CREATION OF MULTIPLE OPTION PROBLEMS AND ASSIGNMENTS FROM THEORETICAL MECHANICS

docent Makhmudov Zokirdjon Sotivoldievich,

senior teacher Najmiddinov Insomiddin Biloldinovich

Namangan Engineering-Construction Institute

Abstract: Based on the requirements of the present time, the number of institutes and universities in our country and the number of students admitted to them has increased dramatically. As a result of this, the issue of adequate educational and methodological support of these students appeared. This article deals with the experience of creating multiple-choice problems and tasks for students of theoretical mechanics.

Key words: theoretical mechanics, kinematics, forward motion, velocity, acceleration, rotational motion, radius, rope, linear velocity, rotational acceleration, centripetal acceleration, transmission of motion, rail, gear wheel.

Today, in our country, great changes are being made in the field of education, as well as in other fields. The number of students of institutes and universities and the number of educational fields is constantly expanding and increasing. Non-state higher educational institutions are joining the ranks of state higher educational institutions operating in the field of education. If we take the Namangan region, 10 new state and non-state higher educational institutions have been added to the existing 3 higher educational institutions in recent years. The increase in the number of students, along with providing them with quality education, also puts the issue of improving the educational and methodological provision of subjects on the agenda. It is necessary to improve the methodological provision of Latin alphabet students. Students should be provided with high-quality and color printed textbooks, study guides and problem sets that meet the requirements of the times by teaching professors and teachers. Collections of problems and tasks compiled by subjects are outdated, most of them have ready-made solutions on the Internet.

One of the authors, Makhmudov Z.S., developed multiple-choice problems and tasks for students of the departments of theoretical mechanics. It was recommended to publish the set of

questions and assignments for the departments of statics and kinematics after the approval of the ministry as a study guide. Compilation of issues and tasks for the dynamics department is nearing completion. Q.S. Azamov is supporting these issues in the educational process.

The problems proposed to be solved by the students in the practical training of theoretical mechanics are structured as multiple options. As a result, students had the opportunity to solve individual problems. Below is a recommended problem for students from the department of kinematics:

3.3. Problem. A material point moves in the plane according to the law $x = f_1(t)$, $y = f_2(t)$. Find the trajectory equation of the material point, its velocity and acceleration components for time $t = t_1$, and represent them in the figure. The necessary quantities for calculations are given in table 3.3.

Table 3.3

Variantions	Functions		
	$x = f_1(t)$ m	$y = f_2(t)$ m	t_1 sek
1	$2t^3$	$2t$	1
2	$6t$	$-3t^2$	2
3	$3t+2$	$9t^3$	1
4	$5-8t^2$	$16t+2$	2
5	$2-3t$	$5-6t^2$	3
6	t^2	$2t-3$	3
7	$6t-3$	$4t^2$	1
8	$1-t^2$	$1+t$	2
9	$5t^2$	$-5t^2$	3
10	$1+3t^2$	$2t^2-6$	1

The students were offered test questions prepared in the statics, kinematics and dynamics departments of theoretical mechanics. The test-issues determine the extent to which the students

have mastered the curriculum, their ability and knowledge in a short period of time. Below is a test problem from the statics section:

3.61. The test is the problem. 3.61 A vertical beam clamped at point A on the horizontal plane is in equilibrium under the influence of a couple of forces M. Which answer shows the base reaction forces of the beam correctly (answer options are shown in figures *3.61 a, 3.61 b, 3.61 c, 3.61 d*). Justify your answer.
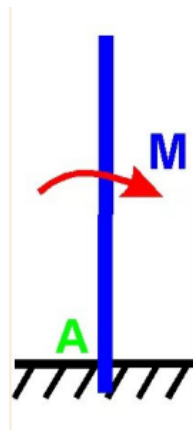

