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Mains Master

Use dictionary meaning of 'forest', Supreme Court tells Central govt.

Context & Background:

- The Forest (Conservation) Act, 1980, enacted due to increasing deforestation's environmental damage, restricted the use of forest land for non-forestry purposes without central government approval.
- In 2023, the Act was amended, introducing Section 1A, which aimed to streamline the approval process. However, concerns arose that it:
  - Narrowed the definition of "forest" to exclude undeclared forests, potentially reducing protected areas.
  - Limited public participation in the decision-making process for forest land use.

Challenge in Court:

- Environmental groups and individuals filed petitions challenging the amended Act, arguing that:
  - **Section 1A's definition** of "forest" was restrictive and ignored historical rulings like the **1996 T.N. Godavarman Thirumulpad case**, which adopted a broader interpretation.
  - The amended Act reduced transparency and accountability in forest management.

- **T.N. Godavarman Thirumulpad,** an environmental activist, filed a public interest litigation (PIL) petition challenging the rampant deforestation in India.
- The petition argued that the existing Forest (Conservation) Act, 1980, was inadequate in protecting forests due to loopholes and lax implementation.

Judgment:

- The Supreme Court, recognizing the critical importance of forests for ecological balance and environmental well-being, delivered a groundbreaking judgment.
- **Key aspects of the judgment:**
  - **Broader definition of "forest":** The Court adopted a broad and inclusive definition of "forest," going beyond just officially declared forests. It included areas with tree cover and ecological significance, even if not formally designated.
  - **Precautionary principle:** The Court emphasized the precautionary principle, stating that the lack of scientific certainty about the environmental impact of deforestation shouldn't be a reason to postpone action.
  - **Community participation:** The Court recognized the crucial role of local communities in forest conservation and mandated their involvement in decision-making and conservation efforts.
  - **Stricter regulations:** The Court issued stricter regulations for forest clearance, requiring stricter scrutiny and public hearings before granting permission for non-forestry activities.

Supreme Court's Observation:

- The Court sided with the petitioners, highlighting that:
  - Section 1A's definition contradicted the Act's original intent and the broader meaning established in previous judgements.
  - Protecting all forest areas, regardless of official declaration, is crucial for ecological balance.
- The Court ordered the **use of the "dictionary meaning" of "forest" from the Godavarman case, encompassing a wider range of land types with tree cover.**
- This broader definition applies until a comprehensive record of all government-recorded forests is prepared, ensuring transparency and preventing potential loopholes.
- **The Court also:**
  - Mandated the disclosure of comprehensive forest land records by states and union territories.
  - Required the Environment Ministry to publish these records online for public access.
  - Restricted the approval of new zoos and safaris until the Court's final decision in July 2024.

Way Forward:

- States and union territories have a deadline of March 31st to submit their forest land records.
- The Environment Ministry must publish these records online by April 15th.
- The Court will hear the case again in July 2024 to make a final ruling on the amended Act's validity and potential revisions.

The recent report on local fintech players

Context:

- The rise of digital payments in India has led to concerns about the dominance of foreign-owned fintech apps.
- The **Parliamentary Standing Committee on Communications and Information Technology** has presented a report highlighting these concerns.

Background:

- **UPI** dominates digital payments in India by volume (**73.5%**) but holds a low share in terms of value (**6.67%).**
- Foreign-owned apps like PhonePe and Google Pay hold significant market share (**46.91% and 36.39% respectively**), while **NPCI's BHIM UPI** app has a minimal share (0.22%).

Issues with Fintech:

- **Regulatory control:** Regulating foreign apps operating across multiple jurisdictions is challenging.
- **Market dominance:** Concerns exist about the dominance of foreign players and the potential stifling of local innovation.
- **Money laundering:** The Committee identified instances of fintech apps being used for illegal activities like money laundering.

NPCI's 30% Cap:

- To address concerns, NPCI imposed a 30% volume cap on transactions by any third-party app, aiming for market equilibrium and encouraging other players to grow.

Way Forward:

- The Committee recommends promoting **local fintech players** to balance the ecosystem.
- Experts suggest a **balanced approach**, allowing both local and foreign players to contribute while ensuring regulatory compliance and accountability.
- The focus should be on fostering innovation and ensuring financial inclusion while addressing concerns about dominance and potential misuse.

Prelims Booster

Thangjing Hills

The Manipur government has rejected the claims of the Kuki-Zomi tribal people over swathes of land on the Thangjing Hills, following the installation of a Cross last month, which led to fresh tensions in the State. The government has labeled the claims as "fabricated and concocted," amid ongoing inquiries by both the State government and the National Commission for Scheduled Tribes.

The hill range, located in the buffer zone between Churachandpur and Bishnupur districts, has been contested by Kukis and Meiteis for its religious and cultural significance, with disputes over the right to pray and worship escalating since the ethnic conflict between the two communities began on May 3, 2023.

