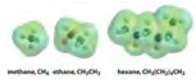
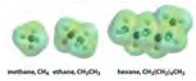
1 Which molecule has the most deformable electron cloud?



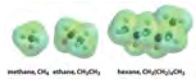
A Methane, CH4
B Ethane, CH3CH3
C Hexane, CH3(CH2)4CH3

2 Which molecule has the weakest dispersion force for another molecule of same kind?



A Methane, CH4
B Ethane, CH3CH3
C Hexane, CH3(CH2)4CH3

3 Which substance has the lowest boiling point?



A Methane, CH4
B Ethane, CH3CH3
C Hexane, CH3(CH2)4CH3

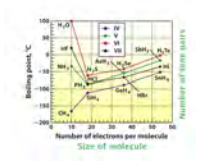
4 Predict the order of boiling points for the compounds at the right.

A ethyl methyl ether < n-butane < 1-propanol
B n-butane < ethyl methyl ether < 1-propanol
C 1-propanol < n-butane < ethyl methyl ether

5 Identify the compound with the smallest energy of vaporization (kJ/mol).

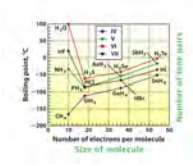
A water
B ethanol
C dimethyl ether
D hexane

6 Why are the boiling points of the group V hydrides higher than those of group IV?



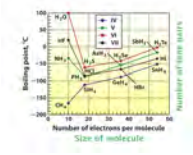
A The group V molecules weigh more
B The group V molecules are smaller
C The group V molecules have more lone pairs

7 Why does CH4 boil at a lower temperature than SiH4?



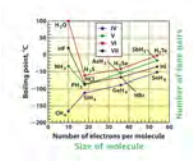
A CH4 weighs less than SiH4
B CH4 has fewer valence electrons than SiH4
C CH4 is smaller than SiH4
D CH4 is nonpolar but SiH4 is polar

8 What is the relative polarity of HCl, HBr, and HI?



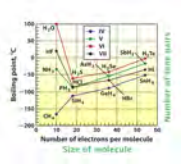
A HCl is most polar
B HBr is most polar
C HI is most polar

9 Considering the relative polarity HCl > HBr > HI, what accounts for the bp order HCl < HBr < HI?



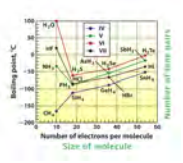
A HCl has the strongest dipole-dipole interaction.
B HI has the weakest dipole interaction.
C Dipole moment does not affect bp and so there must be some other reason.

10 What is the relative polarity of NH3 and PH3?



A NH3 is more polar
B PH3 is more polar
C NH3 and PH3 are of equal polarity

11 Why does NH3 boil at a higher temperature than PH3?



A NH3 is more polar than PH3
B NH3 has fewer electrons than PH3
C NH3 can form hydrogen bonds

12 The boiling point of NH3 is much higher than that of NF3. Which of the following best accounts for this?

A NH3 has fewer electrons than NF3 and so its dispersion forces are less than those of NF3.
B The N-F bond is much more polar than the N-H bond.
C F is more electronegative than N, while H is less electronegative than N.
D None of the above

13 What is the most important difference between NH3 and NF3 that accounts for the boiling point of NH3 being much higher than that of NF3. accounts for this?

A NH3 has fewer electrons than NF3 and so its dispersion forces are less than those of NF3.
B NH3 has is much more polar than NF3.
C F is more electronegative than N, while H is less electronegative than N.
D NH3 has hydrogen bonding but NF3 does not.