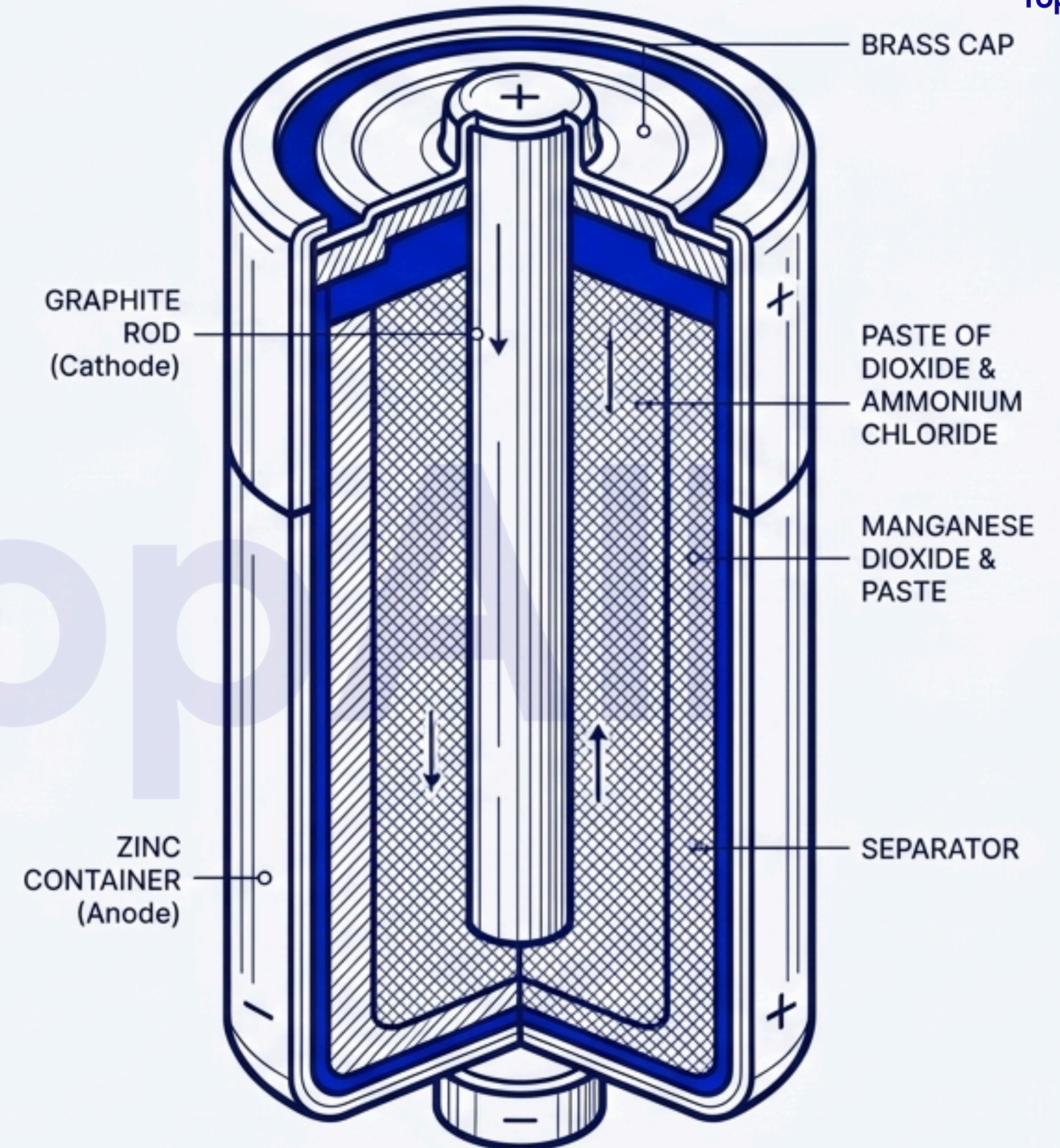


JEE MAIN + ADVANCED

Batteries

Galvanic Cells Designed for Real Life



The Core Principle



⚠ JEE TRAP

Do not confuse with electrolytic cells.

