MOL-4106 Phase Transformations and Heat Treatments of Metals
Course 2010
Examination 16.12.2010 at 13-16 (1 to 4 p.m.)

USE OF LITERATURE AND LECTURE NOTES PROHIBITED

NOTE! Answer six (6) questions which you may select freely among the eight questions presented below!

1. Describe the reasons for the formation of the left- pointing nose on the TTT- diagrams of diffusional phase transformations

2. The role of lattice distortions in the nucleation stage of new phases in the solid state phase transformations

3. Overaging in precipitation hardening heat treatments.

4. Why the accommodation deformation is needed in the diffusionless shear- based phase transformations? What are the possible mechanisms for this deformation?

5. Formation, microstructure and properties of lath martensite.

6. Normalization as the heat treatment of low- alloy steels. How the grain refinement treatment of steels by microalloying influences the normalization?

7. Explain the nitriding heat treatment of steels and the microstructures resulting from this treatment.

8. Why the precipitation hardening can be used as strengthening mechanism in the high- temperature nickel- based superalloys without the danger of overaging?