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CAIE A LEVEL Chemistry Topic Questions / 9701

1.4.2-Trends-in-Ionisation-Energies-Across-Periods-and-Groups-set-1-qp

Total Questions: 9

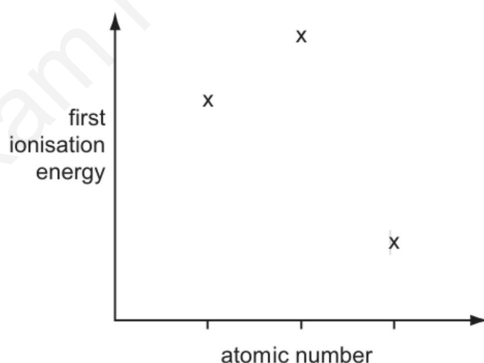
Note:

- For questions with answer choices as statements 1, 2 and 3, follow these instructions for selecting options A/B/C/D:
- A= 1, 2 and 3 are correct
- B=1 and 2 only are correct
- C=2 and 3 only are correct
- D=1 only is correct

Questions

Question 1:

Three successive elements in the Periodic Table have first ionisation energies which have the pattern shown in the diagram.



What could be the first element of this sequence?

- A** C **B** N **C** F **D** Na

Question 2:

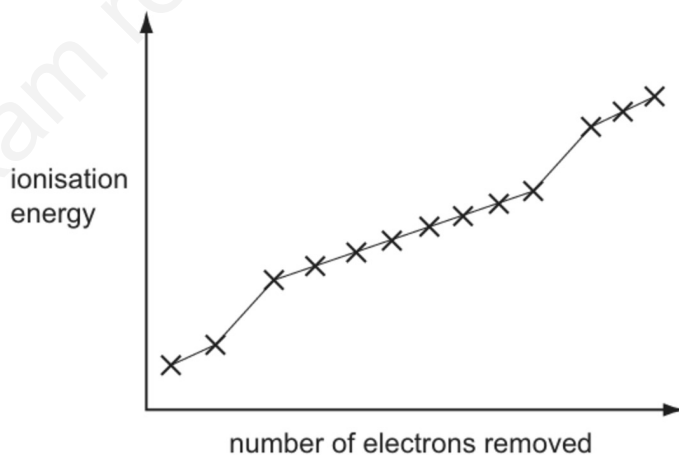
Which statement is correct?

- A** The first ionisation energy of chlorine is more than the first ionisation energy of argon.
- B** The second ionisation energy of calcium is more than the second ionisation energy of magnesium.
- C** The second ionisation energy of sulfur is equal to the first ionisation energy of phosphorus.
- D** The eighth ionisation energy of chlorine is more than the first ionisation energy of neon.

Questions (Continued)

Question 3:

The graph shows the first thirteen ionisation energies for element X.



What can be deduced about element X from the graph?

- A It is in the second period (Li to Ne) of the Periodic Table.
- B It is a d-block element.
- C It is in Group II of the Periodic Table.
- D It is in Group III of the Periodic Table.

Question 4:

Which statement about the first ionisation energies of magnesium and neon is correct?

- A Magnesium has the greater numerical value and both are endothermic.
- B Magnesium has the greater numerical value and both are exothermic.
- C Neon has the greater numerical value and both are endothermic.
- D Neon has the greater numerical value and both are exothermic.

Questions (Continued)

Question 5:

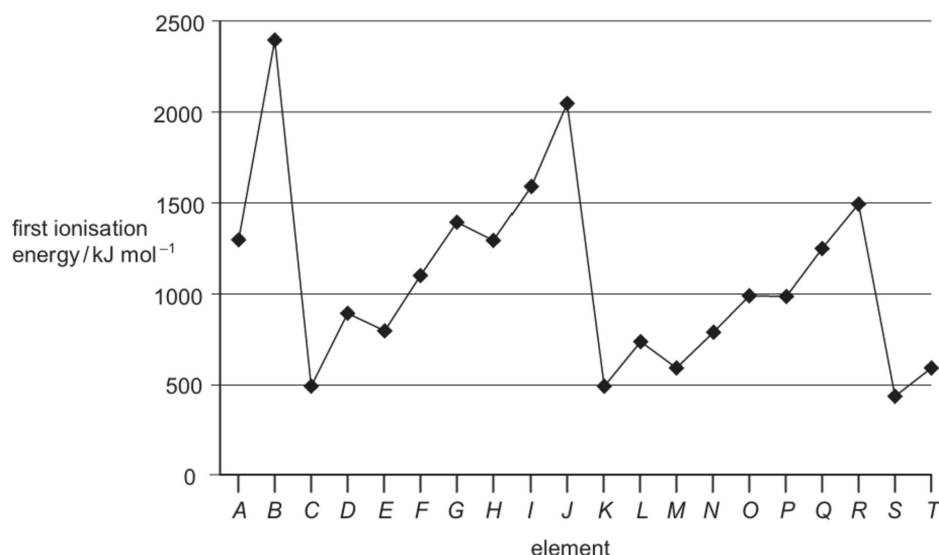
Consecutive elements X, Y, Z are in Period 3 of the Periodic Table. Element Y has the highest first ionisation energy and the lowest melting point.

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

- A sodium, magnesium, aluminium
- B magnesium, aluminium, silicon
- C aluminium, silicon, phosphorus
- D silicon, phosphorus, sulphur

Question 6:

The first ionisation energies of successive elements in the Periodic Table are represented in the graph.



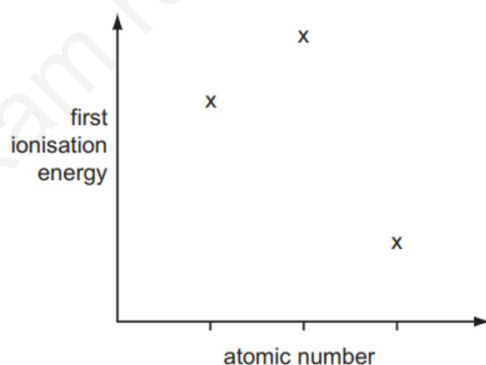
Which of these statements about this graph are correct?

- 1 Elements B, J and R are in Group 0 of the Periodic Table.
- 2 Atoms of elements D and L contain 2 electrons in their outer shells.
- 3 Atoms of elements G and O contain half-filled p orbitals.

Questions (Continued)

Question 7:

Three successive elements in the Periodic Table have first ionisation energies which have the pattern shown in the diagram.



What could be the first element of this sequence?

- A** C **B** N **C** F **D** Na

Question 8:

Use of the Data Booklet is relevant to this question.

The elements radon (Rn), francium (Fr) and radium (Ra) have consecutive proton numbers in the Periodic Table.

What is the order of their first ionisation energies?

	least endothermic	→	most endothermic
A	Fr	Ra	Rn
B	Fr	Rn	Ra
C	Ra	Fr	Rn
D	Rn	Ra	Fr

Questions (Continued)

Question 9:

The relative first ionisation energies of four elements with consecutive atomic numbers below 20 are shown on the graph.

One of the elements reacts with hydrogen to form a covalent compound with formula HX .

Which element could be X?

