ABOUT A NEW WAY OF ASSESSING STUDENTS' KNOWLEDGE IN LECTURES

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ANNOTATION

It is shown how the confusing logical chain method, which is proposed to be applied to increase the activity of students in the lectures of theoretical mechanics, can be applied to one chapter, section and complete part of the science.

Keywords: theoretical mechanics, statics, kinematics, dynamics, force, equation, motion, velocity, acceleration, trajectory, forward motion, rotational motion, moment of inertia.

At present, the main problem in the field of education of young people is the problem of improving the educational process, the solution of which is the content of education, teaching methods, tools, forms, as well as the interaction of teachers and students. membership analysis and development play an important role.

Numerous studies have been conducted by many pedagogical scholars on the teaching of theoretical mechanics on the basis of advanced pedagogical technologies. The organization of lectures using Venn diagram in lessons is given in [2,6]. Practical solutions have been given in the study [4] to increase the visualization of lessons by applying the cluster method to the teaching process. Research [1,3] discusses ways to increase student engagement in the classroom. An unconventional method based on the generation of electricity using wind energy has been described in [5,7].

The skill of the teacher plays an important role in achieving the effectiveness of the lesson. The educator is required to be a master of his craft, a deep knowledge of his subject, a well-versed in the relevant fields of science and art, a good understanding of general and youth psychology in practice, a thorough knowledge of teaching and educational methods and a high culture. In order to perform these tasks, the teacher must know the skillful use of advanced pedagogical technologies. The following is a discussion of a new applicable method of teaching theoretical mechanics and the assessment of students' knowledge.

The “confusing logic chain” method. This method is used to study the cause-and-effect relationships of an event. When using this method, the student learns to match the concepts related to the topic being studied, such as formulas, expressions, definitions, theorems, when the data on several topics studied are brought together.

Procedure: the set of facts studied is presented to students in a confusing (distorted) chronological order of cause and effect. Task: students should place them in the correct order, students can also compose a text using additional words to the presented ones to connect the facts.

Let us consider the application of this method in the teaching process of the subject "Flat parallel motion of a rigid body" in the Department of Kinematics of Theoretical Mechanics. Information on progress, rotation around a fixed axis, and straight parallel motions is given by the confusing logic chain method. The teacher distributes a copy of the table to the students according to the number of students in the classroom. Students will review this chart in detail and write the correct answer number for each question on the left, followed by the number on the right. The teacher collects the answers from all the students, checks them and announces the results. The following is a table corresponding to the above topics:

1	The motion of a rigid body in a fixed plane with all points ..... is called a plane parallel motion	1	All points of a rigid body moving forward draw the same trajectory, and at each moment they have velocities and accelerations that are equal in quantity and direction.
2	Definition of progressive action	2	The axis of rotation
3	Instantaneous center of velocities	3	$\vec{V}_B = \vec{V}_p + \vec{V}_{pB}$
4	An arrow passing through fixed points	4	$\vec{a}_B = \vec{a}_A + \vec{a}_{AB}$
5	Equation of plane parallel motion	5	This is called rotational motion around a fixed axis
6	Angular velocity in a plane parallel motion	6	A point whose velocity is zero when a body is in a straight parallel motion
7	Theorem on the motion of progress	7	The ratio of the linear velocity of an arbitrary point in a plane to the distance from that point to the instantaneous center of velocities
8	The formula for determining the velocity in a plane parallel motion through the instantaneous center	8	Any cross-section taken on a body moves parallel to itself at all times during the movement of the body.
9	Of an arbitrary point on a body in plane parallel motion acceleration	9	$x_A = x_A(t), y_A = y_A(t),\ \varphi = \varphi(t)$
10	If two points of a moving rigid body are constantly left motionless	10	Parallel

Correct answers (10,8,6,2,9,7,1,3,4,5).

