**Solids & Liquids questions**

Name and date submitted (3 pts):

Instructions: Using this form as a template, write or type your answers. KEEP THE SAME NUMBERING. The questions are taken directly from Ch. 11, BJU Chemistry, 3rd edition.

(34 questions)

1. (BJU #1): Predict the type of INTERmolecular forces that may act between the molecules in these substances.
   1. CO2
   2. NH3
   3. HCl
   4. C3H8
2. (BJU #2): Based on your understanding of intermolecular forces, which substance in each of the pairs would have the higher boiling point? Give your reasoning.
   1. NF3, NH3
   2. NaCl, HCl
   3. CF4, CHF3
   4. Cl2, C3H5Cl
3. (BJU #4): Explain the major differences in melting point between a crystal and an amorphous solid.
4. (BJU #5): Assume that the particles in table salt (NaCl) vibrate just as forcefully as the particles in lead (Pb). Explain why table salt remains a solid at 500 °C while lead exists as a liquid at that temperature.
5. (BJU #7): After a jar of liquid has been sealed, the level of the liquid decreases slightly because of evaporation. After a slight decrease, the level of the liquid ceases to change. Why?
6. (BJU #11): In terms of attractive forces and kinetic energies of particles, explain what happens during the following phase changes. Example: Melting – The particles gain enough kinetic energy to overcome the attractive forces that hold them in fixed positions.
   1. Boiling
   2. Evaporation
   3. Freezing
   4. Sublimation
7. (BJU #12): A white power contains tiny, cube-shaped grains and melts at a temperature between 141.6 °C and 142.2 °C. Is this solid more likely to be a crystalline solid or an amorphous solid?
8. (BJU #13): Fill in the following chart, which summarizes the properties of solids, liquids, and gases.

|  |  |  |  |
| --- | --- | --- | --- |
| **State** | **Compressible** | **Fluid** | **Density** |
| Solid |  |  | Relatively high |
| Liquid |  | Yes |  |
| Gas | Yes |  |  |

1. (BJU #14): What causes surface tension in a liquid?
2. (BJU #15): Water rolls off a duck’s back but thoroughly wets a head of human hair. What do these observations reveal about the chemical nature of these two surfaces?
3. (BJU #17): How does perspiration cool the skin on a person’s body?
4. (BJU #18): Why does the surface of water in a glass test tube curve upward at the edges? (this is called a meniscus)
5. (BJU #19): Automobile engines are designed to be lubricated with motor oils of specific viscosities. These are rated from the lowest viscosity of 5 W up to the highest viscosity of 70 W. What can you conclude about the intermolecular attractions in an oil rated 10 W?
6. (BJU #20): What is the essential difference between boiling and evaporation?
7. (BJU #21): Water in a truck’s radiator can get hotter than 100 °C when the radiator is sealed tightly. How is it possible for water to exist as a liquid at temperatures above its normal boiling point?
8. (BJU #26): T/F: The bonds between atoms within a molecule are stronger than the forces that exist between molecules.
9. (BJU #27): T/F: A hydrogen bond is a special kind of dispersion force that can occur only in a molecule containing hydrogen.
10. (BJU #28): T/F: In most cases, a substance has a greater density in its solid than in its liquid state.
11. (BJU #31): Using Fig. 11-27, determine the state of water at
    1. 80 C, 300 torr
    2. 100 C, 900 torr
    3. -10 C, 500 torr
12. (BJU #32): Using Fig. 11-25, determine
    1. Boiling point of ethanol at normal atmospheric pressure
    2. Boiling point of methanol at 720 torr
    3. Atmospheric pressure at which diethyl ether boils at 20 C
13. (BJU #34): Write the three common states of matter – solid, liquid, and gas – in a triangle with space for long arrows between each pair of terms. Draw an arrow in each direction from each term and write the term for the phase change that goes in that direction. For instance, the arrow from solid to liquid would be identified as ‘melting’.