VSB TECHNICAL UNIVERSITY OF OSTRAVA | FACULTY OF MECHANICAL ENGINEERING

Questions for the state final exam

Master study programme N0715A270022 – Engineering Technology, academic year 2024/2025

PROCESS THEORY

1. Chip formation, cutting forces, cutting resistance, power consumption.
2. Tool wear, durability and tool life, Taylor formula, T-vc dependence.
3. Heat and cutting temperature, temperature distribution.
4. Machinability and cutting ability.
5. Theory of high performance cutting and high speed cutting.
6. Principle of weld joint formation of metallic materials in fusion and pressure welding.
7. Temperature cycles in welding, measurement, and calculation of temperature cycles.
8. Metallurgy of fusion welding, refining of weld metals, gas absorption in weld metal.
9. Stresses and strains in welded joints, distribution of strains and stresses in welded joints.
10. Weldability of materials, quantities affecting weldability, importance of carbon, equivalent carbon, and preheating temperature for weldability.
11. Equilibrium diagrams of metallic systems.
12. Diffusion in metals, basic thermodynamics of metallic systems.
13. Phase transformations in metals, and phase transformations in Fe-C alloys.
14. Fatigue of engineering materials, creep of material.
15. Fracture of engineering materials, concept of transit temperature.

16. Geometry of crystals, lattice failures, and description of the microstructure.
17. Mechanisms of plastic deformation.
18. Stress state, principal stresses, transformations.
19. Deformation state, physical interpretation.
20. Description of the plastic flow of the material, temperature, and strain rate.