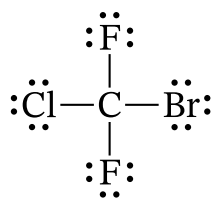


Question 5

The following information applies to parts A and B.

5. The Lewis diagram of CBrClF_2 is shown.

**Part A**

Which of the bonds in CBrClF_2 (C–Br, C–Cl, or C–F) is the most polar? **Justify** your answer.

Part B

In a molecule of CBrClF_2 , the F–C–F bond angle is 106.8° and the Br–C–Cl bond angle is 112.3° . **Explain** the difference in bond angles using principles of atomic structure and VSEPR theory.

Part C

Lewis diagrams and boiling points for CBr_4 and CBrClF_2 are given in the following table.

Formula	CBr_4	CBrClF_2
Lewis diagram	$\begin{array}{c} \text{:}\ddot{\text{Br}}\text{:} \\ \\ \text{:}\ddot{\text{Br}}\text{—}\text{C}\text{—}\ddot{\text{Br}}\text{:} \\ \\ \text{:}\ddot{\text{Br}}\text{:} \end{array}$	$\begin{array}{c} \text{:}\ddot{\text{F}}\text{:} \\ \\ \text{:}\ddot{\text{Cl}}\text{—}\text{C}\text{—}\ddot{\text{Br}}\text{:} \\ \\ \text{:}\ddot{\text{F}}\text{:} \end{array}$
Boiling point	463 K	269 K

- Clearly **identify** all the intermolecular forces in pure $\text{CBr}_4(l)$ and in pure $\text{CBrClF}_2(l)$.
 $\text{CBr}_4(l)$:
 $\text{CBrClF}_2(l)$:
- In terms of the relative strengths of all the intermolecular forces, **explain** why pure $\text{CBr}_4(l)$ has a higher boiling point than pure $\text{CBrClF}_2(l)$ does.