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INCREASING STUDENTS' ACTIVITY AND KNOWLEDGE LEVEL USING TEST ASSIGNMENTS

MAKHMUDOV ZOKIRJON

Professor, Namangan State Technical University, Namangan, Uzbekistan
Phone.: (0597) 374-1956, E-mail.: zokirjon.1956ms@gmail.com

Abstract: This article examines the possibilities of improving the knowledge level of students in higher education institutions using test tasks.

Keywords: Theoretical mechanics, test problem, lecture, practical lesson, student, level of knowledge, statics, equation, reaction force, beam, equilibrium equation, rotational motion, graph of a point.

Introduction. One of the main requirements for professors and teachers of higher educational institutions of the Republic of Uzbekistan is to organize classes for young students in a highly understandable, demonstrative and modern pedagogical and information technologies. To implement these tasks, they are required to widely use interactive methods in the process of conducting lessons. Currently, the time has come to attract new ones to the methods of brainstorming, cluster, Venn diagram, and tangled logical chain, which are widely used by most scientists in the process of conducting classes. One of such methods is the creation of test questions in the subject and their effective use in the educational process.

Theoretical mechanics is one of the basic subjects for specialized subjects in technical higher educational institutions. In lectures and practical classes organized in this subject, it is recommended to use pre-prepared test questions to increase the level of knowledge of students and ensure their high level of mastery of the material. The test problem is divided into three categories depending on its content and level. The first category includes simple problems based on definitions and concepts. They are usually solved by students without difficulty. Below are two examples of the first category of test problems.

1. Test assignments. A flat plate rotates around the axis OB passing through point O (Figure 1). Which of the points given in the figure has the greatest linear velocity.

a). The velocity of point A.
b). The velocity of point C.
c). The velocity of point B.
d). The velocity of point M.

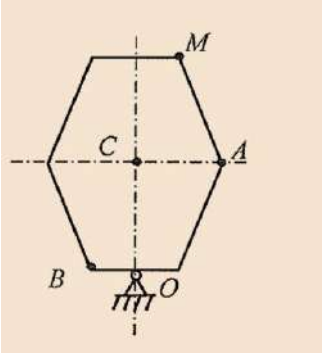

Figure 1

2. Test assignments. The horizontal beam, fixed to the wall as shown in Figure 2 below, is in equilibrium under the action of the system of forces acting on it. Which answer correctly indicates the support reaction forces of the beam (answer options are given in the figures). Justify your answer.

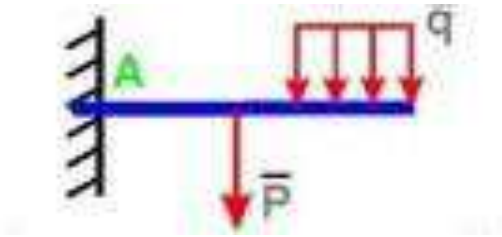

Figure 2

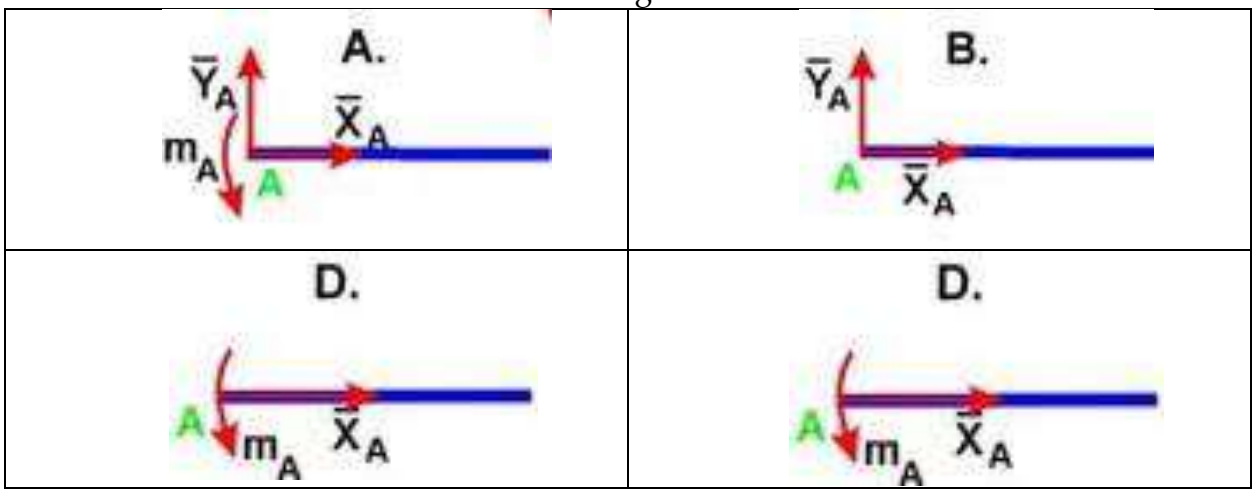

Figure 3

The second category includes problems that deal with formulas and smaller tasks. The following problems are examples of this category.

