

# PERIODIC TABLE 1

**Q1(a)** Complete the sentences.

Elements in the periodic table are arranged in order of atomic \_\_\_\_\_.

The elements in Group \_\_\_\_\_ are called the noble gases.

(2 marks)

**(b)** Draw a ring around the correct answer to complete each sentence.

**(b)(i)** Sodium (Na) is

an alkali metal.

a non-metal.

a transition metal.

(1 mark)

**(b)(ii)** Nickel (Ni) is

an alkali metal.

a non-metal.

a transition metal.

(1 mark)

**(c)** In 1869 Mendeleev produced his periodic table.

Why did Mendeleev leave gaps in his periodic table?

---

---

(1 mark)

**Q2** The periodic table on the Data Sheet may help you to answer these questions.

Part of the periodic table is shown below.

	<b>A</b>																	
												<b>B</b>						
																	<b>C</b>	
											<b>D</b>							
														<b>E</b>				
<b>F</b>																		

The letters are **not** the symbols of the elements.

Choose your answers **only** from the letters shown in the periodic table above. Which letter, **A, B, C, D, E** or **F**, represents

- (i) Aluminum \_\_\_\_\_ (1 mark)
- (ii) A group 5 element \_\_\_\_\_ (1 mark)
- (iii) An alkali metal \_\_\_\_\_ (1 mark)
- (iv) The element with atomic (proton) number of 47 \_\_\_\_\_ (1 mark)
- (v) An element with seven electrons in its outer shell \_\_\_\_\_ (1 mark)

**Q3** The periodic table on the Data Sheet may help you answer these questions.

**(a)** Many chemists have contributed to the development of the periodic table.



John Newlands was one of the first chemists who attempted to classify elements in a systematic way based on atomic weight. In 1866 he suggested that there was a repeating pattern of elements with similar properties every eighth element.

Part of Newlands' periodic table is shown below.



H	Li	Be	B	C	N	O
F	Na	Mg	Al	Si	P	S
Cl	K	Ca	Cr	Ti	Mn	Fe
Co, Ni	Cu	Zn	Y	In	As	Se
Br	Rb	Sr	Ce, La	Zr	Di, Mo	Ro, Ru

Many chemists in 1866 did not accept Newlands' periodic table.

**(i)** Give **one** piece of evidence which supports Newlands' ideas.

(1 mark)

**(ii)** Suggest **two** reasons why many chemists in 1866 did not accept Newlands' ideas.

(2 marks)

**Q4.** Use the periodic table on the Data Sheet to help you answer these questions.

Part of the periodic table is shown below.

The letters are **not** the symbols of the elements.

										<b>A</b>										
<b>B</b>																<b>C</b>				
								<b>D</b>												
																		<b>E</b>		
											<b>F</b>									

Choose your answers **only** from the letters shown in the periodic table above. Which letter, **A**, **B**, **C**, **D**, **E** or **F**, represents

- (i) Hydrogen \_\_\_\_\_ (1 mark)
- (ii) A Group 3 element \_\_\_\_\_ (1 mark)
- (iii) A halogen \_\_\_\_\_ (1 mark)
- (iv) The element with atomic (proton) number of 7 \_\_\_\_\_ (1 mark)
- (v) An element with one electron in its outer shell? \_\_\_\_\_ (1 mark)

**Q5.(a)** Dimitri Mendeleev was one of the first chemists to classify the elements by arranging them in order of their atomic weights. His periodic table was published in 1869.

How did Mendeleev know that there must be undiscovered elements and how did he take this into account when he designed his periodic table?

---

---

---

---

(2 marks)

**(b)** By the early 20th century protons and electrons had been discovered.

Describe how this discovery allowed chemists to place elements in their correct order and correct group.

---

---

---

---

---

(3 marks)

**(c)** The transition elements are a block of elements between Groups 2 and 3 of the periodic table.

**(c)(i)** Transition elements have similar properties.

Explain why in terms of electronic structure.

---

---

---

---

(2 marks)

**(c)(ii)** There are **no** transition elements between the Group 2 element magnesium and the Group 3 element aluminum.

Explain why in terms of electronic structure.

---

---

(1 mark)

**Q6.** The periodic table may help you to answer some of these questions.

**(a)** Draw a ring around the correct answer to complete these sentences.

**(a)(i)** Dimitri Mendeleev attempted to classify

compounds.
elements.
mixtures.

(1 mark)

**(a)(ii)** He arranged them in order of their

atomic weight.  
boiling point.  
electrical conductivity.

(1 mark)

**(a)(iii)** They are now arranged in order of their

atomic (proton) number.  
atomic weight.  
mass number.

(1 mark)

**(b)** In the periodic table between Groups 2 and 3 there is a block of metals which includes chromium, iron and nickel.

**(b)(i)** Which **one** of the following is the correct name for this block of metals?

Draw a ring around the correct answer.

**ALKALI METALS**

**REACTIVE METALS**

**TRANSITION METALS**

(1 mark)

**Q7.** Read the information about the development of the periodic table and answer the questions that follow:



Johann Döbereiner was a chemist who realised there was a link between atomic weight and chemical properties. Although it was difficult to measure atomic weights accurately, by 1829 Döbereiner had arranged many elements with similar chemical reactions in groups of three. He noticed that the middle element had an atomic weight that was approximately the average of the other two. These groupings were known as triads. Three of these triads are shown below:

Li	7	S	32	Cl	35.5
Na	23	Se	79	Br	80
K	39	Te	128	I	127

As new elements were discovered, it became difficult to group them in triads, and it was left to others to build on Döbereiner's work. The result was the first periodic table, suggested by Dimitri Mendeleev in 1869.

Our modern periodic table has evolved from Mendeleev's Table. Lithium, sodium and potassium are still together in Group 1, and chlorine, bromine and iodine are in Group 7.

It was many years before chemists understood the nature of the transition elements.

The modern periodic table on the Data Sheet may help you to answer these questions.

**(a)** Döbereiner suggested that calcium (Ca), strontium (Sr) and barium (Ba) were also a triad.



Use relative atomic masses to explain why.

---

---

(1 mark)

**(b)** Suggest why Döbereiner's ideas were replaced by those of Mendeleev.

---

---

(1 mark)

**(c)** In terms of electronic structure, explain why:

**(c)(i)** Elements in the same group of the periodic table have similar chemical properties

---

---

(1 mark)

**(c)(ii)** Transition elements have similar properties even though they are not in the same group.

---

---

---

---

(2 marks)

Total marks (35)