Department of Materials Science and Engineering
Massachusetts Institute of Technology
3.14 Physical Metallurgy – Fall 2003

Problem Set #1

Due Wednesday, September 10, 2003

1.1   Exercise 1.6. In addition to labeling the faces of the tetrahedron, also indicate the directional indices of the tetrahedron edges and the vectors that lie on the faces and connect the center of an edge to a vertex.

1.2   Exercise 1.7. In addition, also give the indices of the vectors between points:
   i.   *g* and *j*
   ii.   *h* and *e*
   iii.   *f* and *e*

1.3   (Related to Chapter 3) Draw a pair potential curve for interacting metal species on a graph with axes energy and distance. Using your knowledge of how energies relate to forces and materials properties, describe which features of your potential curve are related to each of the following properties:
   i.   Tensile strength
   ii.   Elastic modulus
   iii.   Melting temperature
   iv.   Coefficient of thermal expansion

1.4   Exercise 7.10

1.5   Exercise 7.11