

3.1 The Periodic Table & Periodic Trends

Question Paper

Course	DPIB Chemistry
Section	3. Periodicity
Topic	3.1 The Periodic Table & Periodic Trends
Difficulty	Easy

Time allowed: 40
Score: /30
Percentage: /100

Question 1a

a)

Define the term *first ionisation energy* and state what is meant by the term *periodicity*.

[1 mark]

Question 1b

b)

Distinguish between the terms *group* and *period*.

[1 mark]

Question 1c

c)

State the property that determines the order in which elements are arranged in the periodic table.

[1 mark]

Question 1d

d)

State the relationship between the electron arrangement of an element and its group and period in the periodic table.

[2 marks]

Question 2a

a)

Explain the following statement.

The first ionisation energy of potassium is smaller than the first ionisation energy of calcium.

[2 marks]

Question 2b

b)

Explain the following statement.

The first ionisation energy of potassium is larger in value than rubidium

[2 marks]

Question 2c

c)

Using section 8 of the data booklet, explain the trend of decreasing electronegativity values of the Group 17 elements from F to I.

[3 marks]

Question 2d

d)

Define the term *electronegativity*.

[1 mark]

Question 3a

a)

Define what is meant by the term *electron affinity*.

[1 mark]

Question 3b

b)

State whether first electron affinity is an exothermic or endothermic process.

[1 mark]

Question 3c

c)

Write an equation, including state symbols, for the first electron affinity of bromine.

[2 marks]

Question 3d

d)

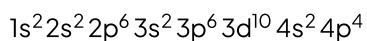
State whether the first electron affinity of I is more or less exothermic than Br.

[1 mark]

Question 4a

a)

An element has the following electron configuration.



i)

State which block of the periodic table the element is in.

ii)

State how many electrons it has in its outer shell.

[2 marks]

Question 4b

b)

Magnesium can be ionised to form a cation, Mg^+ .

i)

Write the electron configuration of an Mg^+

ii)

Define the term '*first ionisation energy*' in relation to magnesium.

[3 marks]

Question 4c

c)

The periodic table can be divided into blocks.

State why are silicon, carbon, oxygen and chlorine all classified as p-block elements.

[1 mark]

Question 4d

d)

This question is about the periodicity of period 3 elements.

i)

State the trend in atomic radius across period 3.

ii)

State the general trend in first ionisation energies across period 3.

[2 marks]

Question 5a

a)

Antimony, Sb, has atomic number 51.

Using section 6 of the data booklet, complete the table to show where antimony is found in the periodic table.

Period	Block

[1 mark]

Question 5b

b)

Identify the element that is in the d-block of the periodic table which forms a 3+ ion with the following electron configuration.



[1 mark]

Question 5c

c)

Ionisation energies can provide evidence for electron structure.

Write an equation, including state symbols, for the first ionisation energy of chlorine.

[1 mark]

Question 5d

An element Y has the following six first ionisation energies in kJ mol^{-1} . These are shown in the table below.

	1 st	2 nd	3 rd	4 th	5 th	6 th
Ionisation energy (kJ mol^{-1})	577	1820	2740	11 600	14 800	18 400

d)

State what group of the periodic table this element belongs to.

[1 mark]

