

ME 216  
ENGINEERING MATERIALS II  
TUTORIAL

T.1. Figure 1 shows a part of the silver-tin thermal equilibrium diagram. Consider an alloy which contains 18% by mass of tin, cooling under equilibrium conditions:

- At what temperature of the solidification begin?
- What is the composition of the initial solid which forms?
- At what temperature of the solidification completed?
- What is the composition of the last trace of liquid?
- What are the natures and composition of the phases present at 730°C?
- In what proportions by mass are these phases present at 730°C?
- For the alloy draw the microstructural changes step by step, cooling from 900°C.

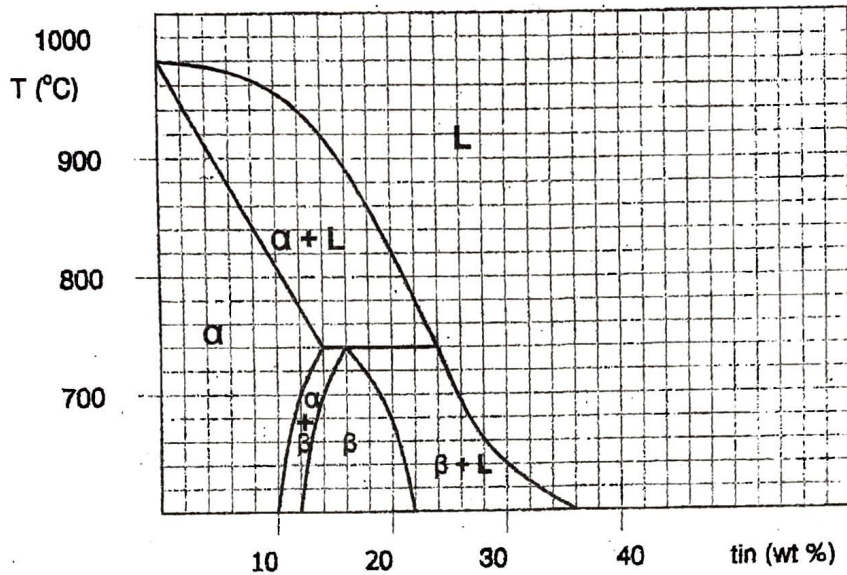


Figure 1

T.2. Figure 2 shows a part of the Al-Mg thermal equilibrium diagram.

- What the solid solubility of Mg in Al?
- Over what temperature ranges will an alloy containing 3 % Mg exist as a single solid phase?
- At what temperature does an alloy containing 5 % Mg begin to melt on heating?
- What are the compositions of the phases for an alloy containing 16 % Mg is at 560°C?
- What is the amount of Mg in solid and in Liquid for (d)?

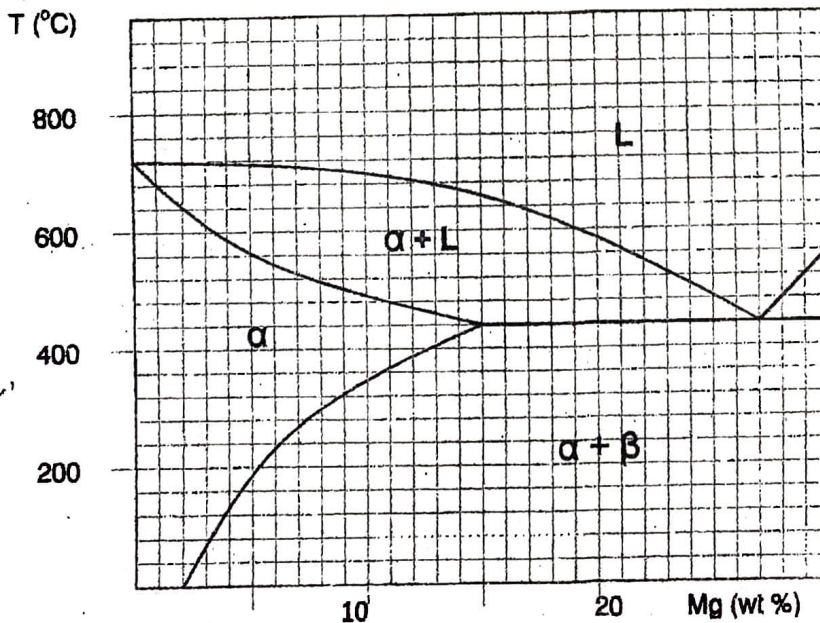


Figure 2

- T. 3. Figure 3 shows an A-B thermal equilibrium diagram. For an alloy containing 70 % A, determine:
- The solidification beginning temperature?
  - The temperature of the solidification completed?
  - The existing phases at 450°C.
  - The amount of B in solid at 450°C.
  - Draw microstructures from 600°C to room temperature.

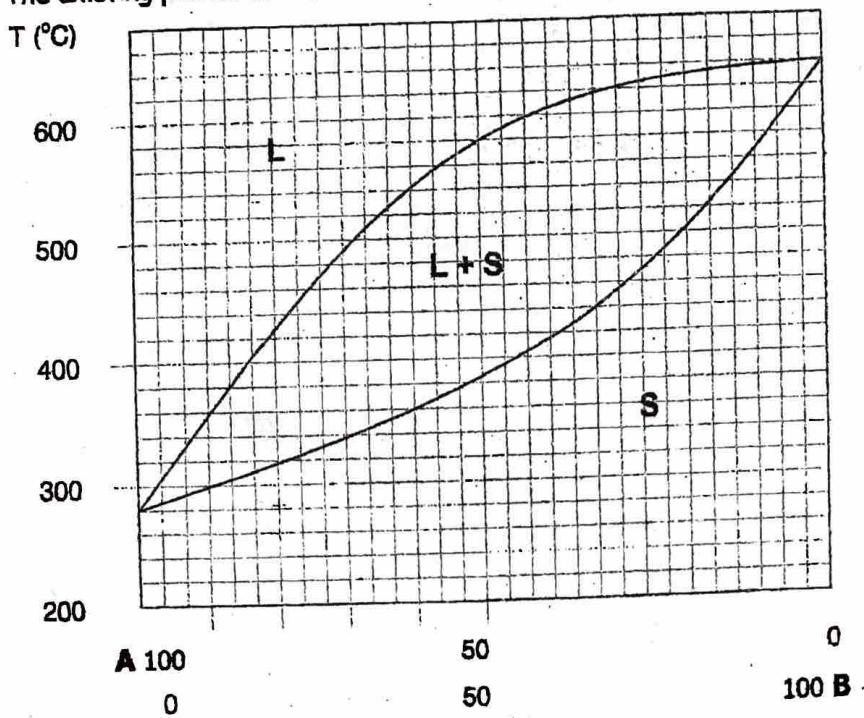


Figure 3

- T. 4. Determine the percentages of austenite and cementite in ledeburite at 1000°C.

