

Quiz (Polarity of Molecules)

- Explain why an ammonia molecule is polar while a methane molecule is non-polar.
 - Explain why an NCl_3 molecule is polar while a BCl_3 molecule is non-polar.
 - Explain why a PCl_3 molecule is polar while a PCl_5 molecule is non-polar.
- Draw a labelled diagram to show the orientation of four NBr_3 molecules under the influence of a positively charged rod. Use δ^+ and δ^- signs to indicate the partial charges of the molecules.

Suggested Answer

1. (a) An ammonia molecule is trigonal pyramidal in shape.
As the polarities of the three polar N–H bonds cannot cancel out each other, the ammonia molecule is polar.

A methane molecule is tetrahedral in shape and the four polar C–H bonds are arranged symmetrically.

As the polarities of the C–H bonds cancel out each other, the methane molecule is non-polar.

- (b) An NCl_3 molecule is trigonal pyramidal in shape.
As the polarities of the three polar N–Cl bonds cannot cancel out each other, the NCl_3 molecule is polar.

A BCl_3 molecule is trigonal planar in shape and the three polar B–Cl bonds are arranged symmetrically.

As the polarities of the B–Cl bonds cancel out each other, the BCl_3 molecule is non-polar.

- (c) A PCl_3 molecule is trigonal pyramidal in shape.
As the polarities of the three polar P–Cl bonds cannot cancel out each other, the PCl_3 molecule is polar.

A PCl_5 molecule is trigonal bipyramidal in shape and the five polar P–Cl bonds are arranged symmetrically.

As the polarities of the P–Cl bonds cancel out each other, the PCl_5 molecule is non-polar.

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