Breakthrough Prize laureate calls for collecting 'precious' protein structures

- John Jumper, Breakthrough Prize laureate, emphasized the importance of collecting and pooling protein structures into a central resource, highlighting the significant gap between learning about protein sequences and protein structures, with the latter being much harder to measure.
- Mr. Jumper, who leads the AlphaFold2 project at Google DeepMind, discussed the project's ability to make structure predictions for over 200 million proteins, showcasing the impact of Artificial Intelligence (AI) on scientific discovery and its potential to reduce the time taken to determine protein structure.
- AlphaFold, an AI system developed by DeepMind, predicts a protein's 3D structure from its amino acid sequence, with ongoing efforts to expand its domain and usefulness, aiming to make predictions for all the atoms within the Protein Data Bank (PDB), reflecting the continuous progress in this area.
- Mr. Jumper highlighted the importance of diverse data for machine learning (ML), emphasizing that data diversity is crucial for solving problems with ML, particularly for addressing bigger and more general problems, reflecting the significance of diverse and comprehensive datasets in this field.

Hundred years ago, Satyendra Nath Bose changed physics forever

- In 1924, Satyendra Nath Bose made a groundbreaking contribution to physics by discovering the correct set of equations to work out the behavior of collections of photons, which was fundamental to the emerging quantum theory. His work was greatly appreciated by Albert Einstein and was listed as one of the six foundational papers of quantum theory by physicist and writer Abraham Pais. This discovery marked a significant addition to the evolving quantum theory, which was undergoing a major upheaval at the time, with physicists searching for missing pieces to complete the jigsaw. Bose's work provided a crucial missing piece to the fractured picture of the new 'quantum theory' and played a pivotal role in shaping the understanding of the microscopic world.
- Bose's derivation of Planck's law of black-body radiation, independent of classical physics, and his demonstration of the statistical property of photons, pioneered the field of quantum statistics, laying the foundation for the understanding of fundamental particles as either bosons or fermions based on their statistics. His work not only contributed to the development of quantum statistics but also had a lasting impact on the categorization of fundamental particles, establishing the distinction between bosons and fermions based on their statistical behavior.
- Bose's paper on the statistical properties of photons and his demonstration of the independence of Planck's law from classical physics marked a significant milestone in the field of quantum theory, providing a fundamental understanding of the behavior of photons and their statistical properties. His pioneering work in quantum statistics and the demonstration of the statistical nature of photons laid the groundwork for the subsequent development of quantum mechanics and the categorization of fundamental particles based on their statistical behavior.
- Despite his sparse publications and the absence of another work of similar value, Bose's contribution to quantum theory and the field of quantum statistics remains a lasting legacy, earning him a place as a bright comet in the history of physics. Bose's groundbreaking work in quantum statistics and the statistical properties of photons has left an indelible mark on the field of quantum mechanics, establishing him as a pivotal figure in the development of quantum theory and the understanding of fundamental particles. His significant contribution to the field of quantum statistics and the categorization of fundamental particles based on their statistical behavior has solidified his position as a key figure in the history of physics.

Saturn's moon Mimas may have ocean under its crust

- Astronomers have proposed that Mimas, Saturn's smallest major moon, may harbor a liquid ocean approximately 20-30 km beneath its heavily cratered ice shell, challenging the initial perception of the moon as an unlikely candidate for hosting an ocean due to the absence of surface modifications typically associated with internal dynamics.
- A study published in the Nature journal analyzed Mimas's orbital motion based on data from NASA's Cassini spacecraft, suggesting that the moon's librations indicate the presence of either an elongated silicate core or a global ocean, both of which would impact Mimas's gravitational interactions with Saturn, leading to slight changes in its orbit over time.
- The calculations reached a dead end when considering Mimas as entirely solid, prompting scientists to explore the possibility of a subsurface ocean, leading to the theoretical determination of the ice sheet's required thickness of 20-30 km to align with observations, aligning closely with previous findings from a 2022 study.
- The estimated heat released at the surface of Mimas, approximately 25 milliwatt per sq. m, is expected to reduce the moon's eccentricity by a factor of two in 4-5 million years, suggesting that its ocean may have formed 2-25 million years ago, with the predicted surface heat aligning with observations of Enceladus, another Saturn moon with a global ocean beneath its crust, indicating potential hydrothermal activity within Mimas.

West challenges China's hold on critical minerals in African continent

The West is now challenging China's tight grip on the mineral riches lying beneath the soil of the Congo and its neighbour Zambia; this new scramble for Africa comes with a post-colonial twist since both the African countries have ambitions to be major actors in the critical minerals race.

China's CMOC Group overtook Glencore to become the world's largest producer of cobalt last year as it ramped up its new Kisanfu mine in the Democratic Republic of Congo, with the company's production leaping by 174% year-on-year to 55,526 metric tonne, accounting for over a quarter of global demand of 2,13,000 tonne.

The Cobalt Institute estimates global production exceeded demand by 12,500 tonne in 2023, making it one of the "biggest surpluses in recent years," leading to a slump in the cobalt price from $40 per lb in May 2022 to a current $13, impacting project economics and undermining Western hopes of reducing dependency on China for a metal critical to clean-energy technology and military hardware.

The West is now challenging China's tight grip on the mineral riches lying beneath the soil of the Congo and its neighbour Zambia, with KoBold Metals, a California-based metals exploration company backed by billionaires Bill Gates and Jeff Bezos, venturing into the renascent Copperbelt, and the U.S. International Development Finance Corporation (DFC) planning to near double its financial commitments to de-risk mining in the Copperbelt.

The U.S. and European government backing aims to de-risk logistics for the private sector, with the United States Trade and Development Agency (USTDA) funding a feasibility study into a new 200-megawatt solar power plant in Solwezi, addressing persistent problems for Copperbelt operators and marking the West's re-engagement with the Congo and Zambia.