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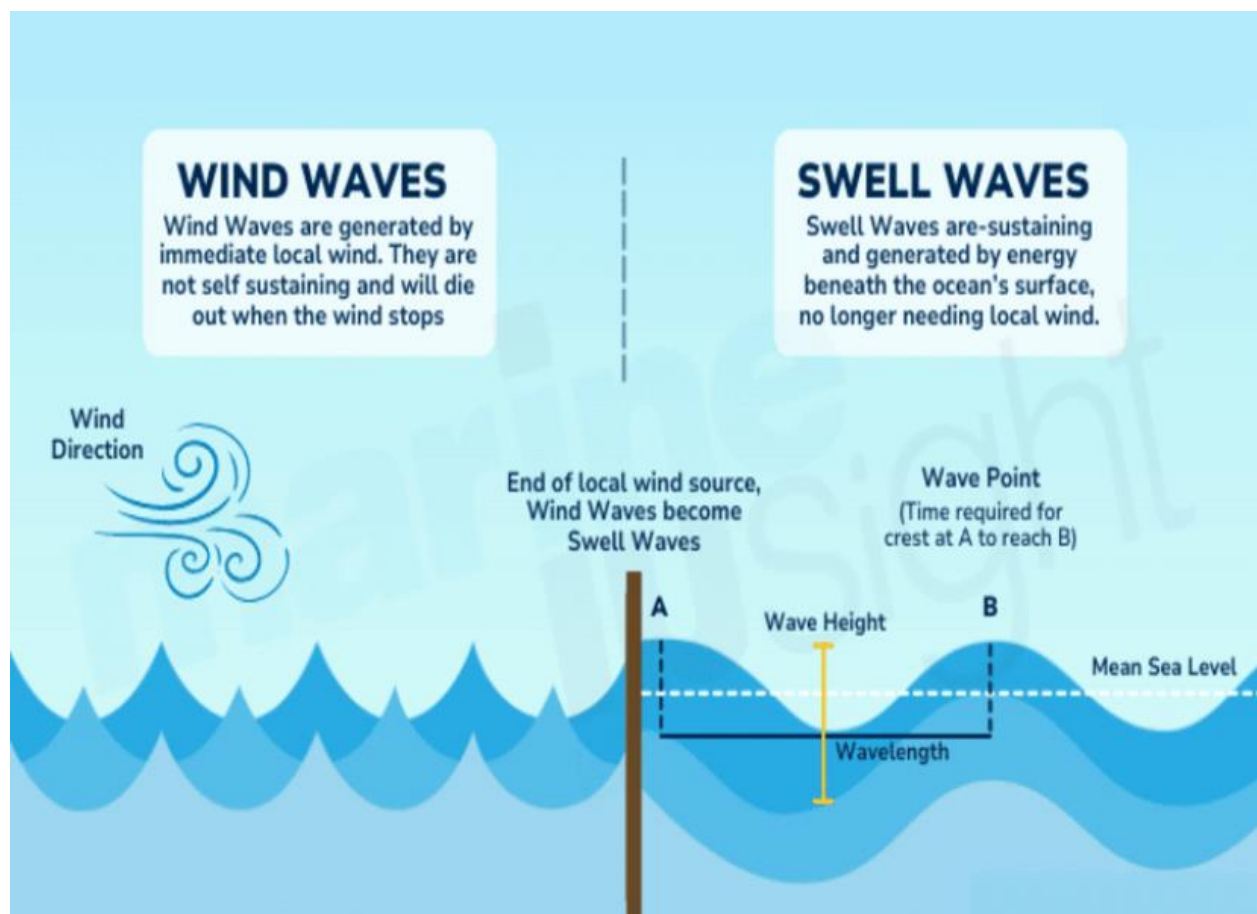5. Plankton balloon

Swell waves

Syllabus: GS-1; Geography

Context

➢ The **Indian National Centre for Ocean Information Services (INCOIS)** in Hyderabad, an autonomous body under the Union Ministry of Earth Sciences, has issued extensive advisories for swell waves for Andaman and Nicobar and Lakshadweep islands as well as parts of coastal areas in Andhra Pradesh, Goa, Gujarat, Kerala, Maharashtra, Odisha, Tamil Nadu, West Bengal, Daman and Diu, and Puducherry.

About

➢ Swell waves are long, smooth, and often powerful ocean waves that have traveled a great distance from their point of origin, typically generated by strong winds from storms far out at sea.

➢ Unlike wind-driven waves, which are created by local winds, swell waves maintain their energy as they move away from the storm system that created them.

➢ They can travel thousands of kilometers across oceans before reaching the coastline.

