I- List both the domain and molecular geometries of the molecules below, in that order. Note that the molecules are 3 dimensional so pictures may be deceptive. (20 pts.)

Choices for domain geometry: 1) linear 2) trigonal planar 3) tetrahedral 4) trigonal bipyramidal 6) octahedral

Choices for molecular geometry: 1) square planar 2) tetrahedral 3) square pyramidal 4) trigonal pyramidal 5) T-shaped 6) see-saw

(a) \[
\begin{align*}
\text{F} & \quad \text{F} \\
\text{S} & \quad \text{F} \\
\text{F} & \quad \text{F}
\end{align*}
\]

(b) \[
\begin{align*}
\text{H} & \quad \text{N} \quad \text{H} \\
\text{H} & \quad \text{H}
\end{align*}
\]

(c) \[
\begin{align*}
\text{F} & \quad \text{N} \quad \text{F} \\
\text{F} & \quad \text{F}
\end{align*}
\]

(d) \[
\begin{align*}
\text{F} & \quad \text{F} \\
\text{F} & \quad \text{F} \\
\text{F} & \quad \text{Br}
\end{align*}
\]

(e) \[
\begin{align*}
\text{Xe} & \quad \text{F} \\
\text{F} & \quad \text{F} \\
\text{F} & \quad \text{F}
\end{align*}
\]
II-Multiple choice questions. Circle the correct choice. (2 pts. each)

1. Which of the following molecules or ions is **not** linear?

   ![Molecules](image)

2. When the molecules H₂O, CH₄, and NH₃ are arranged in order of increasing bond angle, the correct sequence is:
   a. H₂O, CH₄, NH₃  
   b. H₂O, NH₃, CH₄  
   c. NH₃, H₂O, CH₄  
   d. CH₄, NH₃, H₂O  
   e. CH₄, H₂O, NH₃

3. What are the approximate values of the bond angles, \( a \) and \( b \), in the ion illustrated below?

   ![Ion](image)

   a. \( a \) is \(~90^\circ\) and \( b \) is \(~90^\circ\)  
   b. \( a \) is \(~109^\circ\) and \( b \) is \(~109^\circ\)  
   c. \( a \) is \(~109^\circ\) and \( b \) is \(~120^\circ\)  
   d. \( a \) is \(~120^\circ\) and \( b \) is \(~109^\circ\)  
   e. \( a \) is \(~90^\circ\) and \( b \) is \(~180^\circ\)

Consider the following molecules:

a) NH₃    
 b) CO₂    
 c) BF₃    
 d) XeF₄    
 e) HBr

4. Which **two** molecules above are polar (have a **non**-zero dipole moment)? Need to draw._________ (4 pts.)