Figure 3.61

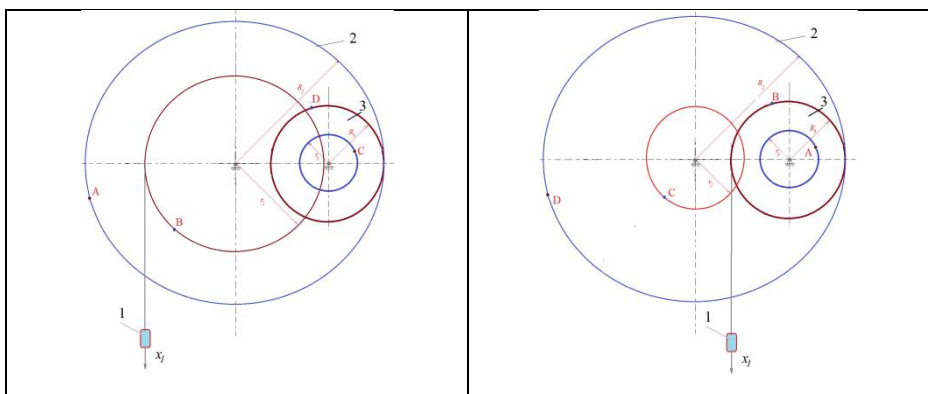|	
Figure 3.61 a	*Figure 3.61 b*

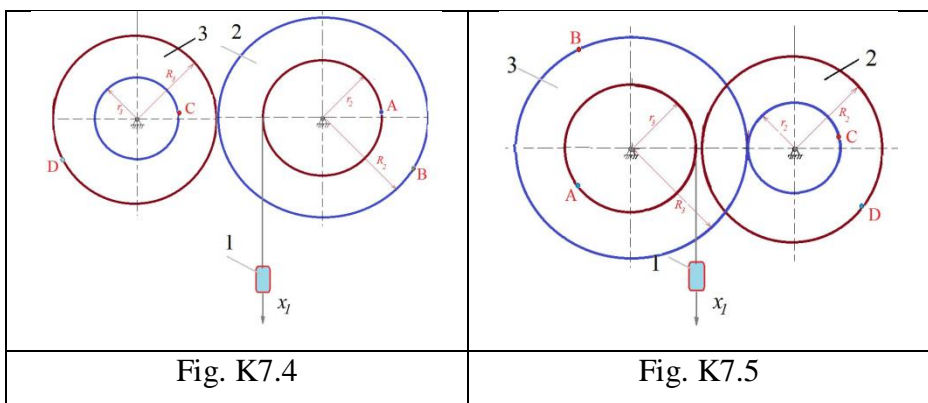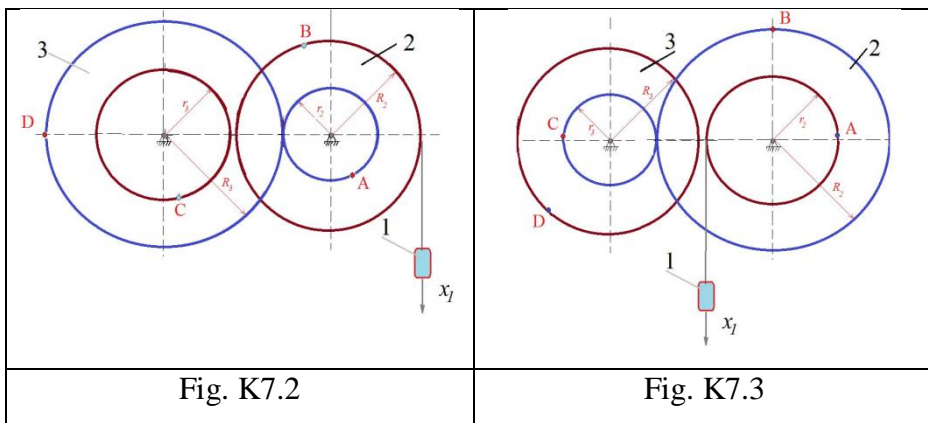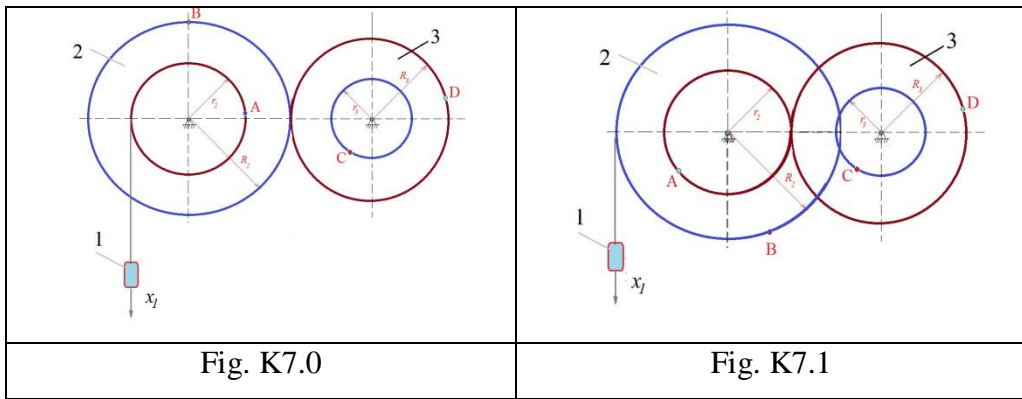| *Figure 3.61 c*	*Figure 3.61 d*

