

Name of the Student: _____

Max. Marks : 27 Marks

Time : 27 Minutes

Q1.

- (a) Complete the electronic configuration for the sodium ion,
- Na^+

 $1s^2$ _____

(1)

- (b) (i) Write an equation, including state symbols, to represent the process for which the energy change is the second ionisation energy of sodium.

(2)

- (ii) Explain why the second ionisation energy of sodium is greater than the second ionisation energy of magnesium.

(3)

- (iii) An element
- X**
- in Period 3 of the Periodic Table has the following successive ionisation energies.

	First	Second	Third	Fourth
Ionisation energies / kJ mol^{-1}	577	1820	2740	11600

Deduce the identity of element **X**.

(1)

- (c) State and explain the trend in atomic radius of the Period 3 elements from sodium to chlorine.

Trend _____

Explanation _____

(3)

- (d) Explain why sodium has a lower melting point than magnesium.

(3)

- (e) Sodium reacts with ammonia to form the compound NaNH_2 which contains the NH_2^- ion. Draw the shape of the NH_2^- ion, including any lone pairs of electrons. Name the shape made by the three atoms in the NH_2^- ion.

Shape of NH_2^-

Name of shape _____

(2)

- (f) In terms of its electronic configuration, give **one** reason why neon does not form compounds with sodium.

(1)

(Total 16 marks)

Q2.

This question is about the elements in Period 3 from Na to P

- (a) (i) Explain the meaning of the term *first ionisation energy*.

(2)

- (ii) State and explain the general trend in first ionisation energies for the elements Na to P

Trend _____

Explanation _____

(3)

- (iii) State which one of the elements from Na to P deviates from this general trend and explain why this occurs.

Trend _____

Explanation _____

(3)

- (b) State which one of the elements from Na to P has the highest melting point and explain your answer.

Element _____

Explanation _____

(3)

(Total 11 marks)