A battery produces electricity (Galvanic); it does not consume it to drive non-spontaneous reactions (unless it is a secondary cell actively being recharged).



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$$E=mc^2$$



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Commercial Viability: The 3 Golden Rules

01



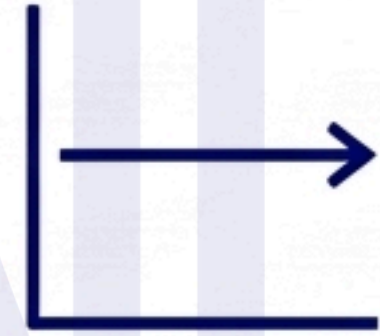
Must be reasonably light for portability and integration into everyday devices.

02



Must be compact, maximizing energy density per unit volume.

03



Voltage must remain reasonably stable during use (e.g., the concentration of reacting ions shouldn't drop rapidly, or solid reactants should be used).

The Binary Classification



Primary Batteries

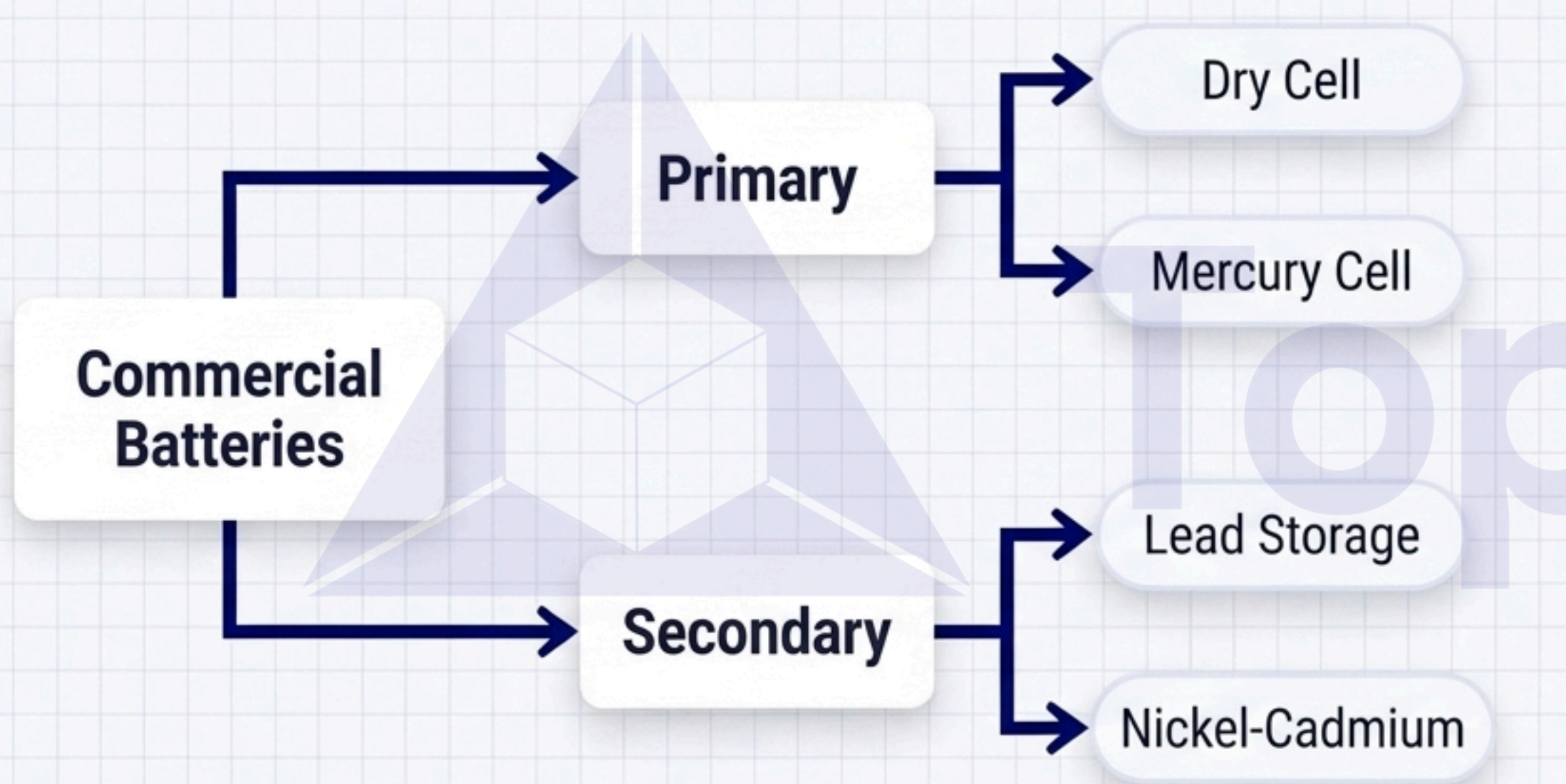
The redox reaction occurs essentially **once**. After extended use, the battery becomes 'dead' and **cannot be reused**.



