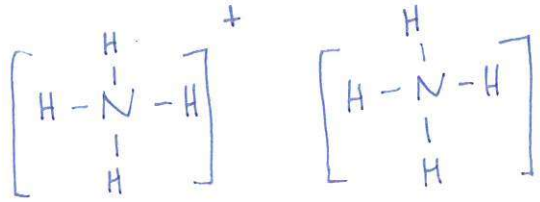
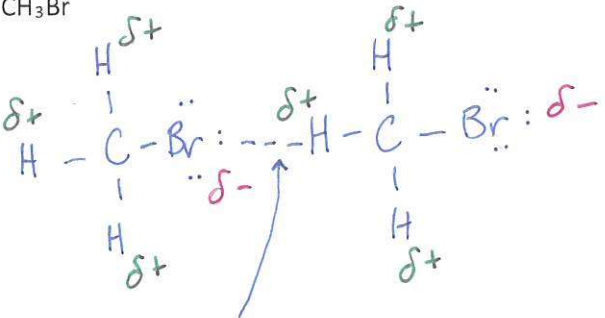
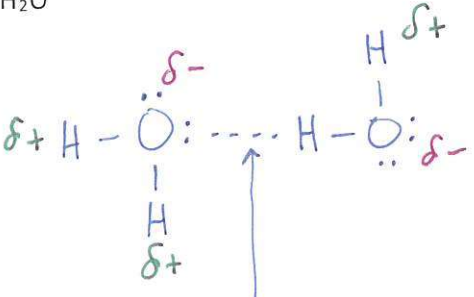
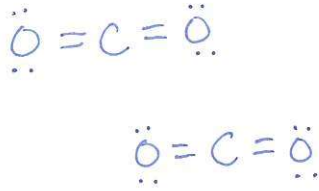


①

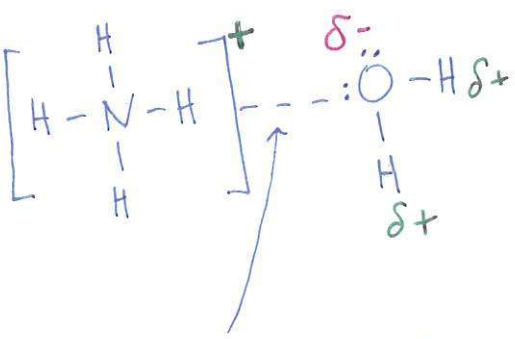
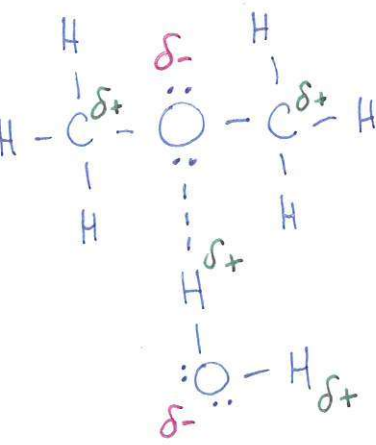
54

②

Let's Practice! Draw TWO Lewis dot structures for each of the following molecules. Then, draw dipoles where appropriate and determine the type(s) of intermolecular forces that exist between the molecules, underline strongest.

<p><math>\text{NH}_4^+</math></p>  <p>Type(s) of IMFs? <u>LDFs</u> (not H-bonds: no lone pair available!)</p>	<p><math>\text{CH}_3\text{Br}</math></p>  <p>Type(s) of IMFs? <u>dipole-dipole</u>, LDFs</p>
<p><math>\text{H}_2\text{O}</math></p>  <p>Type(s) of IMFs? <u>hydrogen bonding</u>, <u>dipole-dipole</u>, LDFs</p>	<p><math>\text{CO}_2</math></p>  <p>Type(s) of IMFs? <u>LDFs</u></p>

**More Practice:** Draw one EACH of the two compounds given in each example. Then, draw dipoles where appropriate and determine the type(s) of intermolecular forces that exist between the molecules.

<p><math>\text{NH}_4^+</math> and <math>\text{H}_2\text{O}</math></p>  <p>Type(s) of IMFs? <u>ion-dipole</u>, hydrogen bonding, LDFs</p>	<p><math>\text{CH}_3\text{OCH}_3</math> and <math>\text{H}_2\text{O}</math></p>  <p>Type(s) of IMFs? <u>hydrogen bonding</u>, dipole to dipole, LDFs</p>
---	--

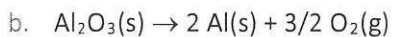
More Practice!



55

1. What type of intermolecular OR intramolecular attractive forces must be overcome for each process below?

a. ~~Al(s)  $\rightarrow$  Al(l)~~  $\leftarrow$  state change  $\Rightarrow$  intermolecular force overcome  
type = LDFs (or dispersion forces)



chemical change  $\Rightarrow$  intramolecular force overcome  
type = ionic bond

2. What is the predominant intermolecular force in  $CBR_4$ ?

- (a) London dispersion forces      c. Dipole-dipole attraction      e. Ion-dipole attraction  
 b. Ionic bonding      d. Hydrogen bonding

3. Which one of the following derivatives of methane has the highest boiling point?

- (a)  $CBR_4$       b.  $CCl_4$       c.  $CF_4$       d.  $CH_4$

4. Based on the molecular mass and dipole moment of the five compounds in the table below, which should have the lowest vapor pressure?

Substance	Molecular Mass (amu)	Dipole Moment (D)
Propane, $CH_3CH_2CH_3$	44	0.1
Dimethylether, $CH_3OCH_3$	46	1.3
Methylchloride, $CH_3Cl$	50	1.9
Acetaldehyde, $CH_3CHO$	44	2.7
Acetonitrile, $CH_3CN$	41	3.9

- a.  $CH_3CH_2CH_3$       b.  $CH_3OCH_3$       c.  $CH_3Cl$       d.  $CH_3CHO$       (e)  $CH_3CN$

5. Which of the following BEST explains why neopentane has the lowest boiling point?

Common Name	n-pentane	isopentane	neopentane
Structure			
Formula	$C_5H_{12}$	$C_5H_{12}$	$C_5H_{12}$
Boiling Point $^{\circ}C$	36.0	27.7	9.5

- a. Neopentane is less polarizable due to having fewer electrons.  
 b. Neopentane is more polarizable due to having more electrons.  
 (c) Neopentane has the shortest carbon chains and thus the least surface area.  
 d. Neopentane has the shortest carbon chains and thus the most surface area.