CLASS 11 CHEMISTRY EXTRA QUESTIONS

Class 11 Chemistry Chapter 3 Classification of Elements and Periodicity in Properties – Extra Questions with Answers

Extra practice questions for Class 11 Chemistry Chapter 3 (Classification of Elements and Periodicity in Properties), beyond the textbook. These Class 11 Chemistry Chapter 3 important questions are handy for last-minute exam practice.

Contents

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Very Short Answer Questions (1 mark)

Q1. Who proposed the modern periodic law based on atomic number?
Ans: Henry Moseley.

Q2. How many periods are there in the modern periodic table?
Ans: 7.

Q3. Which block do transition elements belong to?
Ans: d-block.

Q4. Define electronegativity.
Ans: The tendency of an atom in a molecule to attract the shared pair of electrons toward itself.

Q5. How does ionization enthalpy generally vary across a period?
Ans: It generally increases from left to right.

Short Answer Questions (2–3 marks)

Q6. Arrange Na, Mg, Al in increasing order of atomic radius, with reasoning.
Ans: Al < Mg < Na. As we move left to right across period 3, nuclear charge increases while shielding stays similar, pulling electrons closer and decreasing atomic radius.

Q7. Why is the ionization enthalpy of nitrogen higher than that of oxygen, despite oxygen being to the right of nitrogen?
Ans: Nitrogen has a stable, exactly half-filled 2p3 configuration, which offers extra stability, making it harder to remove an electron compared to oxygen (2p4), where removing one electron actually relieves some electron-electron repulsion in the paired orbital.

Q8. Why does electronegativity generally decrease down a group?
Ans: Down a group, atomic radius increases due to added electron shells, so the nucleus has a weaker pull on the shared bonding electrons (which are farther away), reducing electronegativity.

Higher-Order Thinking / Application Questions

Q9. Explain why the first ionization enthalpy of magnesium (Z=12) is higher than that of aluminium (Z=13), even though aluminium has a greater nuclear charge and comes after magnesium in the periodic table.
Ans: Magnesium has the electronic configuration [Ne]3s2, a fully filled 3s subshell, which provides extra stability (filled subshell stability). Aluminium has the configuration [Ne]3s2 3p1, where the single 3p electron is at a slightly higher energy and is more shielded by the 3s2 electrons than a typical valence electron would be, making it comparatively easier to remove despite aluminium's greater nuclear charge. Since removing this 3p electron doesn't disturb magnesium's stable filled 3s2 arrangement analog, aluminium's first ionization enthalpy ends up being lower than magnesium's, illustrating an exception to the general left-to-right increasing trend caused by subshell stability effects.

Q10. Using periodic trends, predict and justify which would have a more negative electron gain

enthalpy: chlorine or fluorine, considering both the general periodic trend and any exceptions.
Ans: Based on the general periodic trend alone, electron gain enthalpy becomes more negative moving up a group (and fluorine, being smaller with higher effective nuclear charge per electron added, might be expected to have the most negative value in its group). However, fluorine is an exception: because of its very small atomic size, the added electron experiences significant inter-electronic repulsion in the already compact 2p subshell, making the electron gain enthalpy of fluorine less negative than expected. Chlorine, being larger, can accommodate the extra electron with less repulsion in its more spacious 3p subshell while still benefiting from strong effective nuclear attraction, giving chlorine the most negative electron gain enthalpy in the halogen group, higher in magnitude than fluorine's — illustrating that atomic-size-driven electron repulsion can override the simple periodic trend for small, electronegative atoms like fluorine.

Class 11 Chemistry Chapter 3 – Solutions and Notes

For complete step-by-step answers and a quick summary, check the Class 11 Chemistry Chapter 3 Solutions and Class 11 Chemistry Chapter 3 Revision Notes.

See also: Chapter 1 | Chapter 2 | Chapter 3

Practice more: Chapter 1 | Chapter 2

Quick revision: Chapter 1 | Chapter 2