

Classification of Elements and Periodicity in Properties — Assignment 1

Class 11 Chemistry · Topic-wise question bank covering every concept of the chapter · Narayan Gurukul Academy

Instructions: (1) Attempt all questions. This worksheet walks through every concept of the chapter, topic by topic.
(2) The interactive MCQ version of these questions (with instant answer reveal) is available on the notes page.
(3) Universal values: $g = 10 \text{ m/s}^2$ unless stated. Give answers with correct SI units.

From Mendeleev to the Modern Periodic Law

MCQ Questions (choose the correct option)

- The modern periodic law states that the properties of elements are a periodic function of their
 - atomic numbers
 - atomic masses
 - densities
 - valencies
- Mendeleev arranged the elements in order of increasing
 - atomic mass
 - atomic number
 - density
 - valency
- The long form of the periodic table has
 - 18 groups and 7 periods
 - 8 groups and 7 periods
 - 18 groups and 8 periods
 - 16 groups and 7 periods
- The main defect of Mendeleev's periodic table was
 - the ambiguous position of hydrogen and isotopes
 - the arrangement of noble gases
 - the number of groups
 - the use of valency

1 Mark Questions

- State the modern periodic law.
- How many groups and periods are there in the modern periodic table?
- On what basis did Mendeleev arrange the elements?

2 Mark Questions

- State the modern periodic law and explain how it improved upon Mendeleev's periodic law.
- State the main defects of Mendeleev's periodic table.

3 Mark Questions

- Explain the limitations of Mendeleev's periodic table and how the modern periodic law overcame them.
- Describe the general structure of the modern periodic table and explain the basis of classification of elements into groups and periods.

Electronic Configuration and the Blocks

MCQ Questions (choose the correct option)

1. Elements of Group 1 belong to the
 - (A) s-block
 - (B) p-block
 - (C) d-block
 - (D) f-block
2. The d-block elements are also called
 - (A) transition elements
 - (B) representative elements
 - (C) alkali metals
 - (D) halogens
3. The general outer electronic configuration of the p-block elements is
 - (A) $ns^2 np^{1-6}$
 - (B) ns^{1-2}
 - (C) $(n-1)d^{1-10} ns^{1-2}$
 - (D) $(n-2)f^{1-14}$
4. The f-block elements are also called
 - (A) inner transition elements
 - (B) transition elements
 - (C) alkali metals
 - (D) noble gases

1 Mark Questions

1. What are representative elements?
2. Write the general outer electronic configuration of the s-block elements.
3. Name the block to which the halogens belong.

2 Mark Questions

1. Classify the elements into s, p, d and f blocks with their general outer electronic configurations.
2. What are transition elements? Give an example and write its outer electronic configuration.

3 Mark Questions

1. Explain the classification of elements into s, p, d and f blocks on the basis of their electronic configurations, giving examples of each.
2. Write the electronic configurations of Na, Cl and Fe and state the block to which each element belongs.

Atomic and Ionic Radii**MCQ Questions (choose the correct option)**

1. Atomic radius generally decreases across a period from left to right because of
 - (A) an increase in nuclear charge
 - (B) an increase in atomic mass
 - (C) a decrease in nuclear charge
 - (D) the addition of shells

2. Atomic radius increases down a group because of

- (A) the addition of new shells
- (B) an increase in nuclear charge
- (C) a decrease in shielding
- (D) a decrease in mass

3. The radius of a cation is

- (A) smaller than its atom
- (B) larger than its atom
- (C) equal to its atom
- (D) independent of charge

4. The radius of an anion is

- (A) larger than its atom
- (B) smaller than its atom
- (C) equal to its atom
- (D) always zero

1 Mark Questions

1. How does atomic radius change across a period?
2. How does atomic radius change down a group?
3. Compare the size of a cation with its parent atom.

2 Mark Questions

1. Explain the variation of atomic radius across a period and down a group.
2. Arrange the following in increasing order of size: Na, Na^+ , Cl, Cl^- . Justify your answer.

