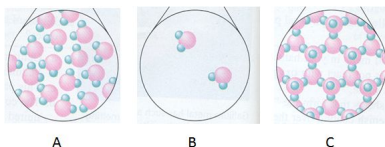Name: _____   Date: _____

[10 pt]   1. Complete the following table:

       Shape and Volume Columns: (D)efinate or (I)ndefinate.

       Compressibility: (H)igh, (L)ow, and (N)one.

       Density: (H)igh or (L)ow

       Picture: Which picture below best represents each state.

       Particles: Provide a general description of how particles are arranged.

       IMF: Include how the attractive (Intermolecular Forces) between the molecules relates to the Kinetic Energy available.

State	Shape	Volume	Compressibility	Density	Picture	Particles	IMF vs KE
Solid							
Liquid							
Gas							

[4 pt]   2. Complete the table below illustrating the differences between Chemical Bonds and Intermolecular Forces (IMF's)?

Property	Chemical Bonds	Intermolecular Forces
Attraction between:		
Relative Strength:		
Represented by (in LS):		
Determine Properties like:		

[4 pt] 3. Give an equation describing the attractive force between opposite charges (be sure to define each variable) and **TWO** reasons why IMF are much weaker than chemical bonds.

[7 pt] 4. Define (using words) each of the following Intermolecular Forces (IMF's) including their relative strengths. In addition draw an example illustrating the attractive force between **TWO** molecules. Properly label all charges (+/-) and partial charges (δ^+/δ^-). **DO NOT USE THE EXAMPLES FROM CLASS**

(a) London Dispersion Forces (LDF)

(b) Dipole-Dipole Forces (DD)

(c) Hydrogen Bonding (HB)

(d) Ion-Dipole (ID)

[3 pt] 5. Draw a picture showing how water molecules would hydrogen bond to ethanol (CH_3CH_2OH).
        Pay careful attention to the bond angles in ethanol. (Remember your Lewis Structures)

[3 pt] 6. Is the relationship between Melting Point and the strength of the IMF's between molecules directly
        proportional (DP) or inversely proportional (IP). Explain.

[6 pt] 7. List the IMF present in a pure sample of each of the molecules below. Order the following molecules
        from lowest Boiling Point to highest Boiling Point (A < B < C etc). Explain.

NaCl

(a)   (b)   (c)   (d)   (e)
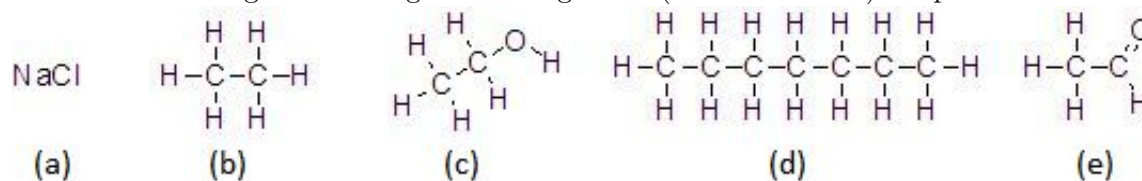
[2 pt] 8. The boiling point for compound A is 50°C and for compound B is 75 °C. From this data, 8. _____
        which compound is more likely to be able to form hydrogen bonds. Explain.

[2 pt] 9. The melting point for compound A is -25°C and for compound B is -50 °C. From this 9. _____
        data, which compound is more likely to be able to form hydrogen bonds. Explain.

[4 pt] 10. Define Surface Tension (include units). Is surface tension directly proportional or inversely proportional to the IMF present in a liquid? Explain.

[3 pt] 11. How much energy does it take to increase the surface area of a water by 25 ft^2? Explain.

[3 pt] 12. Using the molecules in Question 6 order them from lowest surface tension to highest surface tension. Explain.

[5 pt] 13. Define the term 'Viscosity'. What are the units of viscosity? Is viscosity directly proportional or inversely proportional to the IMF present in a liquid? Viscosity also depends on MW/size and Temperature, is viscosity directly or inversely proportional to each?

[4 pt] 14. Define 'Capillary action'. Capillary action is the result of interaction between two forces, define each. In the following picture are the cohesive forces or the adhesive forces stronger? Explain.