

Design Methodology

Exam question

Summer 2020

1. Define the main engineering design activities.
2. What tasks involves developing a new product. Describe the difference between piece production and series production.
3. What resources of information you know.
4. Explain the concept of creative activity.
5. Describe the creative team and the roles of its members.
6. Describe methods to improve creative properties.
7. Define the "Konstruction method" of creative activity.
8. Explain the meaning of "Brainstorming". Briefly describe the classical brainstorming.
9. Explain the concept of "Multi-criteria decision".
10. What is the weight of the criterion and how we determine it.
11. Write the list of methods of ranking variants.
12. What is the role of CAD designer in the "product life cycle".
13. What do we mean by the term "Creative Team".
14. What are the basic rules at creating a creative team.
15. Explain the difference between serial and parallel engineering. What is the importance of parallel engineering in contemporary industry.
16. Describe the possible way to create large assemblies and using the skeleton model to creating CAD 3D data.
17. Explain the importance of Technological design and explain the general principles in the design of technical objects.
18. List the main reasons why the emphasis today is on using standardized and norm parts. Write an examples.
19. Describe your experience in obtaining 3D and 2D data of standardized and norm parts.
20. What are usually procedures for filing a patent application (utility model).
21. What is protection of utility model
22. What is a PLM/PDM system (Product Lifecycle Management, Product Data Management). Which PLM / PDM systems do you know?
23. What is ECR (Engineering Change Request) and what it is use for.
24. What is the the "FMEA" (Failure Mode and Effects Analysis).
25. What are the advantages and disadvantages of electric drives. Specify typical applications of electric drives.
26. What are the advantages and disadvantages of pneumatic drives. Specify typical applications of pneumatic drives.

27. What are the advantages and disadvantages of hydraulic drives. Specify typical applications of hydraulic drives.
28. What is the reference coordinate system. What it is used for. Draw and describe a simple example.
29. What shape and position tolerances we use. Draw a simple example using a reference coordinate system and at least three kinds of shape and position tolerances.
30. Explain the reasons why we use tolerance analysis.
31. Describe three basic methods of tolerance analysis.
32. Describe some modern materials that can be used in engineering practice.
33. Name typical protective devices to increase machine safety.
34. How the safety requirements of machines within the EU are defined.