ROSEDALE ACADEMY

Name_____

**1-6: Physical Properties of Solids Assignment (13 Marks total):**

1. Describe the type bonding that holds the following molecular solids together **(1 mark each):**

**a) Ionic Crystals**

Ionic Bonding

**b) Metallic Crystals**

Metallic bonds

**c) Molecular Crystals**

Intermolecular Forces

**d) Covalent Network Crystals**

Covalent Bonds

2. Complete the following tables for each of the different types of solid. For each property describe the characteristic that the solid displays. The table for ionic crystals has already been completed to act as a guide **(9 marks total)**

## a) Ionic Crystals

| Property | Characteristic | Reason |
|---|---|---|
| **Hardness** | Hard | Ionic bonds, which are very strong hold ionic crystals together |
| **Malleability (Flexible or Brittle)** | Brittle | Lattice structure allows for clean breaks between oppositely charged ions |
| **Melting Point** | High | Ionic bonds, which are very strong hold ionic crystals together |
| **Soluble in Water** | Yes | Polar nature of water molecules dissolves ionic crystals, separating their positive and negative ions |

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## b) Metallic Crystals (3 marks)

| Property | Characteristic | Reason |
|---|---|---|
| **Hardness** | Range from soft to hard | Dependent on nature of the metal. |
| **Sheen (shiny or not)** | Shiny | Electron configuration - freely moving electrons allow for absorbtion and emission of photons of light. |
| **Electrical Conductivity** | Yes | Electron Configuration- Electrons are freely moving |

## c) Molecular Crystals (3 marks)

| Property | Characteristic | Reason |
|---|---|---|
| **Melting Point** | Low | Intermolecular Forces Hold them together these forces are weak |
| **Hardness** | Soft | Intermolecular Forces Hold them together these forces are weak |
| **Electrical Conductivity** | Low | Made up of neutral molecules |

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## d) Covalent Network Crystals (3 marks)

| Property | Characteristic | Reason |
|---|---|---|
| **Melting Point** | High | Covalent bonds are very strong |
| **Hardness** | Hard | Covalent bonds are very strong |
| **Electrical Conductivity** | Low | Electrons do not move around freely |