

## TOPICS OF ISSUES DURING THE DIPLOMA EXAMINATION

### A) Group of basic educational contents

1. Division and classification of mechanical systems constraints
2. Definition of forces and generalized dislocations. General mechanics equations.
3. Formulating and solving dynamic tasks.
4. Shaping of machine elements based on strength criteria.
5. Strengthening of construction materials.
6. Modern engineering materials and their application in the construction of machine elements and tools.
7. Give Euler's I and II theorem about the speed and acceleration of the rigid body in the plane motion.
8. Principle of prepared work.
9. Integration of activities in the area of production preparation.
10. Lagrange equation of the second type.

### B) Group of targeted learning contents

11. List the benefits of using CAD techniques in machine building.
12. What is concurrent design?
13. What is the parametric modeling of objects in the design of machine elements using CAD?
14. Stages of the design and construction process.
15. Discuss the principle of measuring strain with a resistance electric strain gauge.
16. Characterize the advantages and disadvantages of the tensometer strain measurement method.
17. Discuss the principle of the brittle coating method and give examples of use.
18. Criteria of fatigue.
19. Basic fatigue characteristics of materials.
20. Calculation of fatigue life at random loads.
21. The use of elastic-plastic models of materials in design.
22. Compliance and criterion conflict in the process of optimization of machine systems.
23. Elements of the basic structure of the mechatronic system and their tasks.
24. Mechatronics and its elements.
25. Division of drives and their application.
26. The goals of computer simulation in the dynamics of machines.
27. Dynamic characteristics of mechanical systems.
28. Describe the steps of numerical modeling using the finite element method.
29. Stepper motors: operating principle and control.
30. Discuss the phenomenon of brittle fracture according to Griffith's theory.