CURRENT AFFAIRS WEEKLY

WEEK 1
JUNE, 2024

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- D-Day: The Turning Point of World War II
- Onset of La Nina

GS-II

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- Insolvency and Bankruptcy Code (IBC)
- Addressing Poor Electricity Supply for Farmers
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DISCLAIMER

The current affairs articles are segregated from prelims and mains perspective, such separation is maintained in terms of structure of articles. Mains articles have more focus on analysis and prelims articles have more focus on facts.

However, this doesn't mean that Mains articles don't cover facts and PT articles can't have analysis. You are suggested to read all of them for all stages of examination.

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SECTION-A
MAINS ISSUES

WOMEN IN CORPORATE ROLES IN INDIA

CONTEXT

The representation of women in corporate roles in India has long been below 30% and has shown signs of stagnation or even decline in the post-pandemic years. This trend is highlighted in a report by LinkedIn titled "Women in Leadership in Corporate India."

Sector-Wise Representation

The report provides data on the representation of women in leadership roles across various sectors:

- **Highest Representation**: Education (30%) and Government Administration (29%) have the highest representation of women in leadership roles.
- **Moderate Representation**: Technology, Information, and Media, and Financial Services sectors have a moderate female representation in leadership at 19%.
- **Lowest Representation**: Construction, Oil, Gas, and Mining, and Utilities sectors have the lowest female representation in leadership at 11%, followed by Wholesale and Manufacturing at 12%, and Accommodation and Food Services at 15%.

Factors Contributing to Decline

- **Reduction in hybrid or work-from-home roles** has suppressed the growth of female participation in the corporate labor market.
- Women still face significant obstacles in reaching leadership roles due to **bias, societal norms, and structural barriers.**
- Structural barriers such as **lack of access to education, limited professional networks, and inadequate support systems** for working mothers also play significant roles.

Suggestions for Improvement

- **Skills-First Approach to Hiring**: This approach focuses on hiring based on skills rather than gendered assumptions about a prospective employee's capabilities.
- **Mentorship and Networking Opportunities**: Providing mentorship and networking opportunities can help women advance in their careers.
- **Shared Parental Leave**: Implementing shared parental leave can support women in balancing work and family responsibilities.

Societal Analysis

From a societal perspective, the underrepresentation of women in corporate leadership roles in India reflects broader gender inequality issues.

- **Gender Norms and Biases**: Deep-rooted societal norms and biases against women in leadership positions need to be addressed through education and awareness programs.
- **Structural Barriers**: Policies and initiatives should focus on removing structural barriers that prevent women from advancing in their careers.
- **Support Systems**: Enhancing support systems for women, such as affordable childcare and flexible working conditions, can help increase their participation in the workforce.
- **Role Models and Mentors:** Encouraging successful women leaders to serve as role models and mentors can inspire and guide other women in their professional journeys.

Mains PYQ

Q: What are the continued challenges for women in India against time and space? (2019)

Q: Male membership needs to be encouraged in order to make women's organization free from gender bias. Comment. (2013)

D-DAY: THE TURNING POINT OF WORLD WAR II

CONTEXT

June 6, 2024, marks the **80th anniversary of D-Day**, the pivotal moment in **World War II** when Allied forces launched the **largest amphibious invasion** in history, marking the beginning of the **end for Nazi Germany**.

The Invasion:

- On June 6, 1944, Allied troops from various countries, including the **United States, the United Kingdom, and Canada**, stormed five stretches of the Normandy coastline, codenamed **Utah, Omaha, Gold, Juno, and Sword beaches.**
- **Allied Forces and Participation:** Over two million troops were stationed in the UK for the invasion, with significant contributions from **American, British, and Canadian forces**. Troops from other Allied nations, including **Australia, Belgium, France, and Poland,** also played vital roles in **Operation Overlord.**
- **Challenges and Losses:** While some landings were successful, particularly at Utah and Gold beaches, others faced significant challenges. Omaha Beach, in particular, witnessed heavy casualties due to strong currents and fierce German resistance. Thousands of Allied troops lost their lives on D-Day, with estimates of German casualties ranging from 4,000 to 9,000.
- **German Defense and Reaction:** Germany's response to **Operation Overlord** was hindered by poor weather conditions, strategic misinformation, and the diversionary tactics of Operation Fortitude. Despite their efforts, German coastal defenses were eventually overwhelmed by Allied advances.
- **Legacy and Impact:** D-Day marked a turning point in World War II, paving the way for the **liberation of France** and the eventual **defeat of Nazi Germany**. The successful invasion allowed the Allies to gain a foothold in **northwest Europe** and accelerate their advance towards victory.

