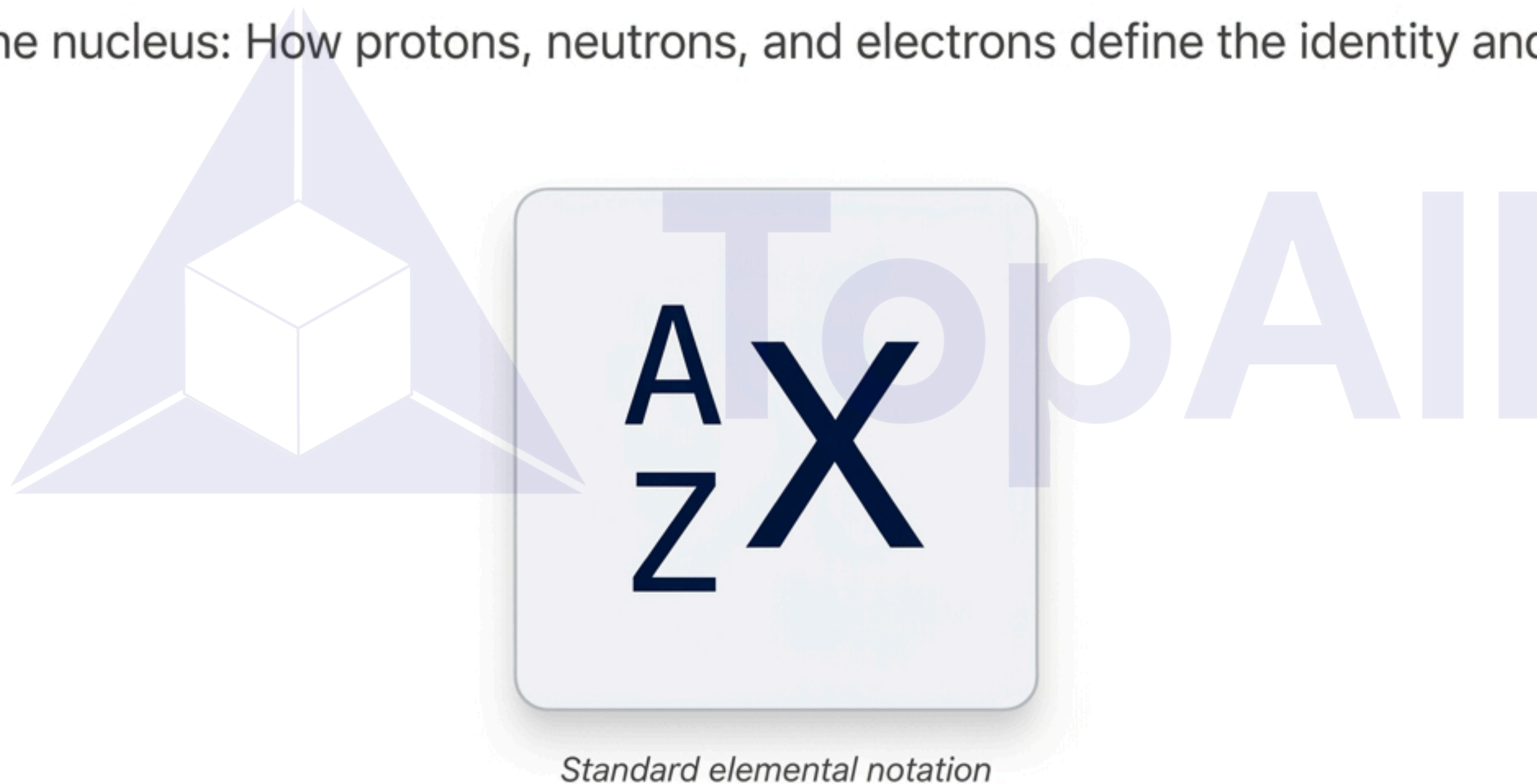


2.2.3 Atomic Number and Mass Number

Decoding the nucleus: How protons, neutrons, and electrons define the identity and mass of an atom.



