

Classification of Elements and Periodicity in Properties — CBSE Pattern Test 1

Class 11 Chemistry · 90 minutes · 40 marks · Sections A–D with answer key · Narayan Gurukul Academy

Test 1 — CBSE Pattern (90 minutes, 40 marks)

Class 11 Chemistry · Classification of Elements and Periodicity in Properties · Narayan Gurukul Academy (ClassApna)

General Instructions: (1) This paper has four sections — Section A (1×10), Section B (2×4), Section C (3×4) and Section D (5×2) — total 40 marks. Time allowed: 90 minutes.

(2) All questions are compulsory. No overall choice is given; internal choice, where allowed, is clearly marked.

(3) For MCQ questions choose the single correct option; for VSA answers write a single line.

(4) Take $g = 10 \text{ m/s}^2$. All symbols carry their usual meaning. Use of a calculator is not permitted.

Section A — MCQ & VSA ($10 \times 1 = 10$ marks)

- 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
- Elements of Group 1 belong to the
 - s-block
 - p-block
 - d-block
 - f-block
- The d-block elements are also called
 - transition elements
 - representative elements
 - alkali metals
 - halogens
- Atomic radius generally decreases across a period from left to right because of
 - an increase in nuclear charge
 - an increase in atomic mass
 - a decrease in nuclear charge
 - the addition of shells
- Ionisation enthalpy generally increases across a period because of
 - an increase in nuclear charge
 - an increase in size
 - an increase in shielding
 - a decrease in nuclear charge
- Electronegativity is the tendency of an atom to

- (A) attract a shared pair of electrons
 - (B) lose electrons
 - (C) gain protons
 - (D) form ions
8. The most electronegative element in the periodic table is
- (A) fluorine
 - (B) oxygen
 - (C) chlorine
 - (D) nitrogen
9. State the modern periodic law.
10. Define first ionisation enthalpy.

Section B — Short Answer I ($4 \times 2 = 8$ marks)

11. How many groups and periods are there in the modern periodic table?
12. Arrange Na, Na^+ , Cl, Cl^- in increasing order of size.
13. Write the general outer electronic configuration of the p-block elements.
14. Explain why the second ionisation enthalpy is greater than the first.

Section C — Short Answer II ($4 \times 3 = 12$ marks)

15. Explain the limitations of Mendeleev's periodic table and how the modern periodic law overcame them.
16. Explain the classification of elements into s, p, d and f blocks with examples.
17. Explain the trends in atomic and ionic radii across a period and down a group.
18. Explain the factors affecting ionisation enthalpy and its trends across a period and down a group.

Section D — Long Answers ($2 \times 5 = 10$ marks)

19. Explain the periodic trends in atomic radius, ionisation enthalpy, electron gain enthalpy and electronegativity, giving reasons for each trend.
20. Describe the structure of the modern periodic table, state the basis of classification into groups and periods, and explain the diagonal relationship with examples.

Answer Key (Marking Scheme)

- Q1 — (A) atomic numbers. Q2 — (A) atomic mass. Q3 — (A) s-block. Q4 — (A) transition elements.
- Q5 — (A) an increase in nuclear charge. Q6 — (A) an increase in nuclear charge. Q7 — (A) attract a shared pair of electrons. Q8 — (A) fluorine.
- Q9 — Properties of elements are a periodic function of their atomic numbers.
- Q10 — Energy required to remove an electron from a gaseous atom.
- Q11 — 18 groups and 7 periods.
- Q12 — $\text{Na}^+ < \text{Na} < \text{Cl} < \text{Cl}^-$.
- Q13 — $ns^2 np^{1-6}$.
- Q14 — Removing an electron from a positively charged ion requires more energy.
- Q15 — Mass-based ordering gave anomalies; atomic-number ordering removed them.

Q16 — s, p, d, f blocks by outer configuration (Na s-block; Cl p-block; Fe d-block; Ce f-block).

Q17 — Decrease across a period, increase down a group; cations smaller, anions larger.

Q18 — Nuclear charge, size and shielding; increases across, decreases down.

Q19 — Trends and reasons as in notes.

Q20 — 18 groups, 7 periods; diagonal relationship e.g. Li–Mg, Be–Al.