3 Mark Questions

1. Explain, with reasons, the trends in atomic and ionic radii across a period and down a group in the periodic table.
2. Compare the sizes of cations, anions and their parent atoms, and account for the differences.

Ionisation Enthalpy

MCQ Questions (choose the correct option)

1. Ionisation enthalpy is the energy required to remove
 - (A) an electron from a gaseous atom
 - (B) a proton
 - (C) a neutron
 - (D) the nucleus
2. Ionisation enthalpy generally increases across a period because of
 - (A) an increase in nuclear charge
 - (B) an increase in size
 - (C) an increase in shielding
 - (D) a decrease in nuclear charge
3. Ionisation enthalpy decreases down a group because of
 - (A) an increase in atomic size
 - (B) an increase in nuclear charge

- (C) a decrease in shielding
 - (D) greater effective nuclear charge
4. The first ionisation enthalpy of an element is always
- (A) less than its second ionisation enthalpy
 - (B) greater than its second ionisation enthalpy
 - (C) equal to its second
 - (D) zero

1 Mark Questions

1. Define first ionisation enthalpy.
2. How does ionisation enthalpy change across a period?
3. How does ionisation enthalpy change down a group?

2 Mark Questions

1. Define ionisation enthalpy and explain its variation across a period and down a group.
2. Explain why the first ionisation enthalpy of an element is less than its second ionisation enthalpy.

3 Mark Questions

1. Explain the factors affecting ionisation enthalpy and the trends in it across a period and down a group.
2. Why is the ionisation enthalpy of nitrogen greater than that of oxygen? Explain with the help of electronic configurations.

Electron Gain Enthalpy and Electronegativity

MCQ Questions (choose the correct option)

1. Electron gain enthalpy is the enthalpy change when
 - (A) an electron is added to a gaseous atom
 - (B) an electron is removed
 - (C) a proton is added
 - (D) a molecule is formed
2. Electronegativity is the tendency of an atom to
 - (A) attract a shared pair of electrons
 - (B) lose electrons
 - (C) gain protons
 - (D) form ions
3. The most electronegative element in the periodic table is
 - (A) fluorine
 - (B) oxygen
 - (C) chlorine
 - (D) nitrogen
4. Across a period, electronegativity generally
 - (A) increases
 - (B) decreases
 - (C) remains constant
 - (D) becomes zero

1 Mark Questions

1. Define electron gain enthalpy.
2. Define electronegativity.
3. Which is the most electronegative element?

2 Mark Questions

1. Define electron gain enthalpy and electronegativity and state how each varies across a period.
2. Why is the electron gain enthalpy of chlorine more negative than that of fluorine?

3 Mark Questions

1. Explain the terms electron gain enthalpy and electronegativity and describe their periodic trends with reasons.
2. Account for the variation of electron gain enthalpy and electronegativity across a period and down a group, giving exceptions.

Trends in Chemical and Physical Properties**MCQ Questions (choose the correct option)**

1. The metallic character of elements generally
 - (A) decreases across a period and increases down a group
 - (B) increases across a period
 - (C) is constant
 - (D) decreases down a group
2. The non-metallic character of elements generally
 - (A) increases across a period
 - (B) decreases across a period
 - (C) is constant
 - (D) increases down a group
3. The valency of an element across a period from left to right
 - (A) increases then decreases
 - (B) increases only
 - (C) decreases only
 - (D) is constant
4. Diagonal relationships in the periodic table arise because of similar
 - (A) electronegativity and size
 - (B) atomic mass
 - (C) number of neutrons
 - (D) density

1 Mark Questions

1. How does metallic character change across a period?
2. How does non-metallic character change down a group?
3. What is meant by a diagonal relationship?

2 Mark Questions

1. Explain the variation of metallic and non-metallic character across a period and down a group.

2. Give one example each to illustrate the diagonal relationship in the periodic table.

3 Mark Questions

1. Describe the periodic trends in metallic character, non-metallic character and valency with reasons.
2. Explain the trends in chemical reactivity of alkali metals and halogens across the periodic table.