The Identity of an Element: Atomic Number (**Z**)

Equation (2.3)

$$\mathbf{Z} = \text{number of protons } \mathbf{p^+}$$

The Rule

The atomic number (**Z**) is exclusively determined by the number of protons in the atom's nucleus.

The Implication

Z acts as the fundamental fingerprint of an element. For example, Hydrogen always has **Z**=1, and Sodium always has **Z**=11.

All atoms of the same element share the exact same Atomic Number.

The Weight of the Nucleus: Mass Number (**A**)

Equation (2.4)

$$\mathbf{A = Z + n}$$

Mass Number = Protons $\mathbf{p^+}$ + Neutrons $\mathbf{n^0}$

The Composition

While positive charge comes only from protons, the mass of the nucleus comes from both protons and neutrons combined.

The Calculation

To find the number of neutrons (n), simply rearrange the formula mathematically:

$$\mathbf{n = A - Z}$$

Electrons have negligible mass, so the Mass Number (A) focuses entirely on the heavy particles inside the nucleus.



You've Learned the Theory. Let's Test Them Now.

$$E=mc^2$$



Turn theory into marks with **unlimited MCQs, smart analysis, and focused revision.**

Practice Now



At prep.topall.app

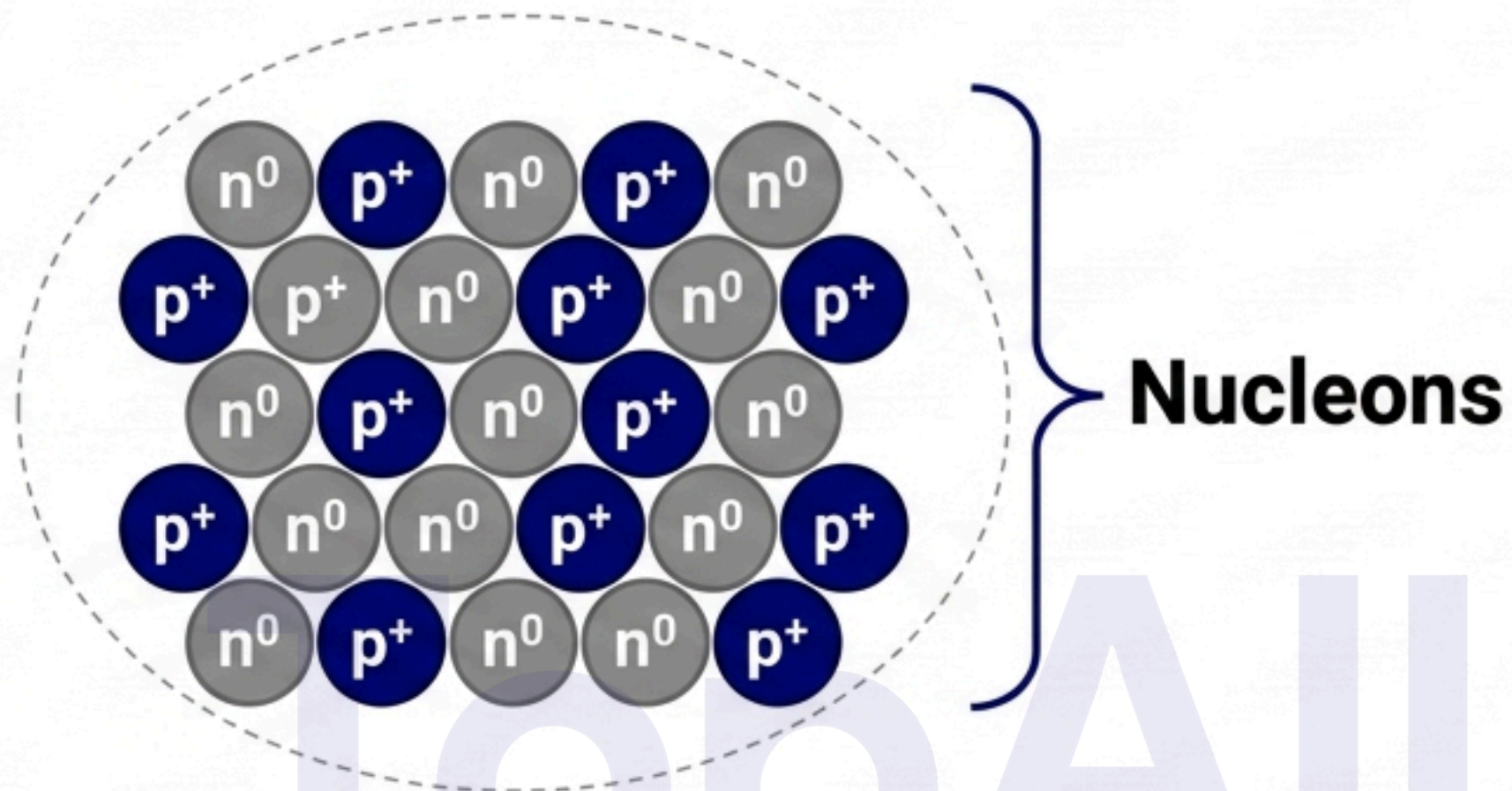
Key Highlights

- » Free Study Material, Videos & Infographics
- » Push Your Limits with Level-Based Challenges
- » Climb the Leaderboard Among Fellow Aspirants
- » Practice Unlimited MCQs for NEET & JEE
- » Get Clear Explanations, Not Just Marks
- » Track Your Performance Smarter



STRUCTURAL ANATOMY

Nucleons: The Inhabitants of the Nucleus



Definition

Protons and neutrons reside together in the extremely dense, small region at the exact center of the atom.

Collective Term

Because they share this central location and comprise the atom's entire mass, they are collectively referred to as nucleons.

