

3.1 The Periodic Table & Periodic Trends

Question Paper

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| Course | DPIB Chemistry |
| Section | 3. Periodicity |
| Topic | 3.1 The Periodic Table & Periodic Trends |
| Difficulty | Easy |

Time allowed: 20
Score: /10
Percentage: /100

Question 1

Which of the following statements describes first ionisation energy?

- A. The energy required to remove one mole of electrons from one mole of gaseous atoms
- B. The energy required to remove the outermost electron from each atom in one mole of gaseous atoms
- C. The energy required to remove the outermost electron from each atom in one mole of atoms
- D. The energy required to produce one mole of ions from one mole of gaseous atoms

[1 mark]

Question 2

A periodic table is needed for this question

Sodium sulfide, Na_2S , is a reactive yellow solid, produced when sodium and sulfur react together.

How do the ionic radius and atomic radius of sodium compare with those of sulfur?

| | ionic radius | atomic radius |
|----------|-----------------|-----------------|
| A | sodium < sulfur | sodium < sulfur |
| B | sodium < sulfur | sodium > sulfur |
| C | sodium > sulfur | sodium > sulfur |
| D | sodium > sulfur | sodium < sulfur |

[1 mark]

Question 3

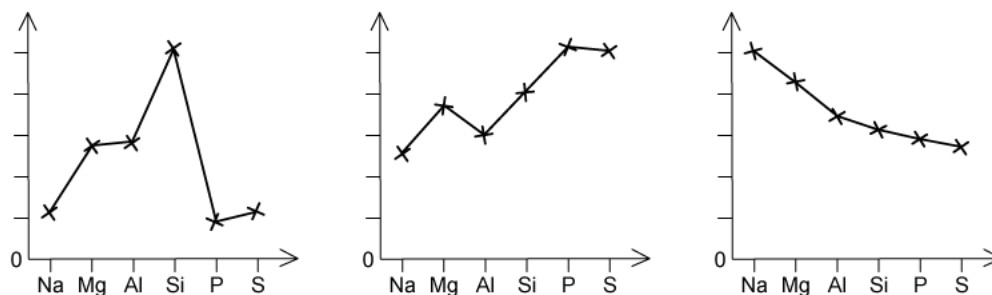
Which property below decreases generally across the second period?

- A. Atomic number
- B. Atomic radius
- C. Electronegativity
- D. Ionisation energy

[1 mark]

Question 4

The trends in three physical properties of the elements of period 3 are shown in the graphs



Which physical property is **not** illustrated?

- A. Electrical conductivity
- B. Atomic radius
- C. Melting point
- D. First ionisation energy

[1 mark]

Question 5

Silicon reacts with chlorine gas to produce silicon chloride.

How many moles of chlorine gas are needed to react with 1 mole of silicon?

- A. 2
- B. 3
- C. 4
- D. 5

[1 mark]

Question 6

This question refers to isolated gaseous species.

The species O^{2-} , Ne and Mg^{2+} are isoelectronic.

In which order do their radii increase?

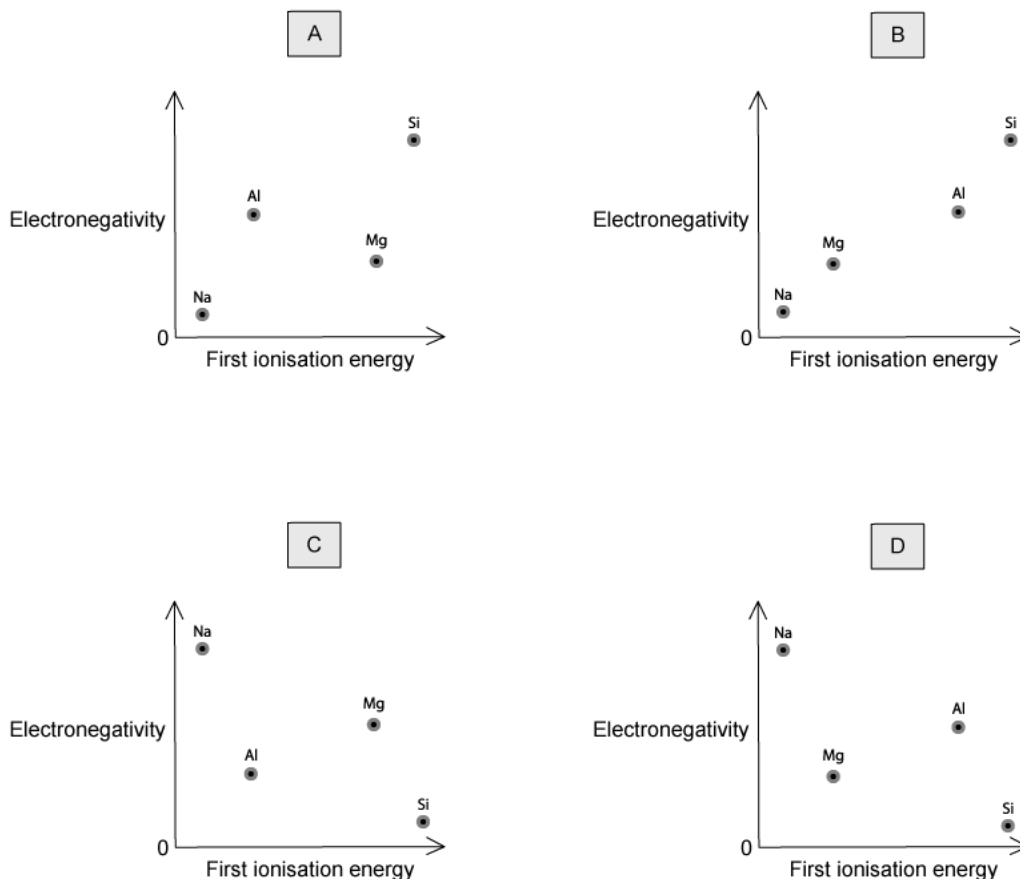
| | Smallest | → | Largest |
|----------|-----------|----------|-----------|
| A | Mg^{2+} | O^{2-} | Ne |
| B | Ne | O^{2-} | Mg^{2+} |
| C | Mg^{2+} | Ne | O^{2-} |
| D | O^{2-} | Ne | Mg^{2+} |

[1 mark]

Question 7

Use of the periodic table is relevant to this question.

Which graph correctly shows the electronegativity of the elements Na, Mg, Al and Si, from period 3, plotted against their first ionisation energies?



[1 mark]

Question 8

Which period 3 element from sodium to silicon, has the largest atomic radius?

- A. Magnesium
- B. Sodium
- C. Silicon
- D. Aluminium

[1 mark]

Question 9

What is the correct classification for the element zirconium, Zr?

- A. s block
- B. d block
- C. f block
- D. p block

[1 mark]

Question 10

Why is the first ionisation energy of magnesium higher than the second ionisation energy?

- A. Less shielding
- B. Ionic radius increases
- C. Nuclear charge is increasing
- D. Greater attraction between positive nucleus and outer electron

[1 mark]