Liquids Practice sheet key

1. For each of the following pairs of molecules, choose the one that answers the question and explain why you made that choice.
	1. Which substance has the stronger London dispersion forces? NCl3 or NI3?

NI3 has the stronger London dispersion forces because it has a higher mass and is more polarizable.

* 1. Which substance is the more polar? CO2 or CO?

CO is more polar. Though both molecules have polar CO bonds, the dipole moments of the two polar bonds cancel each other out in CO2 making it an overall non-polar molecule.

* 1. Which substance is able to form hydrogen bonds? CH3CH2OH or CH3OCH3? Draw a picture showing the hydrogen bonding interactions.

CH3CH2OH will form hydrogen bonds

H bond



1. Name and distinguish between the two components of a solution.

Solvent – The component of the solution that is present in greater quantity.

Solute – The component of the solution that is present in lesser quantity

1. If we say that two liquids are miscible, what does that mean?

Two liquids are miscible if they are soluble in each other in all proportions.

1. Chlorine gas is a good oxidizing agent which is often used to purify municipal water supplies and ensure that it is safe to drink. If Cl2 has a solubility of 8.0 g/kg at 1.23 atm, what will the solubility of the gas be at a pressure of 0.052 atm?

$$\frac{S\_{1}}{P\_{1}}=\frac{S\_{2}}{P\_{2}}\rightarrow \rightarrow \rightarrow S\_{2}=S\_{1}\left(\frac{P\_{2}}{P\_{1}}\right)=8.0 {g}/{kg}\left(\frac{0.052 atm}{1.23 atm}\right)=0.34 g/kg$$

1. Define the term viscosity.

Viscosity is a measure of resistance to flow. The more viscous something is the more thick it appears.

1. Which would be expected to have a higher viscosity, butane (C4H10) or dodecane (C12H26) and why?

Dodecane would be expected to have a higher viscosity because it has a higher molecular mass. Higher molar mass means more polarizable and stronger intermolecular forces. The stronger the intermolecular forces the higher the viscosity because the molecules hold together more strongly thus sticking together and making the solution more viscous.

1. The four major attractive forces between particles are ionic bonds, dipole-dipole attractions, hydrogen bonds, and dispersion forces (8 points).
	1. Classify each compound by its predominant attractive or intermolecular force among atoms or molecules of the same type.

MgF2 ionic

HF hydrogen bonding

HBr dipole

N2 dispersion

* 1. Based upon the intermolecular forces present, rank the substances according to the expected boiling point for the substance from highest to lowest boiling point.

MgF2 > HF > HBr > N2