Science & Technology · GS - III

India's growing civil aviation market presents an opportunity to develop indigenous aerospace manufacturing. Examine the key technological and industrial requirements for achieving self-reliance in commercial aircraft production.

EXAM YEAR	PAPER	SUBJECT
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MARKS	WORD LIMIT
10	~150 words

Answer Hint

Aerospace ecosystem, aircraft engines, avionics, precision engineering, component manufacturing, technology transfer, R&D, MSMEs, certification, skilled workforce.

Model Answer

Introduction

India's expanding aviation market and large aircraft procurement requirements offer an opportunity to move beyond dependence on foreign manufacturers towards indigenous commercial aircraft development.

Key Requirements

1. **Technological capabilities:** Investment in aircraft engines, avionics, advanced materials, aerodynamics and flight-control systems is essential.

2. **Industrial ecosystem:** Development of domestic suppliers, precision engineering industries, component manufacturers and maintenance facilities can reduce import dependence.

3. **Research and development:** Collaboration among universities, research institutions, public-sector enterprises and private companies is necessary for indigenous design and innovation.

4. **Technology transfer:** Strategic partnerships with global manufacturers can facilitate access to advanced technologies and manufacturing expertise.

5. **Regulatory capacity:** Strong testing, airworthiness certification and safety-validation institutions are necessary to meet international standards.

6. **Human capital:** Skilled engineers, technicians and specialised aerospace professionals are critical for sustained industrial growth.

Challenges

High R&D costs, long development cycles, technological complexity, dependence on imported engines and limited economies of scale remain major constraints.

Way Forward

India should adopt a phased manufacturing strategy, strengthen public-private partnerships, support aerospace MSMEs and encourage domestic intellectual property development. Procurement demand can also be leveraged to build a competitive supplier ecosystem.

Conclusion

Indigenous commercial aircraft manufacturing requires sustained investment in technology, institutions and industrial capabilities. A gradual transition from component manufacturing to complete aircraft development can strengthen India's technological sovereignty.

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