Secondary Batteries

Fully rechargeable. Can undergo a large number of **discharging and charging cycles** by passing current in the opposite direction.

Syllabus Roadmap

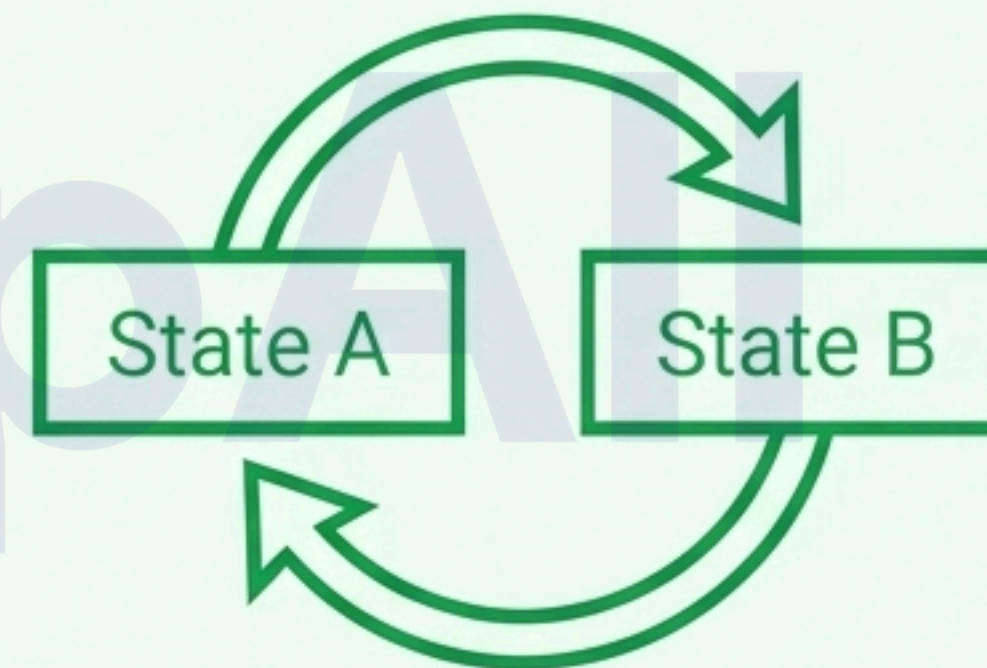


NOMENCLATURE NOTE

While 'cell' refers to a single anode/cathode unit, a 'battery' technically implies one or more cells connected in series to increase overall voltage output.

Chapter Synthesis

- ✓ **Primary = Use Once.** The chemical reactants are consumed irreversibly.
- ✓ **Secondary = Rechargeable.** Passing an external current reverses the spontaneous electrochemical reaction.
- ✓ **Textbook Standard:** Always maintain this strict primary/secondary distinction as defined by standard curriculum constraints for the exam.





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