UDC 531.35

Akhmadjonova U. T

Assistant of the Department of Physics

Jizzakh Polytechnic Institute

Jizzakh city,Uzbekistan1

THE USE OF NEWTON'S LAWS IN THE STUDY OF "CENTRIFUGAL FORCE"

Abstract: *The center provides information on how to use a new modern kind of laboratory work to explain the topic of aspiration to students.*

Keywords: *centrifugal force, Newton, rotational motion, acceleration, radius, angular velocity, instantaneous velocity, mass..*

Ахмаджонова У. Т.

Ассистент кафедры физики

Джизакский политехнический институт

ИСПОЛЬЗОВАНИЕ ЗАКОНОВ НЬЮТОНА ПРИ ИЗУЧЕНИИ "ЦЕНТРОБЕЖНОЙ СИЛЫ"

Аннотация: *Приведены сведения о способе использования нового современного вида лабораторных работ при разъяснении учащимся темы центробежной силы..*

Ключевые слова:*центробежная сила, Ньютон, вращательное движение, ускорение, радиус, угловая скорость, мгновенная скорость, масса.*

Introduction: such requirements are reflected in the national program of Personnel Training of the Republic of Uzbekistan and a number of laws on improvement of the educational system. Proceeding from this program and laws, it is necessary to conduct a lesson on the basis of predicate connections, using unconventional lesson methods, in order to shed light on the content of each chapter, each subject of the physics course.

Main part: as you know, the subject of curved linear motion is one of the basic concepts of the kinematics section. It is a modern requirement to convey this topic to students in a simple and understandable language with the help of vital examples and issues[1-6]. It is necessary to give students as much Internet information on the subjects as possible. Because the elements of modern, new pedagogical technology are subject to these requirements .

Of course, it is controlled that the students are deeply absorbed in this information. The use of these modern test methods will save the student's time budget to some extent.

In this article, we will focus on the above general problems of teaching physics, as well as on the private problems of short content. One such private problem is the use of a new type of laboratory work in explaining the subject of the power of aspiration to the center to the students.

This laboratory work is different from the laboratory work presented in the textbooks of physics, it is based on more science-related elements.

It is known that in order to illuminate the subject of centrifugal force, it is first necessary to give students such concepts as linear velocity, angular velocity, centrifugal acceleration and tangential acceleration [1-2]. Students should pay serious attention to the formation of these concepts, because they are difficult to master. At the same time, instantaneous speed known to students in advance will be of particular importance in the study of curve linear motion.

The main problem of mechanics in this subject is solved for the position of an object moving in a circle. This topic is the last topic of the section on kinematics, in which the basic concepts and conclusions of this section should be summarized.

As the body moves in a circle, an aspiration to the center is accelerated.Let us apply Newton's laws to the rotational motion of a solid.

The solid moving smoothly along the circle has acceleration. Such acceleration is called centrifugal force acceleration .

a= $\frac{\vartheta^2}{R}$ (1) if we put this formula in Newton's second law F= ma (2) to put F= $m\frac{\vartheta^2}{R}$ (3) is formed, and this formula represents the centrifugal force, or the formula can also be expressed as follows:

$$\vartheta = \omega \cdot R \quad (4) \quad \text{from that} \quad F = m\frac{(\omega R)^2}{R} = m\omega^2 \cdot R \quad (5)$$

Therefore, according to these expressions, the centrifugal force acting on an object is directly proportional to the mass of the object and the square of the linear velocity, and inversely proportional to the radius of rotation..

When we rotate a balloon tied to a string, we affect it through the string. Through the string, we pull the balloon to the center with a force that tends to the center. The greater the mass of the balloon, the more force we have to pull it. The greater the square of the linear velocity of the balloon, the greater the force required to pull it. But the longer the rope, i.e. the larger the radius of rotation, the less force is required to pull the balloon [1-2].

We apply Newton's third law to rotational motion. According to Newton's third law, the centrifugal force is quantitatively equal, but there is also a force opposite to it in the direction, which is called centrifugal force. The centrifugal force is expressed as the centrifugal force as follows:

$$F = m\frac{(\omega R)^2}{R} = m\omega^2 \cdot R \quad (6)$$

The centrifugal force is directed from the center of rotation along the radius to the outside of the circle, and it is the force that restricts the free movement of a material point (object) and forces it to move along a curved line.

For example, if a stone (a material point) attached to a rope is rotated in a horizontal plane, the force of attraction to the center acts on the stone from the side of the rope, forcing it to move in a circle. The centrifugal force, on the other hand, acts on the rope from the stone side, tightening the rope and even causing it to break.

