Dougherty Valley HS Chemistry - AP
IMFs – Study Questions

Worksheet #5

Name: **Period:** **Seat#:**

1) Describe the inter-particle forces at work in the following:

a. within a water molecule H_2O	**b.** in a crystal of the salt NaCl
c. in a solution of potassium nitrate KNO_3	**d.** in diamond
e. in a fiber of nylon	**f.** in liquid butane
g. between water molecules in ice	**h.** between the two strands in the double helix of DNA
i. in paraffin wax	**j.** between the molecules of carbon dioxide CO_2 in dry ice
k. between the molecules of HCl in liquid HCl	**l.** in tungsten metal
m. in a solution of perchloric acid	

2) Which one of the following pairs of molecules would you expect to have the higher melting point in each pair of compounds below? Include a reasoning for your choices that relates to the inter-particle forces.

a. Cl_2 or Br_2	**b.** C_4H_{10} or C_5H_{12}	**c.** NH_3 or PH_3
d. Na or Mg	**e.** BeO or KCl	**f.** ICl or Br_2

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3) Which states or types of matter would be characterized by each of the following statements?

a. High individual molecular speeds.	**b.** A melting point spread over a wide temperature range.	**c.** A regular repeating array of structural units.
d. Molecules move with respect to one another but are held together in a condensed state.	**e.** Molecules close together but having sufficiently high kinetic energies to overcome the IMFs.	**f.** Valence electrons delocalized over huge arrays of atoms.
g. Totally random molecular order with great distances between individual molecules.	**h.** A three-dimensional network of covalent bonds.	

4) Acetone (C_3H_6O) and chloroform ($CHCl_3$) form an unusually strong intermolecular bond. Why is this?
Draw a picture of how the molecules attract each other. →

5) Complete the following calculations. USE THESE NUMBERS:
Heat of fusion of ice = 333 J/g Heat of vaporization of water = 2250 J/g

a. How much heat is required to melt 15 grams of ice at 0°C?

b. How much heat is released when 100 grams of steam condenses at 100°C?

c. If a system of ice and water has a mass of 12 grams, and it is converted completely to water at 0.0°C by supplying 1.33 kJ of heat, how much water was initially present?