Metal Forming – Midterm exam topics - 2023

1. What main types of deformations do you know? Describe them.
2. Engineering & true mechanical quantities
3. Stress-strain curves
4. Define the equivalent stress and strain.
5. Define the flow stress and draw a cold forming and a hot forming flow curve.
6. Describe a method for measuring the flow curve (use figure).
7. Describe the Coulomb friction model and its limit values.
8. Describe the Kudo (shear) friction model and its limit values.
9. Describe a method for measuring the friction coefficient (use figure).
10. What are the roles of the lubricant? What requirements must be met?
11. What factors affect the formability of the metals?
12. What is plastic instability? Explain the process. What are the influencing factors?
13. Draw a forming limit diagram (FLD) for sheet forming techniques.
14. Describe the factors used to characterize the anisotropy of sheet metals.
15. What is the meaning of the Lillet diagram?
16. Compare the solid and liquid lubricants by their properties and field of application.
17. Describe shortly the steps of surface treatment of the workpiece prior to and after the forming.
18. Describe the steps of the equilibrium calculation method.
19. What are the steps of the energy calculation method?
20. Describe the technique of upsetting by a schematic figure and name the main elements.
21. Calculate the force, work and power needed to upset a cylinder with the given data.
22. List the possible upsetting defects and give a solution for them.