**Name: Period: Seat#:**

**S-62, 63**

**Directions:** Try these problems. If you can DO them, check the box (🗹).   
If you CANNOT do them, write some notes TO YOURSELF about what you need to study to succeed at these problems.

**S62 – Quick Check #1**

🞎 **IMF Identification**

Indicate the **strongest** IMF holding together crystals of the following substances:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | London  forces | Dipole-dipole attractions | Hydrogen bonding | Metallic bonding | Ionic  bonding | Covalent bonding |
| 1. | KCl |  |  |  |  |  |  |
| 2. | IF3 |  |  |  |  |  |  |
| 3. | HF |  |  |  |  |  |  |
| 4. | AsH3 |  |  |  |  |  |  |
| 5. | Br2 |  |  |  |  |  |  |
| 6. | Pt |  |  |  |  |  |  |
| 7. | NaOH |  |  |  |  |  |  |
| 8. | H2S |  |  |  |  |  |  |
| 9. | Ne |  |  |  |  |  |  |
| 10. | SiO2 |  |  |  |  |  |  |

Describe the interparticle forces at work in the following:

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ a. **within** a water molecule H2O

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ b. in a crystal of the salt NaCl

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ c. in a **solution** of potassium nitrate KNO3

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 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 CO2 in dry ice

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ k. between the molecules of HCl in **liquid** HCl

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ l. in tungsten metal

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ m. in a solution of perchloric acid

🞎 **Type of Bonds**

Elemental boron is extremely hard (nearly as hard as diamond) and has a melting point of 2300°C.

It is a poor conductor of electricity at room temperature. What kind of solid would you expect for boron based on these properties? \_\_\_\_\_\_\_\_\_

A. molecular solid B. metal C. ionic solid D. covalent/network solid

Valence electrons delocalized over huge arrays of atoms.

What kind of solid is described by this property? \_\_\_\_\_\_\_\_\_\_

A. molecular solid B. metal C. ionic solid D. covalent/network solid

🞎 **Some information that is considered “common knowledge” for AP Chemistry students:**

**Paraffin wax** is made up of long carbon chains. The Alkanes area also called the Paraffins.

Chart, line chart

Description automatically generated

**Nylon** is a polymer made up of long chains of carbons with amine groups and C=O groups.

The “*n*” means that this pattern of atoms is repeated thousands of times to make nylon fibers.

Diagram, schematic

Description automatically generated

**Perchloric acid** is based on the perchlorate ion (ClO4-).

This is an “oxoacid” where the H atom bonds to one of the oxygen atoms.

Icon

Description automatically generated with medium confidence

**DNA** has a familiar structure, but we are interested in how the two sides of DNA are connected to each other. Note that there are some N-H bonds and O-H bonds in the “Nitrogenous bases”.

Diagram, schematic

Description automatically generated

**S63 – Quick Check #2**

* **Explaining Problems (from the 1994 AP Exam)**

*For each of the following, use appropriate chemical principles to explain the observation.*

At room temperature, NH3 is a gas and H2O is a liquid, even though NH3 has a molar mass

of 17 grams and H2O has a molar mass of 18 grams.

C(graphite) is used as a lubricant, whereas C(diamond) is used as an abrasive.

* A picture containing icon

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  Description automatically generatedA picture containing icon

  Description automatically generated**Strength of Ionic Bonds**

Consider these three ionic compounds:

Which one of these has the strongest ionic bond? \_\_\_\_\_\_\_\_\_\_ Explain your answer.

* **Boiling**

|  |  |
| --- | --- |
| Chart, line chart  Description automatically generated | What are the normal boiling points of the three liquids?  \_\_\_\_\_\_\_ \_\_\_\_\_\_\_ \_\_\_\_\_\_\_  Indicate which liquid has the **weakest** IMF’s. |