1. Distinguish between intermolecular forces and intramolecular forces. Give examples of each.

.2 Define the following intermolecular forces and give examples of each.

a. dispersion forces c. hydrogen bonds

b. dipole-diploe forces d. ion-dipole forces

3. What is polarizability? What factors affect it?

4. Explain why HF has a higher boiling point than HCl, HBr, and HI.

5. List at least 3 substances that can hydrogen bond with water and 3 that can't.

6. What is surface tension? Which has a higher surface tension, water or ethanol? Why?

7. Why does the meniscus of liquid mercury curve a different direction from the meniscus of water?

8. What is viscosity? How does it vary with intermolecular force?

9. Lead forms face-centered cubic crystals and has a density of 11.3 g/mL. Find the atomic radius of lead atoms in pm.

10. If a particular crystal reflects 200.0 nm x-rays at an angle of 12.4o, find the length of the crystal's unit cell.

11. For each of the following types of crystals, describe what particles are at the lattice points, what holds them together, the expected hardness, melting point, and conductivity. Explain how the properties emerge from the structure.

a. covalent c. ionic

b. molecular d. metallic

12. Explain how, starting with a liquid in a vacuum, a liquid-vapor equilibrium develops.

13. The vapor pressure of Br2 at 9° C is 113 mmHg. At 20° C it is 184 mmHg.

a. Calculate Hvap

b. Find its vapor pressure at 50 ° C.

14. Find the energy needed to change 4.50 g of ice at -20oC to steam at 150oC. You'll need to look up some physical constants!

15. Look up a phase diagram for carbon dioxide. Find it's triple point, normal sublimation point, critical temperature, and critical pressure. Find its melting point and boiling point at 8.0 atm.