3. Test assignments. The following figure shows the types of graphs of the motion of a material point. Which answer shows the graph of a point moving according to the law $x=5\cos(6t)$, $y=5\sin(6t)$?

A	B	C	D

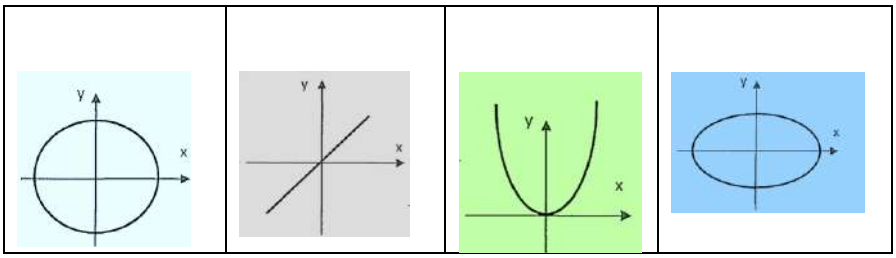

Figure 4.

4. Test assignments. The following answers contain kinematic quantities related to acceleration. Determine the answer that correctly indicates the formula for finding the acceleration:

C	B
$a_x = \frac{dv_x}{dt}\ , a_y = \frac{dv_y}{dt}\ , a_z = \frac{dv_z}{dt}$	$\vec{a} = \frac{d\vec{v}}{dt} = \frac{d^2\vec{r}}{dt^2}$
C	D
$a = \sqrt{(a_x^2 + a_y^2 + a_z^2)}$ $= \sqrt{\left(\frac{dv_x}{dt}\right)^2 + \left(\frac{dv_y}{dt}\right)^2 + \left(\frac{dv_z}{dt}\right)^2}$	$a_\tau = \frac{dv}{dt} = \frac{v_x \cdot a_x + v_y \cdot a_y + v_z \cdot a_z}{v}$

The third category includes test problems that are solved by calculating and formulating equations. We present the following problem for this category.

5. Test assignments. In the following figure 5, the connecting structure AB is in equilibrium under the influence of a system of forces applied to it. AC and CB are connected by a hinge at point C. If it is known that a=2 m and q_2=3 kN/m, find the support reaction forces at points A and C of the structure.

A). R_A= 3,2 kN, X_C=2,25 kN, Y_C=6,75 kN.

B). R_A= 1 kN, X_C=2 kN, Y_C=3 kN.

C). R_A= 6 kN, X_C=4,2 kN, Y_C=3,9 kN.

D). R_A= 5 kN, X_C=2,7 kN, Y_C=3,8 kN.

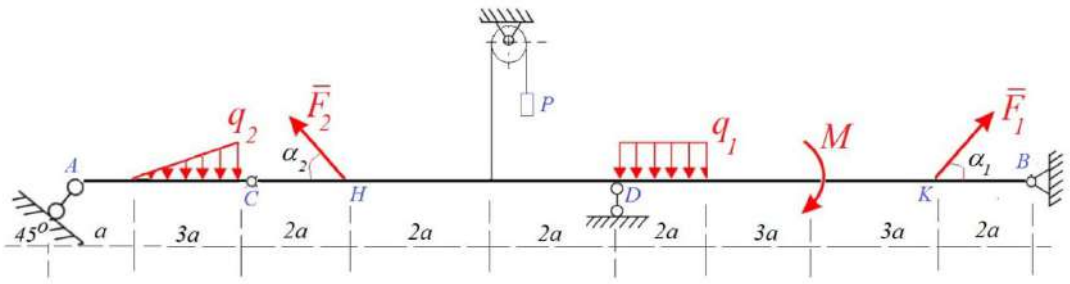

Figure 5.

In conclusion, by using test questions in lectures and practical classes on theoretical mechanics, the level of students' knowledge increases qualitatively, their observational skills expand, a sense of comparing and dividing quantities into parts is formed, first the topic, then the chapter, and then the subject is described and imagined as a whole and in parts. All these factors ultimately lead to an increase in the level of student knowledge. For this, a bank of test questions is compiled in advance by the professors and teachers of the department on topics and is regularly improved.

It was observed in pedagogical experiments that as a result of teaching students using test questions during lectures and practical classes on theoretical mechanics, the level of students' knowledge significantly increased. Thus, it was shown that it is possible to increase the level of student knowledge by using test questions in the lesson.

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