Science & Technology · GS - III

“Smart port infrastructure has the potential to transform maritime logistics and strengthen global supply-chain resilience.” Examine the opportunities and challenges associated with the adoption of automated port technologies in India.

EXAM YEAR	PAPER	SUBJECT
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MARKS	WORD LIMIT
10	~150 words

Answer Hint

Port automation, artificial intelligence, 5G connectivity, IoT, logistics efficiency, Sagarmala, cybersecurity, employment transition, capital investment, indigenous technology, supply-chain resilience.

Model Answer

Introduction

Ports are critical nodes in international trade. Automation and digitalisation can improve cargo handling, reduce delays and strengthen the competitiveness of maritime logistics.

Opportunities for India

- **Operational efficiency:** AI-powered cranes, automated vehicles and digital systems can improve cargo movement and reduce vessel turnaround time.
- **Logistics competitiveness:** Faster port operations can lower transaction costs and improve India's integration with global value chains.

- **Technology integration:** 5G, IoT and predictive analytics enable real-time monitoring and better resource utilisation.
- **Trade facilitation:** Smart terminals can strengthen port connectivity and complement initiatives such as Sagarmala.
- **Supply-chain resilience:** Digital tracking improves visibility and helps identify operational disruptions.

Key Challenges

High capital costs, cybersecurity vulnerabilities, dependence on imported technology, skill gaps and employment displacement require careful management.

Way Forward

India should promote indigenous port technologies, cybersecurity standards, workforce reskilling and public-private investment.

Conclusion

Smart ports can strengthen India's maritime competitiveness, provided technological modernisation remains secure, inclusive and economically sustainable.

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