Intermolecular Forces Worksheet **Dr. Slotsky Honors Chemistry I**

Name_____

What is the strongest intermolecular force present for each of these substances? (London dispersion, hydrogen bonding, dipole-dipole)

1) hydrogen (H_2)_____

2) carbon monoxide (CO) _____

3) silicon tetrafluoride (SiF_4)_____

4) nitrogen tribromide (NBr_3) _____

5) water (H_2O)_____

6) acetone (CH_2O) _____

7) methane (CH_4) _____

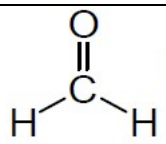
8) benzene (C_6H_6)_____

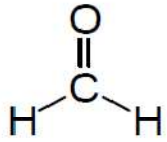
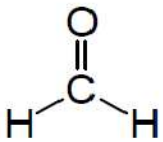
9) ammonia (NH_3) _____

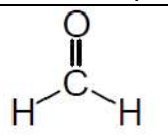
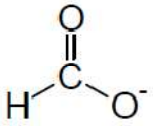
10) methanol (CH_3OH) _____

For each pair of molecules, please check off <u>all</u> intermolecular forces expected between them.

<table>
<tr>
<td>O=C=O and O=C=O

Ion-Dipole _____
Hydrogen Bonding _____
Dipole-Dipole _____
London Dispersion _____</td>
<td>  and Na^+

Ion-Dipole _____
Hydrogen Bonding _____
Dipole-Dipole _____
London Dispersion _____</td>
</tr>
<tr>
<td>  and 

Ion-Dipole _____
Hydrogen Bonding _____
Dipole-Dipole _____
London Dispersion _____</td>
<td>  and 

Ion-Dipole _____
Hydrogen Bonding _____
Dipole-Dipole _____
London Dispersion _____</td>
</tr>
</table>

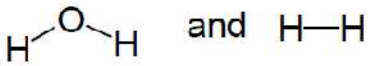
Continued on back →

Name_____

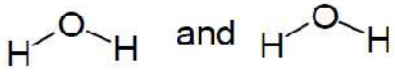
12)

Which of the following pairs of compounds can form H-bonds? For those that can, mark the position of the partial positive (δ^+) and negative (δ^-) charges in the molecules and indicate where the H-bonds will form. For those that can't form H-bonds, describe the strongest IMF available to that pair of compounds.

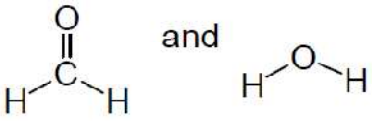
a)



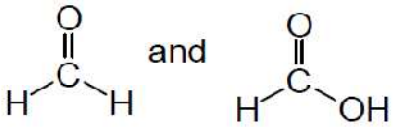
b)



c)



d)



13)

a) HF **b) PCl_3** **c) $FeCl_2$** **d) SO_2** **e) F_2**

Which of the preceding compounds is most likely to form a solid compound at room temperature?_____

Of the gases, which would be hardest to condense to a liquid under pressure? _____

HINT: rank from lowest to higher IMFs. Higher attractive forces mean higher boiling & melting points! Use your IMF reference sheet to judge relative strengths of different types of forces.