Indian Economy · GS - III

Examine the role of domestic battery recycling in strengthening India's critical mineral security and supporting its transition towards electric mobility and renewable energy storage.

EXAM YEAR	PAPER	SUBJECT
DAILY PRACTICE 11/11/2026	GS - III	Indian Economy

MARKS	WORD LIMIT
10	~150 words

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Answer Hint

Critical mineral security, black mass, lithium-ion batteries, circular economy, urban mining, EV ecosystem, energy storage, import dependence, recycling infrastructure, Extended Producer Responsibility.

Model Answer

Introduction

India's transition towards electric mobility and renewable energy storage is increasing demand for lithium, cobalt, nickel and other critical minerals. Domestic battery recycling can strengthen resource security and reduce import dependence.

Significance of Battery Recycling

- **Resource recovery:** Processing battery waste into black mass enables the recovery of valuable metals for reuse.
- **Import substitution:** Recovered minerals can supplement imported raw materials and strengthen domestic supply chains.
- **Circular economy:** Recycling reduces waste generation, resource extraction pressure and environmental degradation.

- **Industrial development:** A domestic recycling ecosystem can encourage investment, technological innovation and employment.

Major Challenges

Inadequate collection systems, high processing costs, technological limitations, informal recycling and inconsistent battery-waste streams constrain the sector. India also needs reliable standards for safe handling and recovery.

Way Forward

Strengthen Extended Producer Responsibility, invest in advanced recycling technologies, promote research and development, and establish efficient collection networks. Stable policy support can attract private investment.

Conclusion

Battery recycling should become an integral component of India's critical mineral strategy, supporting sustainable industrialisation, energy security and the transition to clean mobility.

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