

II B.Tech I Semester Supplementary Examinations, November 2005**PHYSICAL METALLURGY
(Metallurgy & Material Technology)****Time: 3 hours****Max Marks: 80****Answer any FIVE Questions
All Questions carry equal marks**

1. (a) What is a microscope? Name various types of microscopes and briefly discuss advantages and disadvantages associated with them.
(b) What are the limitations associated with an optical microscope? [10+6]
2. (a) Define octahedral and tetrahedral sites and discuss with reference to BCC and FCC structures.
(b) Give an account on bonding and material property. [8+8]
3. (a) Discuss procedure for finding the Miller indices for directions with suitable examples.
(b) Why titanium and magnesium exhibit poor ductility? [8+8]
4. Justify the following statements.
(a) In beta brass (50% Cu; 50% Zn), all corner sites are occupied by Zn atoms but body centered sites by Cu atoms.
(b) In Cu_3Au super lattice, copper atoms are at face-centers while gold atoms are at corners.
(c) An ordered solid solution is different than a chemical compound. [5+6+5]
5. (a) Explain the advantages and disadvantages of a cored-dendritic structure.
(b) Which determine the micro structure of an alloy. Explain them carefully. [8+8]
6. Aluminum (melting point 660°C) and silicon (melting point 1420°C) are assumed to be completely soluble in the liquid state and completely insoluble in the solid state. They form an Eutectic at 578°C , the Eutectic composition being 13% silicon and 87% Aluminum. Draw to the scale the phase diagram of the alloy system Al-Si, labeling the lines, fields and points. Describe the changes which take place during fall of temperature for an Al-5% Si alloy. Draw the cooling curve for this alloy. [16]
7. (a) What is an Equilibrium diagram & mention its importance.
(b) For an alloy of 0.3% carbon steel draw the cooling curve & microstructure at room temperature. [8+8]
8. (a) Differentiate between CCC & TTT diagrams.
(b) Explain about the bainitic transformation. [10+6]
