

Periodicity

Total mark –

Question: 1

1. Modern plasma television screens emit light when mixtures of noble gases, such as neon and xenon, are ionised.

The first ionisation energies of neon and xenon are shown in the table below.

element	1st ionisation energy / kJ mol^{-1}
neon	+2081
xenon	+1170

Explain why xenon has a lower first ionisation energy than neon.

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[Total 3 marks]

Question: 2

2. Chemists use the Periodic Table to predict the behaviour of elements.

Early attempts at developing a Periodic Table arranged elements in order of increasing atomic mass.

- (i) State which two elements from the **first twenty** elements of the modern Periodic Table are not arranged in order of increasing atomic mass.

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[1]

- (ii) Why does the modern Periodic Table **not** arrange some elements, such as those in (i), in order of increasing atomic mass?

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[1]

[Total 2 marks]

Question: 3

3. The table below shows the melting points and atomic radii of the elements in Period 3, Na to Cl.

element	Na	Mg	Al	Si	P	S	Cl
melting point / °C	98	639	660	1410	44	113	-101
atomic radius / pm	186	160	143	118	110	102	99

$$1\text{pm} = 1 \times 10^{-12} \text{ m}$$

- (a) (i) Explain the difference in melting point for the elements Na and Mg.

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[3]

- (ii) Sulfur exists as S_8 molecules and chlorine as Cl_2 molecules. Use this information to explain the difference in their melting points.

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- (b) Explain the decrease in the atomic radii across the period from Na to Cl.

In your answer, you should use appropriate technical terms, spelt correctly.

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[Total 8]

Question: 4

4. (i) Explain why the first ionisation energies show a general increase from Li to Ne.

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- (ii) Explain the difference between the first ionisation energies of Li and Na.



In your answer, you should use appropriate technical terms, spelt correctly.

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[Total 6 marks]