3.1 The Periodic Table & Periodic Trends

Question Paper

Course	DP IB Chemistry
Section	3. Periodicity
Topic	3.1 The Periodic Table & Periodic Trends
Difficulty	Medium

Time allowed: 20

Score: /10

Percentage: /100

Question 1

Electron configurations for atoms of different elements are shown below.

Which electron configuration represents the element with the largest first ionisation energy?

A. $1s^2 2s^2 2p^6 3s^2$

B. $1s^2 2s^2 2p^6 3s^2 3p^4$

C. $1s^2 2s^2 2p^6 3s^2 3p^6$

D. $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2$

[1 mark]

Question 2

The second ionisation energy of magnesium is 1451 kJ mol^{-1}.

Which equation correctly represents this statement?

A. $Mg^+(g) \rightarrow Mg^{2+}(g) + e^-$ $\Delta H^\ominus = -1451$ kJ mol^{-1}

B. $Mg^+(g) \rightarrow Mg^{2+}(g) + e^-$ $\Delta H^\ominus = +1451$ kJ mol^{-1}

C. $Mg(g) \rightarrow Mg^{2+}(g) + 2e^-$ $\Delta H^\ominus = +1451$ kJ mol^{-1}

D. $Mg(g) \rightarrow Mg^+(g) + e^-$ $\Delta H^\ominus = -1451$ kJ mol^{-1}

[1 mark]

Question 3

A periodic table is need for this question

X, **Y** and **Z** are consecutive elements in the third Period of the Periodic Table. Element **Y** has the highest first ionisation energy and also the lowest melting point of these three elements.

What could be the identities of **X**, **Y** and **Z**?

A. silicon, phosphorus, sulfur

B. sodium, magnesium, aluminium

C. aluminium, silicon, phosphorus

D. magnesium, aluminium, silicon

[1 mark]

Question 4

An element in the d block of the periodic table forms a +4 ion and has the electron configuration of [Ar] $3d^1$.

What is the identity of the element?

A. Chromium

B. Copper

C. Vanadium

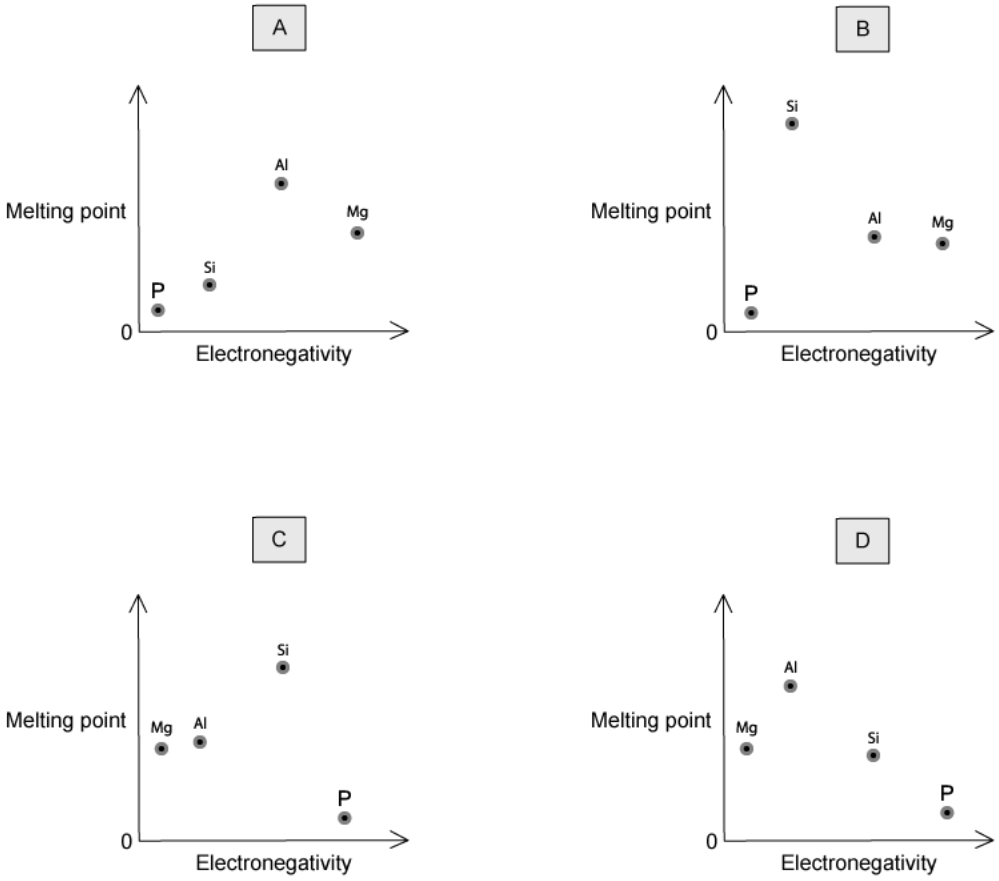
D. Silicon

[1 mark]

Question 5

A periodic table is needed to answer this question

Which graph correctly shows the relative melting points of period 3 elements plotted against their relative electronegativities?



[1 mark]

Question 6

For the following pairs, which has the greatest difference in size?

A. Li and Cl

B. Na and Br

C. Li^+ and Br^-

D. Na^+ and Cl^-

[1 mark]

Question 7

A periodic table is needed for this question.

Elements **X** and **Y** are Period 3 elements that react together to form compound **Z**. Element **X** has the second smallest atomic radius in Period 3. Apart from argon, there is only one element in Period 3 which has a lower melting point than element **Y**.

Which compound could be **Z**?

A. Na_2S

B. MgS

C. $MgCl_2$

D. PCl_3

[1 mark]

Question 8

Which of these elements would form the largest ion with a noble gas electron configuration?

A. Gallium

B. Bromine

C. Arsenic

D. Rubidium

[1 mark]

Question 9

Use a periodic table to deduce the correct information about the element tin, Sn (Z = 50)

	Number of occupied main energy levels	Number of electrons in the highest main energy level
A	4	4
B	4	14
C	5	4
D	5	14

[1 mark]

Question 10

The order of the elements in the periodic table is

A. according to relative atomic mass

B. by nuclear charge

C. by reactivity

D. in order of electronegativity

[1 mark]