9. The Periodic Table: Chemical Periodicity

9.1 Periodicity of physical properties

Paper 2

Question Paper

1 **(d)** Fig. 1.1 shows the variation in melting point of some Period 3 elements in their standard states at room temperature and pressure.

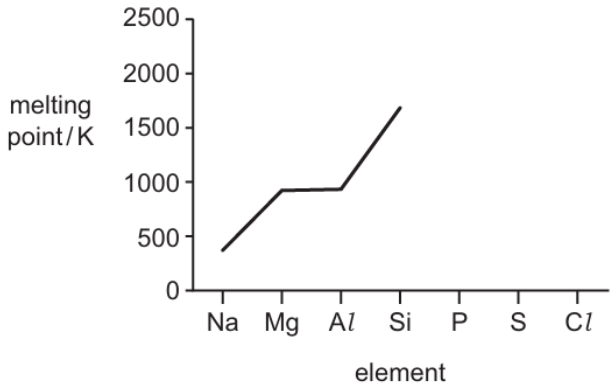

Fig. 1.1

(i) Explain why Si has a high melting point.

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..... [1]

(ii) Complete Fig. 1.1 to show the variation in the melting points of the elements P, S and Cl. [2]

2 The Group 14 elements show a change from non-metallic to metallic character down the group.

(a) Table 3.1 shows some properties of two Group 14 elements, C and Sn, in their standard states. The table is incomplete.

Table 3.1

	C (graphite)	Sn
state and appearance in standard state	grey shiny solid	silvery solid
electrical conductivity		good
type of bonding		metallic
type of structure	giant	

(i) Complete Table 3.1. [3]

3 **(d)** Complete Table 3.1 to show the properties of nitrogen and phosphorus in their standard states.

Table 3.1

	nitrogen	phosphorus
state and appearance of standard state	colourless gas	white solid
electrical conductivity		poor
type of bonding		
type of structure	simple	

[2]

4 The elements silicon, phosphorus and sulfur are in Period 3 of the Periodic Table.

(a) **(i)** Describe the variation in atomic radius from silicon to sulfur.

..... [1]

(ii) The melting point of silicon is 1410 °C. The melting point of sulfur is 113 °C.

Explain this difference.

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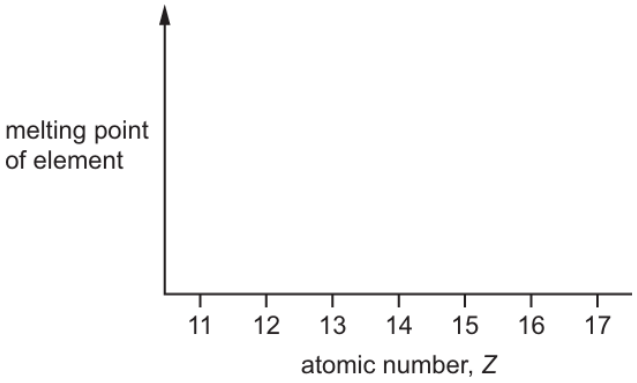
..... [3]

5 **(b)** Use the axes to sketch a graph that shows the trend in melting points of the elements with atomic numbers 11 to 17.



[2]