



Mains Practice Question

Q. What are rare earth materials? Discuss their strategic and environmental significance with respect to India. (150 words)

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Approach

- Define rare earth elements
- Describe their strategic and environmental significance
- Discuss its importance with respect to India
- Conclude by giving a way forward

Introduction

The Rare Earth Elements (REE) are a set of seventeen metallic elements. These include the fifteen lanthanides on the periodic table plus scandium and yttrium. They are also referred to as “rare earth oxides” because many of them are sold as oxide compounds.

Body

Rare-earth elements (REE) are necessary components of products across a wide range of applications, especially high-tech consumer products, such as cellular telephones, computer hard drives, electric and hybrid vehicles, and flat-screen monitors and televisions. The demand for them is small, although rising. They are mined and produced in small quantities and hence the name.

- **Environmental Significance:** Due to their unique magnetic, luminescent, and electrochemical properties, REE help technologies to reduce emissions, and energy consumption; therefore provide them greater efficiency, performance, speed, durability, and thermal stability. They have distinctive electrical, metallurgical, catalytic, nuclear, magnetic and luminescent properties. The futuristic technologies will need these REEs for high-temperature superconductivity, safe storage and transport of hydrogen for a post-hydrocarbon economy, environmental global warming, and energy efficiency issues.
- **Strategic:** Permanent magnets which are used in defence equipment, including actuators, to control guidance systems for airborne smart missiles, as well as in aerospace applications for aircraft components and airstrip maintenance equipment are derived from rare earth minerals.
- With growing global trends in clean technologies, the demand for critical rare earth minerals will grow. While late in joining the race, the Government of India is taking steps to develop and strengthen India’s position in the rare earth market. Moreover, if India wants to position itself as a global leader in renewable energy and be more self-sufficient in defence equipment, it should seek to reduce its dependence on imports of renewable energy equipment like solar panels and modules as well as defence equipment.

Conclusion

While a beginning has been made with the announcement of a National Mineral Policy 2019, covering non-fuel and non-coal minerals, India must strive to acquire expertise in valorising these minerals and shift to

developing its downstream sector. To that end, India should seek to leverage its ties with Japan and other countries that have the requisite technology for manufacturing downstream equipment so that it can set itself up as an alternative source of the REE-based technology, with its own supply chain of minerals and metals required for the same.

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