Key characteristics of swell waves include:

➢ **Longer Wavelengths:** Swell waves have much longer wavelengths than locally generated wind waves, meaning the distance between wave crests is greater.
➢ **Regular and Predictable:** Unlike choppy wind waves, swell waves are more regular and uniform, making them predictable in terms of arrival.
➢ **Low Frequency:** Swell waves tend to have lower frequencies, meaning fewer waves pass a fixed point per minute compared to wind waves.
➢ **Energy Retention:** Since they form far from shore, they carry significant energy, which allows them to travel long distances and still generate substantial wave height when they reach the coast.
➢ **Wave Height:** The height of swell waves can vary, but they tend to be smooth and rolling when they arrive at beaches, although in stormy conditions they can be larger and more forceful.

What does the new 'lady justice' statue signify?

Syllabus: GS-2- Judiciary

Context

➢ Recently, the Chief Justice of India unveiled a 'new lady justice' statue in the Supreme Court premises, replacing the previous statue.

A New Symbol of Justice: The Lady Reborn

➢ Recently, a profound transformation took place in the heart of the Supreme Court of India.
➢ The Chief Justice unveiled a new vision of Lady Justice, a figure draped in a saree, holding the scales of balance in one hand and the Indian Constitution in the other.
➢ Her blindfold is gone—her eyes open, gazing upon the nation she serves.
➢ In this symbolic act, an age-old icon is reimagined, shedding colonial vestiges and embracing the values of a diverse India.

The Origins: From Myth to Modernity

The roots of Lady Justice stretch deep into Roman mythology, where she was known as Justitia, the embodiment of fairness and morality. Through centuries, she evolved, gaining her iconic features: the blindfold, the scales, and the sword.

➢ **The Blindfold:** Introduced during the Renaissance as a satirical jab at the corruption in justice, this simple cloth came to symbolize impartiality during the Enlightenment. Justice, it proclaimed, must be blind—free of prejudice, power, or wealth.
➢ **The Scales:** These scales of balance have always stood for fairness, reminding us that every argument, every case, must be weighed with care before a verdict is rendered.
➢ **The Sword:** Sharp and swift, the sword signified the authority of law, its ability to punish or protect, ensuring that justice prevails.

A New Vision: Shedding the Past

In colonial times, British rulers imposed their legal system on India, and along with it, the image of Lady Justice as we know it today.

The new statue, however, seeks to decolonize this symbol—bringing her closer to Indian sensibilities, reflecting a legal system shaped by the values of independence, equality, and inclusivity.

➢ **The Saree:** Clothed in a saree, the new Lady Justice connects with Indian tradition. Her attire is a reflection of the Indian ethos, moving away from Western symbolism to embrace a deeper cultural resonance.
➢ **Eyes Wide Open:** In this reimagined figure, the blindfold is removed. Her open eyes signify that justice in India must *see*—see the rich diversity of its people, the inequalities that persist, and the unique social fabric that makes one-size-fits-all justice insufficient. This is a call for an empathetic and nuanced approach to the law.
➢ **The Constitution in Hand:** Where once there was a sword, now rests the Indian Constitution—a powerful statement that justice in India is governed by the supreme law of the land, not by brute force or violence.
➢ **The Scales of Balance Remain:** Amid the changes, one element endures—the scales. This signifies that while India evolves, the core tenets of impartiality and fairness remain the bedrock of its judicial system.

The Challenge Ahead: Transforming Symbolism into Reality

Yet, a symbol alone cannot deliver justice. While the unveiling of the new Lady Justice brings hope, urgent actions are needed to breathe life into the ideal it represents.

➢ **Finalizing the MoP:** For eight years, the revised Memorandum of Procedure for the appointment of judges through the collegium system has lingered. It is time to finalize this critical framework, injecting transparency and accountability into the process.

➢ **Reflecting Social Diversity:** The higher judiciary remains starkly underrepresented. Backward classes, scheduled castes, scheduled tribes, and religious minorities constitute less than 25%, while women make up less than 15% of appointments. Justice must mirror society's diversity—only then can it be truly fair.

➢ **Addressing Vacancies:** With High Courts operating at 60-70% capacity and over 60 lakh pending cases, it is vital to fill these vacancies without delay. The same urgency is needed for the lower courts, where 4.4 crore cases await resolution.

➢ **Prioritizing Liberty and Constitutional Cases:** Cases that challenge constitutional amendments or affect personal liberty must be prioritized. These are the heartbeats of a free democracy, and justice delayed here is justice denied.

A Future with Open Eyes

➢ As the scales of justice continue to weigh the balance between right and wrong, the open-eyed Lady Justice stands as a beacon of hope.

