

8. New Test with Quantum Coins & Computers for Quantum Sensing

Prelims Syllabus: Science and Technology – Computer Technology

Mains Syllabus: 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?

- Researchers from the Raman Research Institute (RRI) have devised a new test for fairness of quantum coin or qubit using entanglement theory.
- Raman Research Institute is an autonomous institution under the Department of Science & Technology.

About the New Test:

- The test uses entanglement to test the fairness of the quantum coin. Their strategy enables better discrimination between quantum states. Such an advantage is valuable in quantum sensors.
- This is a significant contribution to quantum state discrimination and an essential aspect of quantum information science which is expected to influence quantum sensing.

About Quantum Computing Technology:

- The domain of Quantum Information and Quantum Computing Technology is a growing area of research which is expected to influence Data Processing, which in turn, plays a central role in our lives in this Information Age. For instance, bank transactions, online shopping and so on crucially depend on the efficiency of information transfer.
- Thus the work on quantum state discrimination is expected to be valuable in people's lives in the current era.

Related Terms:

1. Qubit

- ✓ A quantum bit, or qubit, is the basic unit of information for a quantum computer, analogous to a bit in ordinary machines. But unlike a bit, which can have the value 0 or 1, a qubit can take on an infinite number of values.

2. Quantum Computer

- ✓ A quantum computer is any device for computation that makes direct use of distinctively quantum mechanical phenomena, such as superposition and entanglement, to perform operations on data.
- ✓ Superposition means that each qubit can represent both a '1' and a '0' at the same time

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- ✓ Quantum entanglement occurs when two particles become inextricably linked, and whatever happens to one immediately affects the other, regardless of how far apart they are.
 - ✓ Entanglement is a special type of correlation that exists in the quantum world with no classical counterpart

