For questions 1–5 below, determine the point group for each of the following molecules, ions and objects. Draw a clear picture of each molecule, ion and object and clearly show or describe all symmetry elements necessary to determine the point group. Remember, only the connectivity of the atoms determines the symmetry, not the bond order or lone-pair electrons. Be very careful that you have drawn the correct structure when required.

You do not need to find all symmetry elements, just those necessary to identify the point group. Drawing symmetry elements is great, but I would expect quite a few to be described in brief words based on your drawings.

1. a) borazine, B3N3H6 b) a paper clip

2. a) a trash can b) cyanide ion, CN–

3. a) FeCl63– b) a Pringles® potato chip

4. a) NiCl2H2 (tetrahedral) b) NiCl2H2 (square planar)

5. a) a dxy orbital (shading counts!) b) a pz orbital (shading counts!)