Science & Technology · GS - III

Examine the relationship between semiconductor security and national economic sovereignty. Discuss the challenges posed by foreign intelligence threats and technology theft to India's semiconductor ecosystem.

EXAM YEAR	PAPER	SUBJECT
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MARKS	WORD LIMIT
10	~150 words

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Answer Hint

Semiconductor supply chains, strategic autonomy, economic security, intellectual property theft, corporate espionage, counter-intelligence, cybersecurity, domestic manufacturing, technology partnerships.

Model Answer

Introduction

Semiconductors are critical components of modern economies, supporting artificial intelligence, telecommunications, defence equipment and digital infrastructure. Their security is therefore closely linked to national economic sovereignty.

Major Challenges

1. **Supply-chain dependence:** Concentration of manufacturing and critical materials in a few countries creates vulnerabilities.
2. **Technology theft:** Corporate espionage can expose proprietary chip designs, research and manufacturing processes.

3. **Cyber threats:** Semiconductor firms face risks of data breaches and industrial cyberattacks.
4. **Geopolitical competition:** Export controls and strategic restrictions can disrupt access to advanced technologies.

Measures for India

- Strengthen domestic semiconductor manufacturing and research.
- Protect intellectual property and sensitive industrial data.
- Improve cybersecurity and counter-intelligence coordination.
- Diversify international technology partnerships.
- Develop skilled manpower and indigenous research capabilities.

Conclusion

Semiconductor security requires a combination of domestic technological capacity, resilient supply chains and strong institutional safeguards. This is essential for India's strategic autonomy and long-term economic security.

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