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The consequences of electric current and its influence on the human body

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Abstract

This article is devoted to the fact that in general secondary schools in physics course in teaching direct and alternating electric current, topics are disclosed on the basis of their connection with the subject of electrical engineering.

Keywords: Positive, negative, Benjamin Franklin, electric current, direct and alternating electric current, sinusoidal variable function, amplitude, period, frequency, phase

1. Introduction

Today, electricity has become an integral part of our daily lives. Because our home's lighting lamps, televisions, refrigerators, irons, computers and many other electrical appliances are powered by electricity. All industrial enterprises and institutions also use electricity. In general, life without electricity is unimaginable.

2. Literature review

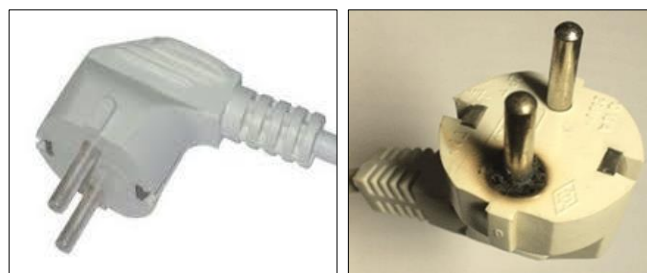
Some of the chapters of "Electrical work and power" in the 8th class physics textbook of general secondary schools by P. Xabibullaev, A. Boydedaev, A. Bakhromov, J. Usarov, K. Suyarov, M. Yuldashev ^[1]. Materials and Images are insufficient. In particular, the topic is "Connecting electrical circuits in the house", connection of electrical circuits in the house, detection of voltage, connection of plugs and sockets, cartridges and connectors. Although it is advised to avoid short-circuiting, the effects of non-compliance, screws on sockets and plugs, or the screws that have been emptied during use are not illustrated by illustrations to facilitate readers' understanding.

Although the topic "Electrical safety measures" it is said to follow electrical safety measures, there is no safe voltage or current. Although the human body has been informed of the effects of electricity, there are no safety precautions or interventions to deal with electrical appliances.

We believe that the materials provided by us below will methodologically fill these gaps and further enhance students' knowledge.

3. Materials and Methods

The followings are disadvantages as a result of neglect in the use of electrical appliances at home ^[2, 3].



1.

2.

Fig 1: A plug and a broken plug

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Fig 2: 3 A socket and a broken sockets

To avoid this, it is important to remember the following: The electrical current I on the circuit depends on the electrical conductivity of the circuit, the external resistance on the R circuit, and the internal resistance of the source r . If the internal resistance is too small ($R \gg r$) against the external resistance, the internal resistance will not have a significant effect on the current. In this case, the voltage at the source poles is approximately equal to the EWC. However, at short circuits ($P \rightarrow 0$), the current on the circuit depends on the internal resistance of the source, and when the rpm is too small, the current I power increases, and $Q = I^2 R t$ thermal dissipation may cause the wires to melt and the source itself to be inoperable (Figs. 1, 2 and 3, 4, 5). Therefore, we must be very careful about short circuit when assembling the electrical circuit and when working with the mains. Also, if you notice the heat of the socket and the plug, we can immediately disconnect the plug from the shield, call a specialist or troubleshoot the socket and plug based on what we have learned.

The foregoing occurs through our neglect, which can be repaired with little expense and time, but if we go through our own electricity, an accident will occur. From this point of view, it is necessary to consider the impact of current on the human body.

When a person passes through the body, electric current reduces the muscles and burns the human body. Muscle contraction can exacerbate a person's breathing and stop the heartbeat. Therefore, it is advisable to touch the back of the hand (Figure 3) before touching any electrical appliances, unless the power is exposed (Figure 3).



Fig 3: Therefore, it is advisable to touch the back of the hand before touching any electrical appliances, unless the power is exposed

Electric shock: Electric injury and electric shock vary. Burns to electric wounds, damage to the eyes caused by electric arcs; electric shock, fracture, exhaustion and the like, as a result of falling and loss of consciousness.

4. Results and Discussion

In case of electric shock, internal organs are damaged.

Electric shock occurs at small voltages of 25-100 mA. A current of up to 10 mA is safe for human life and creates an unpleasant sensation. If the current strength exceeds 10-25 mA, the muscles of the arm may become controversial. As a result, one cannot separate itself from the conductive part. If the current is exposed for more than 15-20 seconds, breathing problems may stop. If the current is 100 mA or more, the pulse of the person stops immediately. The amount of current that passes through the body depends on the voltage and current, as well as the electrical resistance of the human body. The electrical resistance of the human body depends on its mood, weight, physical fitness, skin surface and other parameters. When the skin is dry and unharmed, its electrical resistance is around 10-100 kOm. Therefore, it is very difficult to talk about any amount of safe voltage. Years of experience in using electrical appliances show that the worst-case voltage is less than 12 V and for dry and clean rooms less than 36 V can be considered as safe voltages. In dry rooms, the electrical resistance of the human body can reach several tens of thousands of Om. In this case, the voltage around 100 V may also be safe.

The rules of electrical devices determine the following voltages depending on the environmental conditions: 12, 36V electrical devices - small voltage devices; 65V to 250V devices for low voltage devices; voltage greater than 250V. Applying a range of safety precautions and safeguards will ensure the safety of electrical devices. Such measures include protection of all conductive parts with special protective barriers, attachment of electrical devices to the ground (grounding conductors when metal roofs are closed), or scratching, protective base, rubber, gloves, application of rubber rugs and other protective equipment, use of reduced voltage.

Far from an electrical device, the electrical potential at all points in the human body is zero. However, when a person is approaching an electric device, he or she will be exposed to the electric field because there is always an electric field around the electrical equipment. The potential of the closest point of the human body to electrical current varies from zero, and the electrical potential of the organism remains zero. At this time, the electrical potentials of the two points of the human body are different. In this case, an electrical current will pass through the body.

The closer the device is to the voltage, the greater the electrical potential of certain points in the body, and the more current through the body.

In most cases, the safety precautions must be followed when operating with electrical appliances 127, 220 and 380 volts. Otherwise accidents can occur [4]. It is important to explain to students how to use electrical appliances especially at home.

It should be noted that the drawers and transformers used in the grid are used porcelain or glass kettles (insulators), and are also replaced in case of damage (that is, in the event of partial electrical current). It is good for the students to explain that the wood or concrete tables, which are turned off after the rain and after the rain, partly carry the electricity.

5. Conclusion

We ask students questions about dielectrics or conductors, and summarizing their answers that the person himself is in the conductor, and that electric current cause's burn, disability and even death. To prevent electric shock, to

prevent electric wiring and to inform the public in the event of a power outage.

Because the electrical current is colorless, odorless, odor-free and can't be touched by hand, the safety rules apply when handling it. In fact, if we have a good grasp of the electrical laws, these fears will not be in vain, as we are well aware of it and will always adhere to safety regulations.

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