FOUNDATION TIER

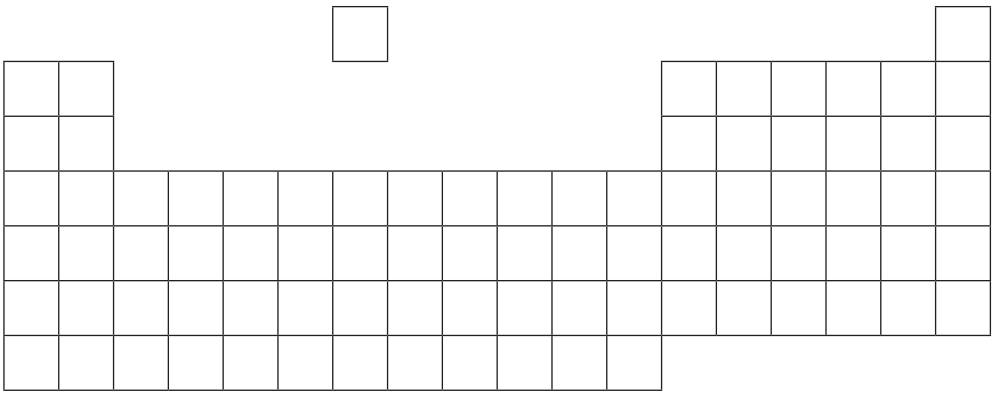
1 The Periodic Table has been developed over many years by several scientists. Each scientist produced a Periodic Table with different characteristics and this eventually led to the Periodic Table we use today.

(a) Complete the table below by adding the name of the scientist.

Characteristic of the Periodic Table	Name of Scientist
Law of octaves	
Spaces for undiscovered elements	

[2]

(b) The diagram below is an outline of the modern Periodic Table.



Using the letters **A–D** show the position of the following elements on the outline of the Periodic Table above. Place each letter in the appropriate box on the outline.

A a gas which burns with a pop

B the least reactive alkali metal

C the element in Period 3 and Group 2

D a metal which is a liquid at room temperature

[4]

(c) The table below shows six elements and the electronic configuration of their atoms. The elements are represented by the letters **P–U** (these are not the symbols of the elements).

Element	Electronic configuration
P	2,6
Q	2,8,1
R	2,8,2
S	2,8,7
T	2,8,8
U	2,8,8,1

Using the letters **P–U**, identify the following elements. Each letter may be used once, more than once or not at all.

(i) two elements in the same Group _____ and _____

(ii) an element in Period 2 _____

(iii) a noble gas _____

(iv) an alkaline earth metal _____

[4]

(d) Iron and sulfur are two elements found in the Periodic Table.

(i) Describe the appearance of sulfur.

_____

_____ [2]

(ii) Describe how you would practically separate a mixture of iron and sulfur.

_____

_____

_____

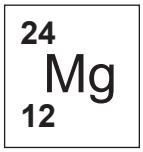
_____

_____ [2]

(iii) **Name** the compound formed when iron reacts with sulfur.

_____ [1]

2 The symbol for the element magnesium as it appears in the Periodic Table is shown below:



(a) (i) The atomic number of magnesium is 12. Explain what you understand by the term atomic number.

_____

_____ [1]

(ii) The mass number of magnesium is 24. Explain what you understand by the term mass number.

_____

_____

_____ [1]

(iii) Complete the table below to give information about the particles present in the nucleus of a magnesium atom.

Name of particle	Relative Mass	Relative Charge
	1	0
		+1

[2]

(b) Magnesium and chlorine react together to form the ionic compound magnesium chloride.

(i) Write the formula for magnesium chloride.

_____ [1]

(ii) Using **dot and cross** diagrams explain how magnesium chloride is formed from atoms of magnesium and chlorine.
Include the charge on each ion.

_____

_____ [6]

(iii) Magnesium chloride is a white crystalline solid at room temperature with a melting point of 714 °C. State two other physical properties of magnesium chloride.

1. _____

_____

2. _____

_____ [2]

(iv) Name one other compound with similar bonding and physical properties to magnesium chloride.

_____ [1]

3 The modern Periodic Table contains over 100 elements.

(a) At room temperature and pressure most of these elements are solids, a few are gases and two are liquids.

(i) Write the symbol for the metallic element which is a liquid at room temperature and pressure.

_____ [1]

(ii) Name two elements which exist as gases at room temperature and pressure.

1. _____

2. _____ [2]

(b) On heating, the element iodine undergoes sublimation.

(i) Explain what you understand by sublimation.

_____

_____ [1]

(ii) What would be observed when a sample of iodine is heated?

_____

_____ [2]

(c) The elements in Group 1 of the Periodic Table are very reactive metals.

(i) Complete the following table.

Group number	Name of group	Number of electrons in the outer shell of an atom
1		

[2]

(ii) State the trend in reactivity in Group 1.

_____

_____ [1]

(iii) What would be observed when a piece of potassium is added to cold water?

_____

_____

_____

_____ [3]

(iv) Complete the word equation below for the reaction between potassium and water.

potassium + water → _____ +

[2]

(d) Elements and compounds may be detected using modern instrumental analysis. Name **two** methods of modern instrumental analysis.

1. _____

2. _____ [2]