GOVERNMENT OF INDIA
MINISTRY OF SCIENCE AND TECHNOLOGY
DEPARTMENT OF SCIENCE AND TECHNOLOGY
RAJYA SABHA
UNSTARRED QUESTION NO. 2206
ANSWERED ON 21/12/2023

Status of National Quantum Mission

2206 Shri Sujeet Kumar:

Will the Minister of **Science and Technology** be pleased to state:

(a) the details of progress made after approval of ₹ 6,000 crores for the National Quantum Mission for the years 2023-24 till 2030-31;

(b) the details of the timeline of implementation of the Mission for the next two years;

(c) whether the implementation of the Mission will lead to employment generation in the field of research and development; and

(d) if so, the details thereof?

A N S W E R

MINISTER OF STATE (INDEPENDENT CHARGE) FOR THE
MINISTRY OF SCIENCE AND TECHNOLOGY
(DR. JITENDRA SINGH)

(a) The Department of Science & Technology (DST) is in the process of implementing the National Quantum Mission, which was approved on 19th April 2023, at an outlay of Rs. 6003.65 Crores for a period of eight years. Four national-state-of-art discussion meetings, chaired by the Principal Scientific Advisor to the Government of India, have been conducted. These meetings focused on Quantum Computing Hardware, Quantum Computing Software, Quantum Communications and Quantum Sensing & Metrology. The objective of these discussions has been to assess the existing capabilities in various quantum technology verticals within the country and formulate a robust research & development action plan.

(b) The mission is for a period of eight years. However, the implementation broadly has three timelines, i.e. 3 years, 5 years and 8 years. Following are the key deliverables of the mission:

1. Develop intermediate scale quantum computers with 20-50 physical qubits, 50-100 physical qubits and 50-1000 physical qubits in 3 years, 5 years and 8 years, respectively.
2. Develop satellite based secure quantum communications between two ground stations over a range of 2000 kilometres within India as well as long distance secure quantum communications with other countries.
3. Develop inter-city quantum key distribution over 2000 km with trusted nodes using wavelength division multiplexing on existing optical fibre.
4. Develop multi-node quantum network with quantum memories, entanglement swapping and synchronised quantum repeaters at each node (2-3 nodes).
5. Develop magnetometers with 1 femto-Tesla/sqrt(Hz) sensitivity in atomic systems and better than 1 pico-Tesla/sqrt(Hz) sensitivity in nitrogen vacancy-centers; gravity measurements having sensitivity better than 100 nano-meter/second (sq.) using atoms and atomic clocks with 10^{-19} fractional instability for precision timing, communications and navigation.
6. Design and synthesis of quantum materials such as superconductors, novel semiconductor structures and topological materials for fabrication of quantum devices for quantum computing and communication.

(c) & (d): Yes, Sir. The National Quantum Mission aims to seed, nurture, and scale up research and development in quantum technologies, creating opportunities for skilled professionals and researchers. The growth of a vibrant and innovative ecosystem in quantum technology corresponds to increased demand for experts in the field, leading to employment generation.

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