The centrifugal force device (Fig. 1) F conducts an experimental study of the dependence of the centrifugal force F on the mass m of a body at point r. At a distance r from the center of rotation, the centrifugal force acting on an object rotating at an angular velocity ō is determined as follows.

$$F = m\omega^2 \cdot R \quad (7)$$

The centrifugal force device is attached to the table with grips. The centrifugal force device is positioned so that the rotating rod can easily pass through the handle with a U-shaped sensor. The centrifugal power drive is connected to the supply source by two cables [6].

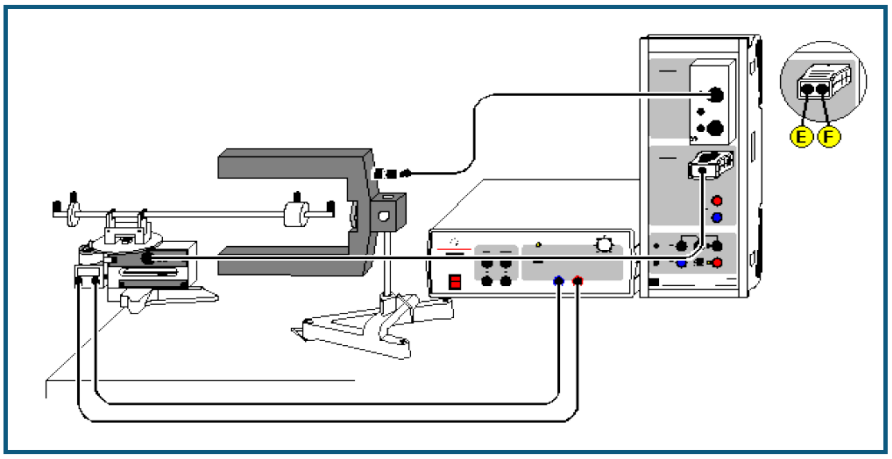

Figure 1. Centrifugal force device [6].

The supply voltage of the drive must be such that the measured power value does not exceed 15 N. By pouring the voltage to 1.5 V, the experiment begins at a low ō angular velocity and the number of revolutions is counted. The measurement is continued at a greater angular velocity by pouring the voltage to 3V.

When performing a series of measurements, measurements are made by changing the mass m (r = const) and changing r (m = const)..

The working formula of laboratory training is as follows $F = m\frac{\vartheta^2}{R}$ (8) derived from the formula. Initially, the v is found in the formula.

$$\vartheta = \frac{s}{t} = \frac{2\pi r}{T} = \frac{2\pi r}{\frac{t}{N}} = \frac{2\pi rN}{t} \quad (9)$$ pour the found value into (8),

$$F = \frac{4\pi^2 RN^2 m}{t^2} \quad (10) \text{ is formed.}$$

In the resulting formula, R is the distance from the center to the load, N is the number of revolutions, m is the mass of the load, t is the time taken to rotate N times.

Experiments show that the force F and ω^2 are in a linear relationship [3-5]. Because centrifugal forces acting on loads of different masses vary in magnitude, they move at different speeds.

Conclusion: Thus, using Newton's laws in a circular motion, it is possible to study the topic of "centrifugal force". Similar methods allow students to develop an interest in physics. This ensures that the learning materials are somewhat deep and solid.

References

1. Akhmadzhonova, Y. T., & Akhmadzhonova, U. T. (2021). “Press conference” in the delivering of chemistry. Экономика и социум, (3-1), 20-22.5.
2. Yaxshiyeva, Z. Z., Axmadjonova, Y. T., & Axmadjonova, U. T. (2021). Evaluation of the quality of education is studied on the basis of foreign experience. Integration of science, education and practice. Scientific-methodical journal, 383-385.
3. Axmadjonova, Y. T., & Axmadjonova, U. T. (2021). Development of agroindustrial complex. Development issues of innovative economy in the agricultural sector, 761-763..
4. LD Didctic GmbH, Leyboldstrasse 1, D-50354 Huerth
5. Axmedovna, S. S., & o rqinoy Tojimurodovna, A. Y. (2021). PISA a criteria for improving the quality of education. Galaxy International Interdisciplinary Research Journal, 9(05), 306-308.

6. Ахмаджонова, Ё. Т. (2021). PISA:«Студентов нужно научить думать, а не запоминать». Гуманитарный трактат, (101), 12-14.