

QUICK DRILL · CBSE CLASS 11

Classification of Elements and Periodicity in Properties

Chemistry · Chapter 3 · 15 MCQs · 20 minutes · PYQ-tagged with time budgets

DATE	TOTAL MARKS 15	DURATION 20 min	MARKING +1 / 0	TARGET ≥ 12/15
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OBJECTIVES

Reinforce the four core topics of Classification of Elements and Periodicity in Properties via 15 PYQ-derived MCQs. Identify weak sub-topics via concept-node IDs (see answer key). Build per-question time budget habit.

INSTRUCTIONS

Attempt all 15. Time budget shown per Q (use it as pacing guide). Mark answers (A/B/C/D) in the margin. Answer key + explanations on the last page. **Don't peek — score yourself honestly.**

SECTION · QUICK DRILL

Q 1-15 · 20 MIN

Q1. The modern periodic law is based on:

- (A) Atomic mass
(C) Atomic radius

- (B) Atomic number
(D) Atomic volume

PYQ 2018 · Delhi · 1 m · 30s

Q2. Which scientist arranged elements by atomic mass and left gaps for undiscovered elements?

- (A) Newlands
(C) Moseley

- (B) Mendeleev
(D) Döbereiner

PYQ 2019 · AI · 1 m · 30s

Q3. The IUPAC symbol for the element with $Z = 120$ is:

- (A) Ubn
(C) Bun

- (B) Ubu
(D) Unb

PYQ 2022 · Delhi · 1 m · 30s

Q4. An element with configuration $[\text{Ar}] 3d^5 4s^2$ belongs to:

- (A) Period 3, Group 7, p-block
(C) Period 4, Group 5, s-block

- (B) Period 4, Group 7, d-block
(D) Period 3, Group 5, d-block

PYQ 2024 · Delhi · 1 m · 45s

Q5. Across a period, atomic radius generally:

- (A) Increases
(C) Remains constant

- (B) Decreases
(D) First increases then decreases

PYQ 2019 · Delhi · 1 m · 30s

Q6. Down a group, atomic radius:

- (A) Decreases
(C) Remains constant

- (B) Increases
(D) Decreases then increases

PYQ 2020 · AI · 1 m · 30s

Q7. Among the following isoelectronic species, the largest radius belongs to:

- (A) Al^{3+}
(C) Na^+

- (B) Mg^{2+}
(D) O^{2-}

PYQ 2019 · AI · 1 m · 45s

Q8. The first ionisation enthalpy of nitrogen is greater than that of oxygen because:

- (A) Nitrogen has higher atomic number
(C) Oxygen is more electronegative

- (B) Nitrogen has a half-filled $2p^3$ (extra stable)
(D) Nitrogen has a smaller atomic radius

PYQ 2020 · Delhi · 1 m · 45s

Q9. The first ionisation enthalpy of beryllium is greater than that of boron because:

- (A) Be has fully-filled $2s^2$
(C) Be has more neutrons

- (B) B has higher atomic mass
(D) B is in a different period

PYQ 2021 · Delhi · 1 m · 30s

Q10. The element with the highest electronegativity on the Pauling scale is:

- (A) Cl (B) O
(C) F (D) N

PYQ 2018 · AI · 1 m · 30s

Q11. The electron gain enthalpy of chlorine is more negative than that of fluorine because:

- (A) Cl is heavier (B) Cl has more protons
(C) F has small 2p shell → high e-e repulsion when an e- is added (D) F has more electrons

PYQ 2023 · Term-2 · 1 m · 45s

Q12. Which of the following pairs shows a diagonal relationship?

- (A) Li and Na (B) Be and Mg
(C) Li and Mg (D) Na and K

PYQ 2022 · Delhi · 1 m · 30s

Q13. An element X has configuration [Ne] 3s² 3p⁵. Its block, period and group are:

- (A) p-block, period 3, group 7 (B) p-block, period 3, group 17
(C) s-block, period 3, group 7 (D) d-block, period 3, group 17

PYQ 2024 · AI · 1 m · 45s

Q14. Among Li, Be, B, C in period 2, the element with the highest first ionisation enthalpy is:

- (A) Li (B) Be
(C) B (D) C

PYQ 2021 · Delhi · 1 m · 30s

Q15. The number of elements in the 4th period of the modern periodic table is:

- (A) 8 (B) 18
(C) 32 (D) 10

PYQ 2020 · Delhi · 1 m · 30s

ANSWER KEY & EXPLANATIONS

Q 1-15 · MARK YOUR SCORE

Q1. Answer: B

Moseley (1913) showed that fundamental property is atomic number (Z = number of protons), not mass. Modern law: 'Properties are a periodic function of atomic number.'

Q2. Answer: B

Mendeleev (1869) arranged 63 elements by atomic mass, left gaps for eka-aluminium (Ga), eka-silicon (Ge), eka-boron (Sc) — predicted properties accurately.

Q3. Answer: A

Digits 1-2-0 → un-bi-nil-ium = Unbinilium. Symbol uses first letter of each root → U-b-n = Ubn.

Q4. Answer: B

Highest $n = 4$ → Period 4. Last e- in 3d → d-block. Group = $(n-1)d + ns = 5 + 2 = 7$. This is Mn ($Z=25$).

Q5. Answer: B

Across a period (left → right), Z increases but electrons added to the SAME shell. Z_{eff} rises → electron cloud pulled in → radius DECREASES.

Q6. Answer: B

Down a group, a new principal shell is added each period. Increase in n outweighs the increase in Z due to shielding by inner electrons.

Q7. Answer: D

All are isoelectronic (10 e-). Lower Z → less nuclear pull → larger radius. Z values: Al=13, Mg=12, Na=11, O=8. O^{2-} has lowest Z → largest radius.

Q8. Answer: B

N: $2p^3$ (half-filled, extra stable via exchange energy + symmetric distribution). Removing an e- breaks this stability. O ($2p^4$) loses one e- to attain $2p^3$ → easier.

Q9. Answer: A

Be: [He] $2s^2$ (fully-filled 2s, extra stable). B: [He] $2s^2 2p^1$ — the 2p electron is at higher energy and less penetrating, so easier to remove. Hence $IE_1(\text{Be}) > IE_1(\text{B})$.

Q10. Answer: C

Fluorine: EN = 4.0 (maximum on Pauling scale). EN trend: increases across period, decreases down group → top-right of table (F) is highest.

Q11. Answer: C

F has a compact 2p valence shell. Adding an extra e⁻ forces high inter-electronic repulsion, partly offsetting nuclear attraction. Cl's 3p is larger → less repulsion → more energy released.

Q12. Answer: C

Diagonal relationship pairs: Li↔Mg, Be↔Al, B↔Si. They show similar polarising power and EN despite being in different groups/periods.

Q13. Answer: B

Last e⁻ in 3p → p-block. Highest n = 3 → period 3. p-block group = 10 + p-electrons = 10 + 5 = 15... wait — correction: for p-block in 1-18 numbering, group = 12 + p-electrons. p⁵ → group 17 (halogen). This is Cl.

Q14. Answer: D

Order across period 2: Li (520) < B (801) < Be (899) < C (1086) kJ/mol. C is highest of these four. (Note: Be > B is the famous anomaly.)

Q15. Answer: B

Period 4 fills 4s (2) + 3d (10) + 4p (6) = 18 subshell electrons → 18 elements (K through Kr).