



## "MECHANICAL VIBRATIONS. FREE VIBRATIONS" ORGANIZING THE LESSON (EXAMPLE OF VOCATIONAL VOCATIONAL SCHOOL)

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**Abstract:** In this work, the reforms carried out in the system of vocational schools in our country, as well as the training of young students in the field of physics "Mechanical vibrations. The procedure for developing a model of the teaching technology of the Free Vibrations lesson was analyzed. The article describes some samples and developments related to the module.

**Key words:** youth, education, vocational school, period, frequency, cyclic frequency, spring pendulum, mathematical pendulum, practical training, assessment.

### INTRODUCTION

Since the adoption of the Law on Education in the new version of 2020, improving the quality of education at all levels of education, including international experience and requirements in the field, including children up to school age in preschool educational institutions, general education schools, academic lyceum and to increase the coverage of graduates of vocational colleges for higher education, to expand the facilities and opportunities for applying for higher education and to ensure the organization of entrance exams in a fair and transparent manner, to reconstruct the buildings of educational institutions based on the requirements of the times and measures are being taken to build modern schools and update their material and technical base, to attract the private sector to the field, to improve the system of material incentives for teaching staff and to gradually increase their wages.



From this point of view, the reform of the professional education system is of great importance. For this purpose, the regulatory legal documents related to the industry were also improved in the past period.

### MAIN PART

In primary professional education, along with special subjects, concrete subjects should also be conducted in an interactive manner. The main task is to organize them in a practical, interesting way, with high-quality, vital examples and evidence. In particular, the development of young people's interest in specific sciences, raising their mathematical and physical consciousness is one of the urgent tasks.

For example, students of the primary professional education system are taught "Mechanical vibrations" as part of the curriculum. We will consider the procedure for organizing lessons in the "Free Vibrations" module.

Processes characterized by repeatability to one degree or another are called fluctuations. Depending on the physical nature of the repetitive process, vibrations are divided into mechanical, electromechanical, electromagnetic, and others. We see mechanical vibrations. Oscillations are divided into free (or special) oscillations, forced oscillations, self-oscillations and parametric oscillations.

#### Criteria for evaluating students' knowledge on the subject:

Assessment	The level of knowledge of students
(5) - excellent	Conduct independent observation, be able to apply in practice, explain the essence, have ideas and imagination, be able to deliver one's opinion.
(4) is good	To conduct independent observation, to be able to apply in practice, to explain the essence, to have thoughts and imagination
(3)- satisfactory	Understanding the essence of the topic, having ideas



	and imagination is 0-54%
(2)-unsatisfactory	Not having a clear idea, not knowing

Oscillations in a system that oscillates on its own after being removed from equilibrium are called free or spontaneous oscillations. For example, the oscillation of a mathematical pendulum is an example of free oscillations. If the oscillations occur according to the sine or cosine law, such oscillations are called harmonic

Rule of the "MENTAL ATTACK" method  
 No co-evaluation and criticism is allowed!  
 Do not rush to evaluate the proposed idea, even if it is wonderful and strange - anything is possible. Criticism - all ideas are valuable and powerful. Don't be the one who comes out! Do not push yourself! The goal is quantity!  
 The more ideas are expressed, the better: there are many

Mechanical vibrations. Free vibrations.

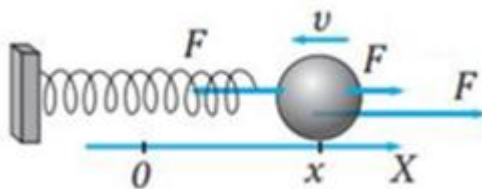
A motion whose condition is periodically repeated at certain time intervals is called oscillatory motion or oscillations.

There are two types of oscillatory motion:

- free vibrations;
- forced vibrations.

Oscillations of a body under the influence of internal forces after being removed from equilibrium and released are called free vibrations.

Vibrations caused by an external periodic force are called forced vibrations.



The time it takes for an oscillating

$$T = \frac{t}{N}$$



body to complete one complete oscillation is called the period of oscillation. The period of oscillation is denoted by the letter T.

A physical quantity equal to the number of vibrations per unit of time is called the vibration frequency. The frequency of vibration is denoted by the letter  $\nu$  (new). 
$$\nu = \frac{N}{t}$$

The quantity characterized by the number of oscillations of a body per 2 $\pi$  second is called cyclic frequency. Cyclic frequency is denoted by the letter  $\omega$  (omega).

$$\omega = 2\pi/T$$

The unit of cyclic frequency is taken as  $[\omega]=1\text{rad/s}$  in XBS.

The oscillation period and oscillation frequency are related to the cyclic frequency as follows:

$$\omega = 2\pi/T = 2\pi\nu(3)$$

The distance a oscillating body moves away from its equilibrium position is called its displacement. The shift is denoted by the letter x.

**Homework. Exercise 12-13.**

1. The amplitude of the moving material point is 0.5 mm, the frequency is 2 kHz. How far does a point travel in 0.1 s?
2. Find the vibration amplitude, frequency and period of a material point whose equation of motion is  $x = 0.06\cos 100\pi t$ .
3. If the length of a mathematical pendulum is reduced by 16 times, how will its period of free (specific) oscillations change?
4. When a pendulum swings freely, it swings to its extreme position 15 times in one minute. What is the frequency of oscillations?
5. If the spring is stretched by 1.5 cm under the influence of a force of 6 N, what is the period of oscillations of a load of mass 1 kg hanging on it?
6. What is the period of oscillations of a load hanging on a spring for 36 h for 1 minute, and a load of mass 1 kg hanging on it?



## CONCLUSION

By organizing practical sessions (conversation-discussion, lecture-dialogue) in the form of heuristic conversations and discussions using audiovisual tools, and practical sessions using active, interactive methods and information and pedagogical technologies will increase their interests. In this way, it is possible to achieve a high amount of residual knowledge among students, and to prepare potential professionals in accordance with the requirements of the time.

It is important to have material, organizational and methodical opportunities to organize classes based on the above principles.

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