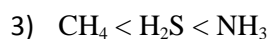


Chapter 10 AP Chemistry Test.

Answer all 4 questions as best that you can. Upload the answers back to me at [jeff@szeryk.ca](mailto:jeff@szeryk.ca)

- 1) Discuss briefly the relationship between the dipole moment of a molecule and the polar character of the bonds within it. With this as the basis, account for the difference between the dipole moments of  $\text{CH}_2\text{F}_2$  and  $\text{CF}_4$ .

- 2) The boiling points of the following compounds increase in the order in which they are listed below:



Discuss the theoretical considerations involved and use them to account for this order.

- 3)  $\text{NF}_3$  and  $\text{PF}_5$  are stable molecules. Write the electron-dot formulas for these molecules. On the basis of structural and bonding considerations, account for the fact that  $\text{NF}_3$  and  $\text{PF}_5$  are stable molecules but  $\text{NF}_5$  does not exist.

4) Experimental data provide the basis for interpreting differences in properties of substances.

TABLE 1

Compound	Melting Point (°C)	Electrical Conductivity of Molten State ( $\text{ohm}^{-1}$ )
$\text{BeCl}_2$	405	0.086
$\text{MgCl}_2$	714	> 20
$\text{SiCl}_4$	-70	0
$\text{MgF}_2$	1261	> 20

TABLE 2

Substance	Bond Length (angstroms)
$\text{F}_2$	1.42
$\text{Br}_2$	2.28
$\text{N}_2$	1.09

Account for the differences in properties given in Tables 1 and 2 above in terms of the differences in structure and bonding in each of the following pairs.

- (a)  $\text{MgCl}_2$  and  $\text{SiCl}_4$                       (c)  $\text{F}_2$  and  $\text{Br}_2$   
(b)  $\text{MgCl}_2$  and  $\text{MgF}_2$                       (d)  $\text{F}_2$  and  $\text{N}_2$