➢ She reminds us that the true test of justice lies not in the symbolism of statues, but in the swift, fair, and impartial judgments delivered every day in courts across the country.

➢ This is not just a new statue—it is a call to action. A call to ensure that justice in India evolves with its people, that it remains vigilant, empathetic, and ever mindful of its role in shaping a fairer society. The law must *see*—and only by seeing can it heal.

Smart Insuline

Syllabus: GS-2; Health

Context

➢ This article explains How 'smart insulin' promises to revolutionise diabetes treatment.

Diabetes Overview

➢ **Global Impact**: Affects over half a billion people, causing nearly 7 million deaths annually.
➢ **Types of Diabetes**:
  o **Type 1**: Occurs when the pancreas fails to produce sufficient insulin, usually beginning in childhood.
  o **Type 2**: Involves the body developing resistance to insulin, requiring increased insulin production to manage blood sugar.

Challenges in Diabetes Management

➢ **Insulin Therapy**: Both types of diabetes are treated using synthetic insulin.
➢ **Blood Sugar Fluctuations**: Blood sugar levels are not constant, and excess insulin can cause dangerously low sugar levels (hypoglycemia), which can be life-threatening. Patients often need to monitor blood glucose and adjust insulin doses.

Smart Insulin Breakthrough

➢ **Development of Glucose-Sensitive Insulin**: Scientists have aimed for decades to create insulin that responds to real-time blood sugar changes.
➢ **Traditional Approaches**: Some of the most advanced methods rely on storing insulin in the body and releasing it based on sensor readings of blood sugar levels.

New "Smart" Insulin (NNC2215)

➢ **Breakthrough Study**: A team from Denmark, the UK, Czechia, and the University of Bristol has developed a glucose-sensitive insulin molecule that activates or deactivates based on blood sugar levels.
  o **Mechanism**: NNC2215 has two parts—a ring-shaped structure and a glucoside (a molecule similar to glucose).
    ▪ **Low Blood Sugar**: The glucoside binds to the ring, keeping the insulin inactive to prevent further drops in sugar.

- **High Blood Sugar**: When glucose levels rise, it replaces the glucoside, activating the insulin to reduce blood sugar.

Impact and Future Research

➤ **Potential Benefits**: This could significantly ease the burden of managing blood sugar levels, improving both physical and mental health for millions of diabetes patients.

➤ **Effectiveness**: The insulin has been found to work as effectively as human insulin in animal trials (rats and pigs), with human trials expected soon.

India-China relations

Syllabus: GS-2; International Relations

Context

➤ India and China should 'properly' manage differences, Xi Jinping tells PM Modi in first formal talks in 5 years.

More to know

➤ India-China relations have been shaped by historical, political, and strategic factors, with cooperation and competition marking their interactions.

➤ As the two most populous nations and major Asian powers, their relationship holds significance not only for bilateral ties but also for regional and global dynamics.

Historical Background

➤ **Ancient Ties**: India and China share centuries of cultural, trade, and religious exchanges, including the spread of Buddhism from India to China. Historic travelers like Xuanzang visited India for study.

➤ **Post-1947 Relations**: After India's independence in 1947 and the founding of the People's Republic of China in 1949, both countries sought cordial ties. However, divergent geopolitical interests emerged soon after.

Border Disputes

- ➢ **Sino-Indian War (1962)**: The primary source of friction between the two nations has been the unresolved boundary dispute. The war was fought over the Aksai Chin region (controlled by China, claimed by India) and Arunachal Pradesh (controlled by India, claimed by China). The war ended in a Chinese victory, worsening relations.
- ➢ **Border Agreements**: Both countries signed agreements in 1993 and 1996 to maintain peace along the Line of Actual Control (LAC). These agreements facilitated confidence-building measures, but tensions remain.
- ➢ **Recent Standoffs**:
  - o **Doklam (2017)**: The standoff in Bhutan's Doklam region highlighted the strategic competition in the India-China-Bhutan tri-junction.
  - o **Galwan Valley Clash (2020)**: A deadly clash in Ladakh's Galwan Valley marked the first combat deaths in decades, severely impacting relations. Both sides have since engaged in military talks, but tensions along the LAC persist.

Economic Relations

- ➢ **Trade**: China is India's largest trading partner, with trade surpassing $100 billion in recent years. India exports raw materials (iron ore, cotton) and imports finished goods (electronics, machinery) from China.
- ➢ **Trade Deficit**: India has a significant trade deficit with China, with concerns about economic dependency and calls for boosting domestic industries to reduce this gap.
- ➢ **Restrictions on Chinese Investments**: Post-Galwan clash, India restricted Chinese investments, especially in sensitive sectors like telecom (5G), infrastructure, and apps. This has led to a recalibration of economic ties.

