

**Solid State Physics Homework on Surfaces 2011 ( Prof. Thoms)**

**Silicon crystallizes in the diamond structure as described on page 76 of Ashcroft and Mermin. The size of the lattice is also given there. This problem involves the structure of the Si(111) surface. The structure of the silicon lattice is shown in Figure 4.18. Notice that all faces of the cube are identical and the expressions Si(100), Si(010) and Si(001) represent equivalent surfaces.**

- a) Write down an expression for all vectors joining lattice points in the plane of the Si(111) surface.**
- b) Write down an expression for the reciprocal lattice vectors in the plane of the surface.**
- c) Calculate the angular positions of low energy electron diffraction spots produced by elastically scattered 100 eV electrons incident normal to the surface.**