Chemistry H2A Problem Set 4 Additional Problem:

Can VSEPR rules work for network bonded solids? From the crystal unit cells, consider these two very important semiconductors:

a) Silicon. Calculate the local symmetry, bond angles and distances for Si atoms in this lattice.

b) Ga and As in GaAs. Calculate the local symmetry, bond angles and distances for both Ga and As atoms in this lattice.

In each case, decide whether the local symmetry for the atoms obeys VSEPR rules.

HINT: Solid Silicon has what is known as the "diamond cubic" crystal structure, the same as diamond, and GaAs has what is known as the "zinc blend" crystal structure, the same as ZnS. The two crystal structures are closely related, but of course diamond has only one type of atom and ZnS has two..