Strategic and Military Issues

- ➢ **India's "Act East" Policy**: India seeks to counterbalance China's influence by enhancing ties with Southeast Asian nations and participating in multilateral forums like ASEAN.
- ➢ **Quad Grouping**: India's involvement in the Quad (with the US, Japan, and Australia) is seen as a counter to China's growing assertiveness in the Indo-Pacific region.
- ➢ **Belt and Road Initiative (BRI)**: India has opposed China's BRI, citing sovereignty concerns, particularly with the China-Pakistan Economic Corridor (CPEC) passing through Pakistan-occupied Kashmir (PoK).

Multilateral Engagement

➢ **BRICS and SCO**: India and China collaborate in multilateral platforms like BRICS (Brazil, Russia, India, China, South Africa) and the Shanghai Cooperation Organisation (SCO), focusing on economic and security issues.
➢ **Climate Change**: Both countries share common interests in global climate negotiations, pushing for financial and technological support from developed nations under the Paris Agreement.

Cultural and People-to-People Relations

➢ Despite political tensions, cultural ties remain robust through initiatives like cultural exchanges, educational programs, and tourism. Buddhist heritage has been a significant link between the two civilizations.
➢ **Soft Power Diplomacy**: The influence of soft power, including films, academic exchanges, and festivals, has been leveraged to improve ties.

Recent Developments

➢ **Border Talks**: Ongoing talks at the military and diplomatic levels to resolve the standoff at LAC, though the situation remains unresolved.
➢ **Economic Decoupling**: Post-Galwan, India's push for "Atmanirbhar Bharat" (self-reliant India) aims to reduce dependency on Chinese imports, with increased focus on domestic manufacturing and FDI from non-Chinese sources.
➢ **Geopolitical Rivalry**: The power tussle in the Indo-Pacific, with India's increasing cooperation with the US, Japan, and Australia, reflects the growing strategic divergence between India and China.

Challenges and Opportunities

➢ **Border Tensions**: Resolving the long-standing border dispute remains crucial to maintaining peace and stability in the region.
➢ **Economic Engagement**: While there are challenges due to the trade imbalance, both countries can explore avenues like services, technology, and pharmaceuticals.
➢ **Global Influence**: Both countries are rising powers, and their relationship will shape the future of global institutions like the UN, WTO, and climate frameworks.

Conclusion

➢ India-China relations are marked by a complex interplay of cooperation and competition. While there is scope for collaboration in economic and multilateral

platforms, border tensions and strategic rivalries continue to challenge the relationship. India's approach to China will likely involve balancing engagement with strategic competition, ensuring its territorial integrity, and fostering ties with other global powers.

Plankton balloon

Syllabus: GS-3; Marine ecology and its importance

Context

➢ Plankton balloon to six times their size to reach ocean surface.

What is the Plankton Balloon?

➢ The Plankton Balloon is a large balloon-like structure designed to collect and analyze plankton samples from various depths of the ocean.
➢ It aims to enhance the understanding of marine biodiversity and the ecological significance of plankton, which are essential for the ocean's food web and play a crucial role in carbon cycling.

Key Features

- **Design**: The Plankton Balloon is equipped with sensors and sampling devices that can capture plankton from different water layers as it ascends and descends in the ocean.
- **Deployment**: The balloon is typically released from a ship or platform and can operate autonomously, collecting data on plankton populations and environmental conditions.

Importance of Plankton

- **Ecosystem Role**: Plankton, including phytoplankton and zooplankton, are vital to marine food chains. Phytoplankton produces oxygen through photosynthesis, while zooplankton feeds on them and serves as food for larger marine organisms.
- **Climate Regulation**: Plankton contribute significantly to carbon sequestration. They absorb carbon dioxide and play a role in mitigating climate change.
- **Indicator Species**: Changes in plankton populations can indicate shifts in ocean health, climate change impacts, and the effects of pollution.

Research and Applications

- **Data Collection**: The Plankton Balloon collects real-time data that can be used for scientific research and monitoring of ocean health.
- **Climate Studies**: It aids in understanding the impacts of climate change on marine ecosystems, particularly how warming waters affect plankton distribution and diversity.
- **Biodiversity Monitoring**: The project contributes to biodiversity assessments, helping scientists track changes in marine life.

Recent Developments

- **Collaborations**: The project often involves collaborations between marine biologists, ecologists, and technology developers to enhance the efficiency and accuracy of data collection.
- **Innovative Technologies**: The integration of advanced technology in the design of the Plankton Balloon is a significant step towards improving oceanographic research methods.