

Name of the Student: _____

Max. Marks : 19 Marks

Time : 19 Minutes

Q1.

(a) Nickel is a metal with a high melting point.

(i) State the block in the Periodic Table that contains nickel.

(1)

(ii) Explain, in terms of its structure and bonding, why nickel has a high melting point.

(2)

(iii) Draw a labelled diagram to show the arrangement of particles in a crystal of nickel. In your answer, include at least six particles of each type.

(2)

(iv) Explain why nickel is ductile (can be stretched into wires).

(1)

(b) Nickel forms the compound nickel(II) chloride (NiCl_2).

(i) Give the full electron configuration of the Ni^{2+} ion.

(1)

- (ii) Balance the following equation to show how anhydrous nickel(II) chloride can be obtained from the hydrated salt using SOCl_2 .
Identify **one** substance that could react with both gaseous products.



Substance _____

(2)

(Total 9 marks)

Q2.

The elements in Period 2 show periodic trends.

- (a) Identify the Period 2 element, from carbon to fluorine, that has the largest atomic radius. Explain your answer.

Element _____

Explanation _____

(3)

- (b) State the general trend in first ionisation energies from carbon to neon. Deduce the element that deviates from this trend and explain why this element deviates from the trend.

Trend _____

Element that deviates _____

Explanation _____

(4)

- (c) Write an equation, including state symbols, for the reaction that occurs when the first ionisation energy of carbon is measured.

(1)

- (d) Explain why the second ionisation energy of carbon is higher than the first ionisation energy of carbon.

(1)

- (e) Deduce the element in Period 2, from lithium to neon, that has the highest second ionisation energy.

(1)

(Total 10 marks)