9. National Mission on Quantum Technologies & Applications

Prelims Level: Robotics & Artificial Intelligence.

Mains Level: GS-III Awareness in the fields of IT, Space, Computers, Robotics, Nano-Technology, Bio-Technology and Issues Relating to Intellectual Property Rights.

Why in News?

- The Finance Minister in budget 2020 has announced a National Mission on Quantum Technologies & Applications (NM-QTA).

Quantum Technology:

- Quantum Technology is based on the principles of quantum theory, which explains the nature of energy and matter on the atomic and subatomic level.
- It concerns the control and manipulation of quantum systems, with the goal of achieving information processing beyond the limits of the classical world.
- Its principles will be used for engineering solutions to extremely complex problems in computing, communications, sensing, chemistry, cryptography, imaging and mechanics.
- This key ability makes quantum computers extremely powerful compared to conventional computers when solving certain kinds of problems like finding prime factors of large numbers and searching large databases.

Quantum Mechanics:

- It is a fundamental theory in physics which describes nature at the smallest – including atomic and subatomic – scales.
- At the scale of atoms and electrons, many of the equations of classical mechanics, which describe how things move at everyday sizes and speeds, cease to be useful.
- In classical mechanics, objects exist in a specific place at a specific time.
- However, in quantum mechanics, objects instead exist in a haze of probability; they have a certain chance of being at point A, another chance of being at point B and so on.

NM-QTA:

- The mission will function under the Department of Science & Technology (DST).
- It will be able address the ever increasing technological requirements of the society, and take into account the International Technology Trends.
- The mission will help prepare next generation skilled manpower, boost translational research and also encourage entrepreneurship and start-up ecosystem development.

Significance:

- Quantum technologies are rapidly developing globally with a huge disruptive potential.
- The range of quantum technologies is expected to be one of the major technology disruptions that will change entire paradigm of computation, communication and encryption.
- It is perceived that the countries who achieve an edge in this emerging field will have a greater advantage in Garnering Multifold Economic Growth and Dominant Leadership Role.
- It has become imperative both for government and industries to be prepared to develop these emerging and disruptive changes.
- It will establish standards to be applied to all research and help stimulate a pipeline to support research and applications well into the future.