homework #5 (problem 1 of 3)

1. In the phase diagrams shown below, label all the phases (use Greek letters for solid phases and chemical formulas for compounds).
2. For phase diagram shown below, sketch the Gibbs free energy as a function of composition for temperatures $T_1$ and $T_2$. Indicate solidus, liquidus, and solvus lines, eutectic isotherms, eutectic points, intermediate phase.
3. (a) Label the phases in the phase diagram shown below.

(b) For points 1 and 3 marked in the phase diagram determine compositions of the phases present and the relative fractions of the phases (please show work, not just the final result).

(c) For an alloy with composition 92 wt.% B and two temperatures marked by points 2 and 3 in the phase diagram shown in the previous page, draw schematically the microstructure formed by a slow cooling from the melt. On your drawing, please list and label all the phases and microconstituents.

(d) For point 3, calculate the fractions of the microconstituents, assuming that the composition at the eutectic point is at 90 wt.% B (please show work, not just the final result)