

Daily Mains Practice Answer 08-10-2026

Q. India's transition from a technology-importing nation to a technology-shaping power requires a shift from imitation to discovery-led innovation. Discuss the role of fundamental research, institutional autonomy, national laboratories, industry linkages and regulatory reform in this transition. (15 marks, 250 words)

Direction: Intro-----their roles + Challenges----Conclusion.

Introduction:

Briefly describe India's transition from a technology-importing nation to a technology-shaping power.

Main Body

Role of fundamental research

- Expanding the knowledge frontier
- Reducing technological dependence
- Developing strategic technologies
- Creating long-term innovation capacity
- Research-led innovation prepares India for emerging technological waves

Role of institutional autonomy

- Replacing procedural control with outcome-based accountability
- Universities and research institutions need autonomy to select research questions based on scientific merit.
- Merit-based recruitment
- Outcome-based accountability
- Trust with transparency - transparent audits, ethical safeguards and consequences for misuse of public funds.

Role of national laboratories

- India's national laboratories possess substantial scientific expertise and specialised infrastructure.
- Act as knowledge-generating institutions and platforms for technological breakthroughs, rather than functioning exclusively as service providers or centres for incremental product development.
- However, many remain insufficiently accessible to external researchers, students and

companies, limiting opportunities for collaboration.

Role of industry linkages

- Collaborative research between universities, national laboratories and companies.
- Commercialisation with stronger technology-transfer mechanisms
- Greater investment from private-sector R&D
- Industry partnerships can expand access to expensive equipment, testing facilities and specialised expertise.

Role of regulatory reform

- Regulation can either facilitate technological development or create barriers through uncertainty, fragmented approvals and disproportionate compliance costs.
- Also preserve privacy, cybersecurity, environmental protection, consumer rights and research ethics. Innovation without appropriate safeguards can create social risks and undermine public trust.

Challenges to India's transition

- Inadequate and fragmented R&D funding
- Brain drain and talent retention
- Weak academia-industry collaboration
- Dependence on critical inputs
- Bureaucratic and regulatory barriers

Conclusion:

Give a balanced conclusion with some measures.