GS III
Syllabus: Indian Economy and issues relating to growth.
INSOLVENCY & BANKRUPTCY CODE 2016
The Hindu, Pg.no: 7.

News: "Recasting insolvency resolution."

About Insolvency & Bankruptcy Code 2016:
- IBC 2016, a comprehensive time bound law for addressing insolvency's of corporate firms, individuals LLOs etc.

4 pillars of IBC:
- **Insolvency Professionals (IPs):** to carry out resolution process.
- **Information Utilities(IUs):** store details on lenders, lending terms/ms etc in electronic format Eg. National e-Governance service Limited.
- **Insolvency and Bankruptcy Board of India** *(IBBI):* to regulate the functioning of IPs and IUs.
- **NCLT & Debt Recovery Tribunal.**

Key objectives of IBC:
- Speedy Resolution (330 days);
- Maximise Asset value.
- Resource Liquidation.

Process followed:
- Initiation of Insolvency by corporate.
- Adjudication authority (NCLT).
- Committee of Creditors (Decision making body).
- Insolvency professional (carry out resolution process).
- Resolution plan.
- Liquidation (incase of failure of Resolution plan).

Issues:
- **Overburdened NCLT** with pendency of cases.
- **Delays:** the average time for insolvency resolutions increased to 716 days in FY2023-24, from 650 days in 2022.
- **Higher Haircuts:** Eg. In FY-22 100 out of 500 companies saw haircuts above 90%.
- **Lack of Standardised Cross Border Insolvencies**: Eg. Videocon case, Jet airways case.
- **Low Utilisation of IU's:** criticised as least used pillar of IBC.
- **Code of conduct:** Creditors discretion in accepting resolution plans and appointing IPs.
- **Issues with IPs:** IBBI expressed concerns over their functioning.

Suggestions: based on Parliamentary standing committee.
- **NCLT shouldn't take more than 30 days** to approve or reject a resolution plan.
- **Vacancies:** advanced recruitment based on pendency of cases.
- **Haircut's**: must be gap between company initial assets in IBC process and final realised value.

About National Company Law Tribunal (NCLT):
- *Quasi-judicial authority,* Central Govt. has constituted NCLT under *Companies Act, 2013.*
- Functions under *Ministry of Corporate Affairs.*
- **The adjudication of issues pertaining to Indian companies**, such as insolvency and the winding up of companies, falls under its jurisdiction.
- *National Company Law Appellate Tribunal (NCLAT),* Appellate body of NCLT.

ENVIRONMENT
Pre-context
WATER HYACINTH
The Hindu, Pg.no: 20.

News: "Water hyacinth threatens the livelihoods of fishers onKenyan lake."

About Water Hyacinth:
- Native to *South America.*
- Presence of water hyacinth is linked to *pollution.*
  - It is known to thrive in the presence of contaminants and grows quickly.
- It is considered the *most invasive aquatic plant species* in the world.
- It **block sunlight and impact airflow, affecting the quality of aquatic life.** This has caused a drastic drop in the population of fish Eg. Case of *Lake Naivasha in Kenya.*
- In India various **Ramsar sites (Sathya Sagar in MP), Wetlands (East Kolkata) etc** are covered in water hyacinth.

TECHNOLOGY

PRE-CONTEXT

QUANTUM TECHNOLOGY & BLOCKCHAIN

THE HINDU, PG.NO: 20.

News: "Indian cryptography research gears up to face the quantum challenge."

Quantum Computing:

- Advanced type of computing that *uses the principles of quantum mechanics to perform certain calculations* more efficiently than classical computers.
- Classical computers use bits (0 or 1) as the basic unit of data, *quantum computers use quantum bits or qubits.*

Key concepts in quantum computing:

- Superposition:
  - Unlike classical bits, qubits can exist in multiple states *(both 0 and 1)* at the same time, allowing quantum computers to perform many calculations at once.
- Entanglement:
  - *Two or more qubits become linked* in such a way that state of one particle directly influences the state of other *no matter how far apart they are in space.*
  - This property is key to the power and efficiency.
- Quantum Tunneling (QT):
  - Unlike classical physics, QT *allows an electron or atom passes through a potential energy barrier.*
  - This allows quantum computers to explore many possible solutions to a problem simultaneously.
- Photon-based Communication:
  - Photons are used as *carriers of quantum information* due to their robustness in long-distance transmission.
- Quantum Key Distribution (QKD):
  - Ensures *secure encryption keys* are shared between users. Provides virtually unbreakable security based on quantum mechanics.

National Mission on Quantum Technologies and Applications.

