



3. For each of the following compounds, place them in the correct location in the table provided. Some compounds may require a considerable amount of rough work to fully determine their best location in the table.

Sn	H <sub>2</sub> O	SiF <sub>4</sub>	KI	C <sub>n</sub> (diamond)
MgCl <sub>2</sub>	HCl	Ag	CO <sub>2</sub>	C <sub>5</sub> H <sub>12</sub>
NCl <sub>3</sub>	N <sub>2</sub>	I <sub>2</sub>	NH <sub>3</sub>	SiO <sub>2</sub> (quartz)

Ionic	Covalent			Metallic
	Network	Discrete Molecules		
		Non-polar	Polar	

/15

4. For the four substances listed, state the conductivity behaviour for each. If conductivity occurs include the full and correct identity of charge carriers, if non-conductive, provide details:

(s) → solid state  
 (l) → liquid  
 (g) → gas  
 (aq) → aqueous solution - solution in water

NaCl(s)	/2
NaCl(aq)	/2
Fe(s)	/2
C <sub>n</sub> (s)	/2

/8

/23

5. Will NaCl(s) dissolve well in hexane? Hexane has the chemical formula  $C_6H_{14}(l)$ . Why or why not?

/2

6. Will NaCl(s) dissolve well in water? Why or why not?

/3

7. What is the underlying basis for crystallinity? Answer this question with consideration for the structure at the atomic level. What is a good example of a crystalline substance that contains only covalent bonds?

/3

8. What is an empirical formula? What classification of compounds (see the headings in question #3) have only empirical formula?

/3

9. What is a molecular formula? Give a clear example. What class of compounds can have a molecular formula.

/3

/14

10. Match each definition with the word that it best defines.

_____	sharing of electrons satisfies the octet rule	a) discrete covalent molecules
_____	forces that exist within a molecule	b) difference in electronegativity
_____	occurs when bond polarizations are present and molecule geometry is not symmetrical	c) intermolecular
_____	can be used to determine bond type or bond polarity	d) macromolecule
_____	electron transfer forms ions that follow the octet rule	e) lattice energy
_____	forces of attraction that exist between discrete covalent molecules	f) intramolecular
_____	molecules with a small and precise number of atoms	g) covalent bond
_____	a type of energy that is associated with an ionic crystal	h) hydration energy
_____	property of a metal that means it is bendable	i) ionic bond
_____	a type of energy that is associated with the interaction between ions and water molecules in an aqueous solution	j) metallic bonding
_____	large and unspecified number of atoms or ions form a high melting point substance	k) cleavage
_____	a property where by a substance can fracture along planes within a lattice arrangement to form flat surfaces	l) net molecular polarization
_____	makes possible free moving electrons	m) malleable

11. With the aid of good well labeled diagrams, explain why diamond has a "melting point" near 4000 °C while water has a melting point of a mere 0 °C and yet the bonds between H and O in water are 33% stronger than the bonds between C and C in diamond. Use the terminology that has been introduced in this course where appropriate.