Science(Chemistry)

Ionic and Covalent Bonding

Name: _____( ) Class: _____ Date: _____

Notes

Differences in properties

Ionic compound	Covalent compound
1. Consists of oppositely charged ions.	Consist of molecules.
2. Strong attractive forces between particles (ions)	Relatively weak attractive forces between particles (molecules)
3. Relatively high melting and boiling points.	Relatively low melting and boiling points.
4. Mostly solids because of their high melting point.	Mostly liquids or gases at room temperatures
5. Non-volatile because they have high melting point.	Volatile because they have low boiling point.
6. Usually soluble in water	Usually insoluble in water but dissolve in organic solvents like ethanol.
7. Conduct electricity in molten or aqueous state. They are electrolytes. In solid state, they do not conduct electricity because of the immobile ions.	They do not conduct electricity whether in solid or liquid state. They are usually non-electrolytes. They do not exist as ions.

Exercises

1a) When elements combine, covalent or ionic bonds can be formed. Fill in the spaces with the correct type of bonds in each case.

i) Metallic elements + Non-metallic elements → _____ bonds

ii) Non-metallic elements + Non-metallic elements → _____ bonds

b) What type of bond would you expect to form between each of the following pairs of elements?

	Type Of Bond
i) Potassium and chlorine	
ii) Magnesium and bromine	
iii) Silicon and oxygen	
iv) Fluorine and fluorine	
v) Aluminium and sulphur	

2 Elements with symbols A, B and C have the following electronic structures.

A 2, 6 **B** 2, 8, 1 **C** 2, 8, 7

a) Name the bond most likely to be formed between

i) **A** and **B**. _____ ii) **A** and **A**. _____

iii) **B** and **C**. _____ iv) **A** and **C**. _____

b) List **two** physical or chemical differences between ionic and covalent compounds.

i)_____

_____

_____

ii)_____

_____

_____

3. For each of the compounds i) potassium chloride (KCl) and ii) chloroform ($CHCl_3$),

a) state the type of bonding involved,

i)_____ ii)_____

b) draw the electronic structure of the compounds,

i) ii)

c) state **2** physical properties of the compound that are related to the type of bonding in it.

i) 1)_____

_____

_____

_____

2) _____

_____

_____

_____

ii) 1)_____

_____

_____

_____

2)_____

_____

_____

_____

4. Calcium oxide is an ionic compound whereas hydrogen chloride is a covalent compound.

i) By means of suitable electronic diagrams, illustrate the bonding in these two compounds.

ii) State the difference between ionic and covalent compounds in terms of the type of elements they are composed of.

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_____

5. Explain why hydrogen chloride does not conduct electricity when dissolved in chloroform, but it is a conductor of electricity when dissolved in water.

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6. You can smell the compound carbon tetrachloride (CCl_4).

You cannot smell the compound sodium chloride (NaCl).

Explain the difference between CCl_4 and NaCl in terms of the chemical bonds in two compounds.

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