3.1 The Periodic Table

Understandings:

- The Periodic Table is arranged into four blocks associated with the four sub-levels: s, p, d, and f.
- The Periodic Table consists of groups (vertical columns) and periods (horizontal rows).

Guidance

The group numbering scheme from group 1 to group 18, as recommended by IUPAC, should be used.

- The period number (n) is the outer energy level that is occupied by electrons.
- The number of the principal energy level and the number of the valence electrons in an atom can be deduced from its position on the Periodic Table.
- The Periodic Table shows the positions of metals, non-metals and metalloids.

Guidance

The terms alkali metals, halogens, noble gases, transition metals, lanthanoides and actinoides should be known.

Exercises

1 Use the IB Periodic Table to identify the position of the following elements:

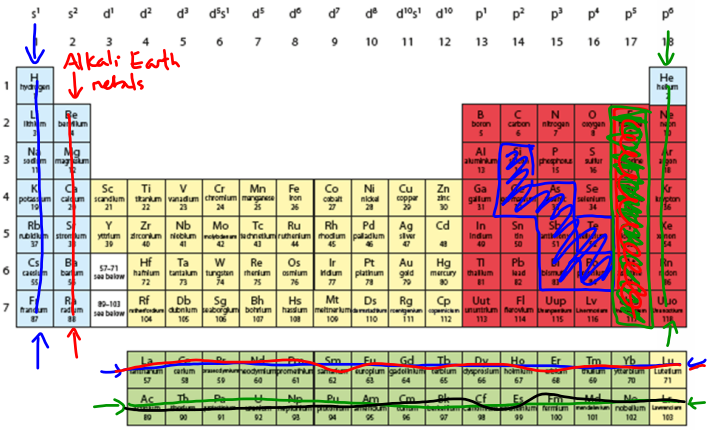
	Element	Period	Group
(a)	helium		
(b)	chlorine		
(c)	barium		
(d)	francium		

2 Phosphorus is in Period 3 and Group 15 of the Periodic Table.

(a) Distinguish between the terms 'period' and 'group'.

(b) State the electron configuration of phosphorus and relate it to its position in the Periodic Table.

3 How many valence (outer shell) electrons are present in the atoms of the element with atomic number 51?



Alkali metals? Halogens? Noble gases? Lanthanoids? Actinoids? Metalloids?

The metalloid elements have the characteristics of both metals and non-metals. Their physical properties and appearance most resemble the metals, although chemically they have more in common with the non-metals. In the Periodic Table the metalloid elements silicon, germanium, arsenic, antimony, tellurium, and polonium form a diagonal staircase between the metals and non-metals.

Silicon is a metalloid. There is enough silicon in this piece to make many hundreds of computers.

Europium (Eu), is one of the lanthanoides. It is a hard silvery-white metallic element and is used in television screens and fluorescent light bulbs.

Exercises

4 Which of the following elements is a metalloid?

A calcium **B** manganese **C** germanium **D** magnesium

5 Which of the following materials is the best conductor of electricity in the solid state?

A silicon **B** graphite **C** phosphorus **D** antimony

6 Which of the following properties is used to arrange the elements in the modern Periodic Table?

A relative atomic mass **B** number of valence electrons

C atomic number **D** effective nuclear charge