Bond Classification

Part I. Physical Appearance
For each of the following solids, include a physical description by observing the solid and cut/paste an appropriate picture (see back page) of the molecular structure of the solid in the space provided.

Crystalline Solid	Physical Description	Example of Molecular Structure
$C_{10}H_8$ naphthalene		
Cu copper		
NH_4NO_3 ammonium nitrate		
$(SiO_2)_x$ quartz		
NH_3 ammonia		

Crystalline Solid	Physical Description	Example of Molecular Structure
KCl potassium chloride		
I_2 iodine		
Cx Graphite		
H_2O water		
Mg Magnesium		

Part II. Physical Properties

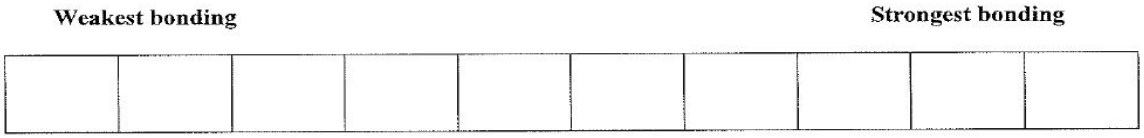
For each of the crystalline solids, determine melting point, boiling point, and conductivity data using the CRC reference guide and conductivity meter. **When reporting melting and boiling points, be sure to indicate whether values are in °C or K. When testing solids for conductivity, be sure to wear safety glasses.** Finally, classify each crystalline solid as Ionic, Covalent network, Metallic, Covalent molecular (nonpolar), or Covalent molecular (polar).

Crystalline Solid	Melting Point	Boiling Point	Conductivity	Classification
$C_{10}H_8$ naphthalene				
Cu copper				
NH_4NO_3 ammonium nitrate				
$(SiO_2)_x$ quartz				
NH_3 ammonia				

Crystalline Solid	Melting Point	Boiling Point	Conductivity	Classification
KCl potassium chloride				
I_2 iodine				
Cx Graphite				
H_2O water				
Mg Magnesium				

Part III. Data Analysis
Answer the following questions as completely as possible using data and your experiences from this lab.

1. Using your melting point and boiling point data from Part II, rank the ten crystalline solids in order of increasing bond strength. (Be sure to convert all temperatures to the same units (°C or K) before making your comparison. The formula for converting Kelvin units to Celsius is: K = °C + 273.15)



2. Compare and contrast the four types of crystalline solids: Ionic, Covalent network, Metallic, and Covalent molecular. Use your experiences and data from this lab.

3. Explain why ionic crystals melt at much higher temperatures than typical covalent molecular crystals. (HINT: Looking back at question #1, what data did you use to classify bonds as weak or strong?)