- Budget 2020-21 allocated *Rs.8000 crore* for focus on development of quantum computing and related technologies.
- **Implemented by:** *Dept. of Science & Technology.*
- **Objectives:** *Setting up 4 thematic Hubs:*
- **Quantum computing.**
  - Developing intermediate scale quantum computers with 50-1000 physical qubits in 8 years.
- **Quantum communication.**
  - Developing satellite based secure quantum communications between ground stations over range of 2000km.
  - **Quantum Satellites:** They facilitate quantum information transmission (qubits) and secure communication via quantum key distribution (QKD).
- **Quantum sensing & Metrology.**
  - Developing magnetometers with high sensitivity atomic systems and Atomic clocks for precision timing, communication and navigation.
- **Quantum material devices.**
  - Development of quantum materials like superconductors novel semiconductors structures.
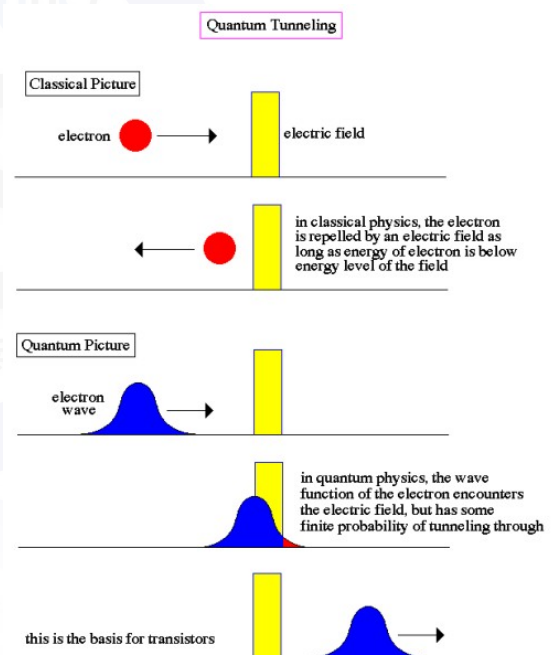
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SUPERPOSITION

Superposition describes a particle's ability to exist across many possible states at the same time. So the state of a particle is best described as a "superposition" of all those possible states.

ENTANGLEMENT

Quantum entanglement refers to a situation in which two or more particles are linked in such a way that it is impossible for them to be described independently even if separated by a large distance.

Source: Deloitte analysis.

Quantum Tunneling

Classical Picture

electron → electric field

in classical physics, the electron is repelled by an electric field as long as energy of electron is below energy level of the field

Quantum Picture

electron wave →

in quantum physics, the wave function of the electron encounters the electric field, but has some finite probability of tunneling through

this is the basis for transistors

P.T.O

TECHNOLOGY
PRE-CONTEXT

BLOCKCHAIN
THE HINDU, PG.NO: 8 & 20.

News: "How is TRAI and the govt. combating spam?"
News: "Indian cryptography research gears up to face the quantum challenge."

Components of Blockchain:
- **Block**: *A package of data that contains a list of transactions.* Each block is linked to the previous one, forming a chain.
- **Decentralisation**: *Distributing control and data across a network of computers (nodes)* instead of relying on a single central authority
- **Ledger**: A *digital record of all transactions* made on the blockchain, accessible to all participants.
- **Hash**: unique string of characters generated from data using a *cryptographic algorithm*. It ensures data integrity and links blocks together.
- **Immutable**: *Once data is recorded on the blockchain, it cannot be changed or deleted,* ensuring a permanent and tamper-proof record.

Traditional systems:
- **Centralized Databases:** Managed by a single entity or organization. Eg. Central banks. If the central system is compromised, the entire banking data can be at risk. *Blockchain offers decentralisation.*
- **Editable Records:** Authorized personnel can alter data, which might lead to inconsistencies or fraudulent changes. *Block chain offers Immutable Ledger.*
- **Limited Transparency:** Access to data is often restricted to specific parties, reducing overall transparency. *Block chain offers Distributed ledger.*
- **Authenticity:** Tracing the exact origin and journey of a product can be challenging. *Blockchain offers every step of a product's journey is recorded.*

Illustration: Blockchain in Supply Chain.
- **Blocks**: Farmers, Processors, Shippers, Distributors, Retailers, Consumers.
- **Data recorded by Farmer:** Planting Date, Farming practices, Harvest Date.
- **Data recorded at processing centres:** processing method, Batch number, Quality checks.
- **Data recorded at shipping centres:** Shipping date, Transport details, Destination.
- **Data recorded by Distributors and realisers:** distribution date, Retailers details, stock levels.

How customer and others are benefited from above process?
- **Access to information:** at every stage of process.
- **Building trust:** Confirm that the raw material is organic, ethically sourced, and free from fraud.
- **Decentralised data**: Data recorded by blocks or stakeholders is distributed across the stakeholders, with no single stakeholder having complete control.
- **Immutable ledger:** So, once data is recorded on the blockchain, it cannot be changed or deleted, ensuring a permanent and tamper-proof record. This enhances trust in the system.
- **Cryptographic security:** Uses advanced cryptography to secure data, making unauthorized access extremely difficult.
- **Distributed Ledger:** digital record of all transactions made on the blockchain, accessible to all participants.

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Thank you!