$$\text{Total Nucleons} = \text{Mass Number (A)}$$

Neutral Atoms & Electron Count



The Requirement for Neutrality

For an atom to have no net electrical charge, the positive charges in the nucleus must be perfectly cancelled by the negative charges orbiting it.

The Full Equation (2.3)

$$Z = \text{protons} = \text{electrons}$$

(Applies ONLY to neutral atoms)

If the atom is neutral, knowing the Atomic Number (Z) instantly tells you the number of electrons.

The Core Formulas: Z and A

	Atomic Number (Z)	Mass Number (A)
Formula	$Z = p^{+} \text{ (and } = e^{-} \text{ if neutral)}$	$A = p^{+} + n^{0}$
Represents	Elemental identity / Positive charge	Total nucleus mass (Nucleons)
Location	Nucleus	Nucleus

Mastering Equations (2.3) and (2.4) allows you to decode the exact subatomic composition of any neutral atom.



You've Learned the Theory.

Now Let's Test It.

Reading notes gets you knowledge.

Practicing MCQs gets you marks.

That's exactly what TopAll Pro is built for.

Try TopAll Pro Now

What TopAll Pro Does Differently

-  **Stuck? Snap it. Solve it. — Doubts AI**
Photo → step-by-step solution in seconds, 24/7
-  **Your AI Coach finds your blind spots**
Concept-level weakness detection — not just chapter-level
-  **4.5 Lakh+ questions. Never run out.**
13× more content than any other prep app in India
-  **Build your own test in 60 seconds**
Pick a chapter, set difficulty — AI does the rest instantly.
-  **AI Recommendation that helps you improve**
AI Recommendation Analysis your Tests and tell you where you need to improve.



Practice the moment you finish studying
Jump in while the concept is still fresh in your head

4.5L+
MCQs

1.5L+
Students

AI Powered
In-Depth Analysis