



Mains Practice Question

Q. India needs to harvest quantum technology for strategic and economic development. Discuss. (250 words)

25 Mar, 2020 GS Paper 3 Economy

Approach

- Briefly highlight what quantum technologies are.
- Highlight its strategic and economic advantage to India.
- Highlight challenges India could face in such endeavour
- Highlight some measures to overcome such challenges.

Introduction

Quantum Technology is based on the principles of Quantum mechanics, developed in the early 20th century to describe nature at the scale of atoms and elementary particles. The first phase of the quantum revolution led to an understanding of the physical world leading to the development of technologies like lasers. Currently, the focus is upon quantum computing. Such technology will prove beneficial for the strategic and economic development of India.

Body

Advantages of such technologies for India

- It will help establish secure satellite communication which will help strengthen cyber, military security as demonstrated by China.
- It can help researchers in numerous fields like the Genome-India Project where huge data needs to be analysed and bring efficiencies in other sectors as well like medical science, agriculture towards the development of novel, sustainable and cheap solutions.
- It can help in better prediction models which are needed in disaster management, climatic prediction and also in managing supply chains in numerous economic activities.
- The pharmaceutical industry can benefit from reducing the time frame of the discovery of new molecules and related processes to a few days from the present 10-year slog that scientists put in.
- Above all, it will quicken the adoption of 4th Industrial Revolution based technologies like the Internet of Things and help smoothly integrate into present architecture.

Challenges associated with the application of such technology

- Harnessing the properties of quantum superposition in a highly controlled manner can be a challenge.
- Creating algorithms and applications for quantum computers will require newer types of hardware.
- It will also open the domain of conflict in military and strategic fields among nations.

To overcome such issues and harness the technology, India has taken following steps:

- Research projects across 51 organisations under **QUEST - Quantum Enabled Science and**

Technology.

- Union Budget 2020-21 proposed to spend ₹8,000 crore (\$ 1.2 billion) on the newly launched **National Mission on Quantum Technologies and Applications (NMQTA)**. The mission seeks to develop quantum computing linked technologies amidst the second quantum revolution and make India the world's third-biggest nation in the sector after the US and China.

Conclusion

Further steps like collaboration with the private sector, increased funding towards research, involvement of scientists and other stakeholders at the strategic level can propel India towards quickly harnessing the technology for its advantage as China and USA have been doing.

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