We will now use this method for a section of science. In this case, students can use their knowledge in a non-traditional way to test the level of mastery of the studied topic and to conduct an intermediate assessment. The table covering all the topics of the Department of Theoretical Mechanics and Kinematics is given below:

1	Qoriolis acceleration formula	1	If the angular velocity of the body does not change
2	The theorem on the projection of the	2	$\vec{a}_B = \vec{a}_A + \vec{a}_{AB}$

	velocities of two points on a flat figure		
3	Show the law of motion of a plane accelerating rotation	3	$\vec{v}_{\text{абс}} = \vec{v}_{\text{от}} + \vec{v}_{\text{пер}}$
4	The law of spherical motion looks like this	4	$v = h\omega$ The amount e, the direction along the attempt to the point trajectory
5	What motion is called a circular motion	5	$a_{mi} = \omega^2 \cdot h$
6	Which formula finds the acceleration of an arbitrary point V in a plane parallel motion	6	All points of a moving body draw the same trajectory, and at each moment they have velocities and accelerations that are equal in quantity and direction.
7	Which formula determines the velocity of a point in complex motion	7	$\left.\begin{array}{l}\psi = f_1(t)\\ \varphi = f_2(t)\\ \theta = f_3(t)\end{array}\right\}$
8	Show the formula for finding the amount of acceleration of aspiration to the center in rotational motion	8	$\vec{a}_{kor} = 2\,\vec{\omega}_e \, x \, \vec{v}_r$
9	The quantity and direction of the linear velocity of an arbitrary point of an object in rotational motion around a fixed axis	9	The projection of the velocities of any two points on a body in plane parallel motion onto a straight line connecting these points is mutually equal.
10	Give a theorem that characterizes the forward motion	10	$\varphi = \varphi_0 + \omega_0 \cdot t + \frac{\varepsilon \cdot t^2}{2}$

Correct answers (8,9,10,7,1,2,3,5,4,6).

The method can also be developed for the entire course of theoretical mechanics. In this case, materials from the question bank are selected from the departments of statics, kinematics and dynamics. The table covering all sections of theoretical mechanics is given below:

1	Analytical equilibrium conditions of a system of forces meeting in a plane	1	The change in the kinetic energy of a material point in a displacement is equal to the sum of the work done by the forces acting on the point.
2	The static problem is -	2	$\vec{a}_{abs} = \vec{a}_{ko'ch} + \vec{a}_{nis} + \vec{a}_{kor}$

3	The amount of force moment relative to a point	3	$v = h\omega_{oniy}$
4	Instantaneous center of velocities	4	$I_x = \sum m_k (y_k^2 + z_k^2), I_y = \sum m_k (x_k^2 + z_k^2), I_z = \sum m_k (y_k^2 + x_k^2)$
5	Absolute acceleration in the complex motion of a point	5	$\sum F_{kx} = 0, \sum F_{ky} = 0, \sum F_{kz} = 0$
6	The velocity of an arbitrary point on an object in rotational motion around a fixed axis	6	$m\ddot{x}_c = \sum R_x^e \quad \ddot{y}_c = \sum R_y^e$ $I_{cz}\ddot{\varphi} = \sum m_z(\underset{F_k}{\rightarrow})$
7	This is the second major issue of dynamics	7	$m_0(\vec{F}) = h \cdot F$
8	Theorem on the change of kinetic energy of a material point	8	In the case under consideration, the number of equilibrium equations is equal to or greater than the number of unknown reaction forces
9	Қаттиқ жисмнинг координата ўқларига нисбатан инерция моментлари формуласи	9	The point at which the velocity of a plane is zero at a given moment
10	Қаттиқ жисмнинг текис параллел ҳаракт дифференциал тенгламаси	10	Find the law of motion of a point when the mass of the material point and the force acting on it are given

Correct answers (5,8,7,9,2,3,10,1,4,6).

The confusing logic chain method builds in students skills such as arranging the topics they have studied, breaking them down into components, comparing them to other parts of the topic, and understanding information about a new topic being studied. Regular use of this method in lectures allows students to systematically study the material on the subject, to organize what they have learned, to divide it into parts, to distinguish them from each other. As a result, the level of knowledge of students increases significantly. Student activity in classes also increases. The teacher will have the opportunity to objectively determine the level of knowledge of students, to conduct intermediate assessments and final assessments.

When using the confusing logic chain method to assess students' knowledge, attention should be paid to the following:

The bank of science questions will be expanded.

The question bank is compiled separately for each subject, chapter of the science.

A bank of logical, easy-to-solve examples and problems on the topics is created.

To determine the level of mastery of the subject, a variant of the table with 5-10 questions is made at least equal to the number of students in the group.

To evaluate the midterm exam, students are given a version of the table with 15-25 questions by the professor.

Tables of 30-50 questions will be developed for the final control assessment.

Samples of the Question Bank and the Sample Bank and the order of execution are regularly published on the website of the department.

The Bank of Questions and the Bank of Examples are updated every academic year.

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