

IV B.Tech I Semester Supplementary Examinations, November 2005
SUPER ALLOYS

(Metallurgy & Material Technology)

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions
All Questions carry equal marks

1. (a) Discuss the important characteristics of super alloys. [8]
(b) What are the phases of superalloys? Explain the structure of superalloys. [8]
2. (a) Explain the micro structural characteristics of cobalt based super alloys. [8]
(b) Discuss the TTT diagrams for cobalt based super alloys. [8]
3. (a) Describe the solid solution strengthening of super alloys. [8]
(b) Discuss the grain size and grain boundary effects of nickel based super alloys. [8]
4. (a) Explain the strength properties of cobalt based alloys. [8]
(b) Describe the alloy phases and characteristics of Co-based alloys. [8]
5. (a) Discuss the oxidation behaviour of Co-based alloys. [8]
(b) Describe the effect of high velocity environment on super alloy components. [8]
6. (a) What are the benefits and limitations of vacuum induction melting? Discuss the thermodynamic and kinetic consideration of vacuum induction melting. [8]
(b) Discuss the equipment and operation of vacuum induction melting process. [8]
7. (a) Describe the development of super alloy turbine blades by single crystals. [8]
(b) Explain the special techniques adopted for the production of dispersive strength-end alloy powders. [8]
8. Write a brief account of the following:
 - (a) Effect of casting condition on micro porosity in Ni-based super alloys. [5]
 - (b) Foundry variables on high cycle fatigue of super alloy components. [6]
 - (c) Process variables in joining super alloy components. [5]
