

1. Determine the basis vectors of the primitive unit cell of the diamond crystal. What Bravais lattice underlies this lattice? Specify the Cartesian coordinates of the basis vectors and all atoms inside the primitive elementary cell. Determine the space group number for the diamond lattice (use <https://www.cryst.ehu.es/>). Calculate the volume of a primitive elementary cell.
2. Mechanism for resistance appearance in conductors. Why resistivity is linear with temperature (describe the mechanism). Position and temperature dependence for Fermi energy and chemical potential.
3. Basis ideas of Density Functional Theory.
4. Do not forget to include the calculation results.