The creation of multiple-choice (100-choice) tasks for students ensures that all students can solve the problem individually or complete the calculation-graphic work as a task. The students were given assignments consisting of 10 forms and 10 conditions, which were compiled independently by the author Makhmudov Z.S. It contains the text of the assignment, a diagram, and an example of the assignment. Below is this assignment in full.
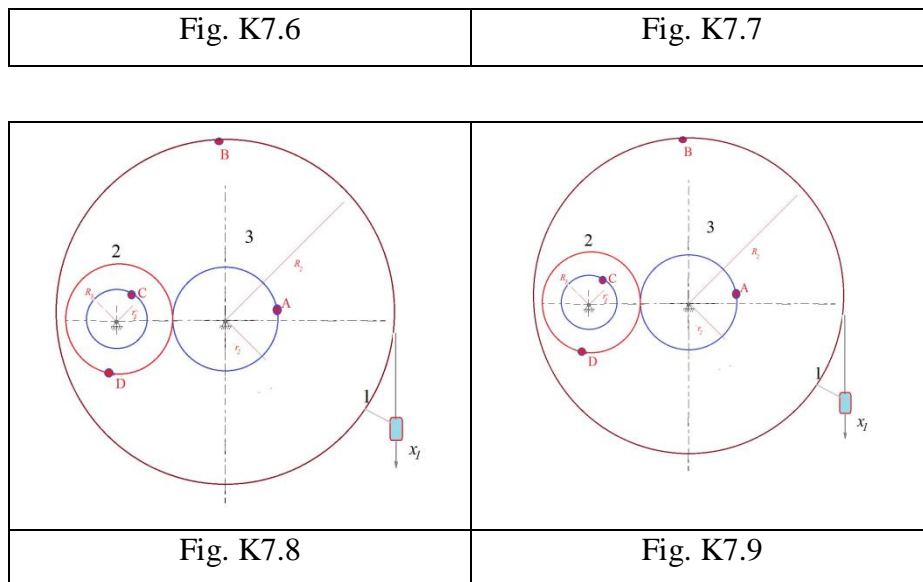
K7 Assignment. Finding the velocities and accelerations of the points of a rigid body in forward and rotational motions

In the mechanical system, the 1st moving load, the 2nd and 3rd gear wheels rotating around the fixed axle are connected by means of a non-extensible rope (Figs. K7.0 - K7.9). The system is released from the forward movement of load 1 according to the law $S_1=f_1(t)$ *sm*. Find the amount of linear velocities and accelerations of the points A, B, C and D shown in the figure at time $t=t_1$ s, and describe their vector representations in the form r_2.

Table K7

№	$S_1=f_1(t)$ sm	t_1 sec	R_2 sm	r_2 sm	R_3 sm	r_3 sm
0	$12t^2$	0,5	40	20	30	15
1	$5t+3t^2$	1	60	30	40	20
2	$2+6t^2$	1	80	40	60	30
3	$9t^2-4t$	2	20	10	16	8
4	$22t+t^2$	0,5	30	15	20	10
5	$6+12t^2$	1	120	60	90	45
6	$3t-5t^2$	2	70	35	50	25
7	$3-2t^2$	2	46	23	34	17
8	$-7t^2+5$	1	52	26	44	22
9	$1-5t^2$	0,5	72	36	60	30

Fig. K7.0	Fig. K7.1

Fig. K7.2	Fig. K7.3

Fig. K7.4	Fig. K7.5

Fig. K7.6	Fig. K7.7

Fig. K7.8	Fig. K7.9

In conclusion, it is useful for students to use theoretical mechanics in practical classes, solve problems independently, create multiple-choice problems and assignments in the process of independent study of science, it is useful for them, it is necessary nowadays and it is a step towards increasing their knowledge level.

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