

Hwa Chong Institution

Chemical bonding (Worksheet 4)

**Section A:**

Answer 'True' or 'False' to the following statements.

Question	T/F
Metallic bonding is a kind of ionic bonding because ionic bonds exist between the cations and the delocalized electrons.	F
Metallic bonding involves electrons being shared; hence it is a kind of covalent bonding.	F
Metals are malleable because the atoms can slide over each other easily when a force is applied.	T
Metals are malleable because the forces of attraction between metal atoms are weak.	F
In a metal, the electrons are able to move freely and randomly among the cations.	T
Metallic bonding is weak because the positively charged ions repel one other.	F
The electrons in metals are able to move only when heat or electricity is supplied.	F
All metals have high melting and boiling points.	F
Only metals can conduct electricity.	F
When an electrical current is passed through the metal, electrons repel each other, thus the metal is able to conduct electricity.	F
When an electrical current is passed through the metal, the moving ions in the metal are able to carry the current from one end to the other.	F

**Section B:**

Sodium, magnesium and aluminium belong to the same period on the Periodic Table. Some of the properties of the metals are given below.

Metals	Melting point/ °C	Boiling point/ °C	Electrical Conductivity/ $\text{cm}^{-1}\Omega^{-1}$	Thermal Conductivity/ W/cmK
Sodium	98	883	$2.1 \times 10^5$	1.41
Magnesium	650	1091	$2.3 \times 10^5$	1.56
Aluminium	660	2519	$3.8 \times 10^5$	2.37

Refer to the above table and the Periodic table and answer the questions below.

1. Write down the electronic configuration of the 3 metals, sodium, magnesium and aluminium.

Na:  $1s^2 2s^2 2p^6 3s^1$  (2, 8, 1); Mg:  $1s^2 2s^2 2p^6 3s^2$  (2, 8, 2); Al:  $1s^2 2s^2 2p^6 3s^2 3p^1$  (2, 8, 3)

2. How many valence electrons do they have?