from $P = I\varepsilon$ the power of the solar panel

$$\varepsilon = \frac{P}{I} = \frac{20W}{1,5A} \approx 13,3V$$

$P_0 = ?\quad R = ?\quad r = ?\quad \varepsilon = ?$ $I = \frac{\varepsilon}{R+r}$ from the formula

$$r = \frac{\varepsilon}{I} - R = \frac{13,3V}{1,5A} - 4\Omega \approx 4,87\Omega$$

Issue 2. The solar panel's passport states: "Maximum voltage - 17.2 V", "Maximum current voltage - 5.82 A" (Figure 2). How much of a 5 W LED diode can be connected to the panel when it is exposed to sunlight?

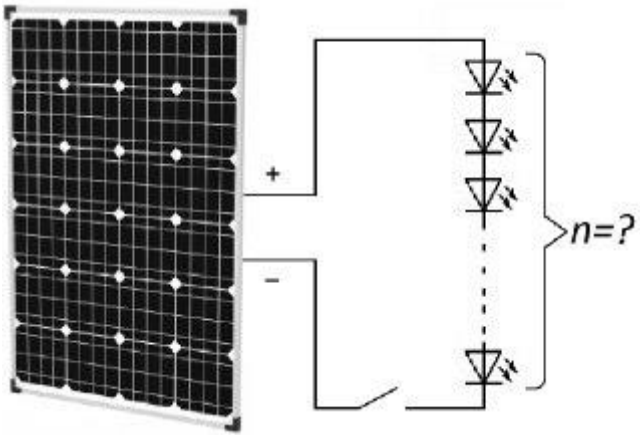

Figure 2.

In explaining Problem 2, students are told about the different LED lighting LEDs, and then, depending on the problem, the solar panel will be able to determine the maximum voltage and maximum power of the solar panel. If we divide the solar panel's capacity by one LED lamp, they will have a number.

Given

$U = 17,2V$

$I = 5,82A$

$P_0 = 5W$

$n = ?$

Formula and solution.

Solar panel power

$$P = IU = 5,82A \cdot 17,2V = 100W$$

$$n = \frac{P}{P_0} = \frac{100W}{5W} = 20ta$$

It is also possible to solve the problem of heliotechnics by using the experience and calculating basic basic formulas, drawing the graphs of the relation between the sizes, answering the questions and using other methods.

By solving problems related to heliotechnics, students can effectively use physics laws and formulas to build their interest in science and create a conviction to use the knowledge gained for practical purposes.

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