FACT BOX

World War II (1939-1945)

- **Factors Responsible for World War II:**
  - **Treaty of Versailles:** harsh conditions imposed on Germany after World War I led to resentment and economic hardship
  - **Rise of Fascism and Nazism**: Dictatorial regimes in Germany (under Hitler) and Italy (under Mussolini) sought expansionist policies.
  - **Economic Turmoil**: The Great Depression exacerbated tensions and weakened international cooperation.
- **Participating Countries:**
  - **Axis Powers:** Germany, Italy, Japan (later joined by others like Hungary, Romania, and Bulgaria).
  - **Allied Powers**: United States, United Kingdom, Soviet Union (after being invaded by Germany in 1941), China, France (after its liberation). **India (as a part of the Allied Nations)**, sent over two and a half million soldiers to fight under **British command** against the Axis powers.
- **Important Locations:**
  - **Europe:** Major battles were fought in France (Normandy, Battle of the Bulge), Germany (Berlin), Italy (Anzio, Monte Cassino), and Eastern Europe (Stalingrad).
  - **Pacific Theater:** Significant battles occurred in Pearl Harbor, Midway, Guadalcanal, Iwo Jima, and Okinawa.
  - **North Africa**: Key battles were fought in El Alamein and Tobruk.
- **Outcome:**
  - **Allied Victory**: The Allies emerged victorious, leading to the defeat of Nazi Germany and Fascist Italy in Europe, and Imperial Japan in the Pacific.
  - **Formation of the United Nations**: The war led to the creation of the United Nations, aimed at preventing future conflicts through international cooperation.
  - **Cold War:** Tensions between the Soviet Union and Western Allies escalated, leading to the Cold War, characterized by ideological and political rivalries.
  - **Decolonization:** The war hastened the decline of European colonial empires, leading to the independence movements in Asia and Africa.

PYQ

Q: To what extent can Germany be held responsible for causing the two World Wars? Discuss critically. (2015)

ONSET OF LA NINA

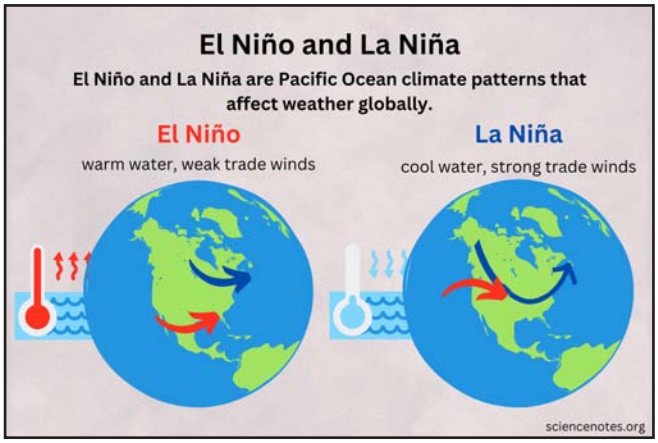
CONTEXT

El Nino, the weather phenomenon known for contributing to record-high temperatures in 2023, has recently subsided. This transition paves the way for the **onset of La Nina**, a cooling phase. However, scientists caution that in the context of human-induced climate change, the cooling effect of La Nina may be minimal.

El Nino:

- El Nino occurs every two to seven years and lasts nine to 12 months.
- It weakens trade winds across the tropical Pacific, leading to warmer ocean temperatures.
- This warming alters rainfall patterns and wind patterns globally, impacting weather conditions.
- El Nino years are often among the warmest on record due to the release of energy into the atmosphere.
- It typically results in drier conditions in southeast Asia, Australia, and parts of Africa, and wetter conditions in the Horn of Africa and the southern United States.
- **Neutral Period:**
  - After El Nino dissipates, a neutral period ensues before La Nina begins.
  - The neutral period may continue to experience above-normal temperatures as the global atmospheric circulation adjusts.
  - Neutral conditions are forecasted to persist through July, with equatorial regions experiencing near-to-below normal temperatures.

La Nina:



- La Nina follows El Nino and lasts one to three years.
- It causes cooling of the eastern Pacific Ocean, leading to opposite effects on global weather compared to El Nino.
- La Nina brings wetter conditions to parts of Australia, southeast Asia, and Africa, while causing dry conditions in parts of South America.
- It can contribute to more severe Atlantic hurricanes.
- Despite La Nina's cooling effect, global temperatures are expected to remain high due to ongoing climate change.

Conclusion:

While the transition from El Nino to La Nina offers insights into global weather patterns, the influence of human-induced climate change complicates these natural phenomena. As La Nina emerges, scientists continue to monitor its impact on weather conditions worldwide, emphasizing the ongoing challenge of mitigating the effects of climate change amidst natural climate variability.

PYQ

Q: Most of the unusual climatic happenings are explained as an outcome of the El-Nino effect. Do you agree? (2014)

Q: La Nina is suspected to have caused recent floods in Australia. How is La Nina different from El Nino? (2011)

1. La Nina is characterised by unusually cold ocean temperature in the equatorial Indian Ocean whereas El Nino is characterised by unusually warm ocean temperature in the equatorial Pacific Ocean.
2. El Nino has an adverse effect on the south-west monsoon of India, but La Nina has no effect on the monsoon climate.

Which of the statement/s given above is/are correct?

(a) 1 Only
(b) 2 Only
(c) Both 1 and 2
(d) Neither 1 nor 2

Solution: (d)

THE TOBACCO EPIDEMIC

CONTEXT

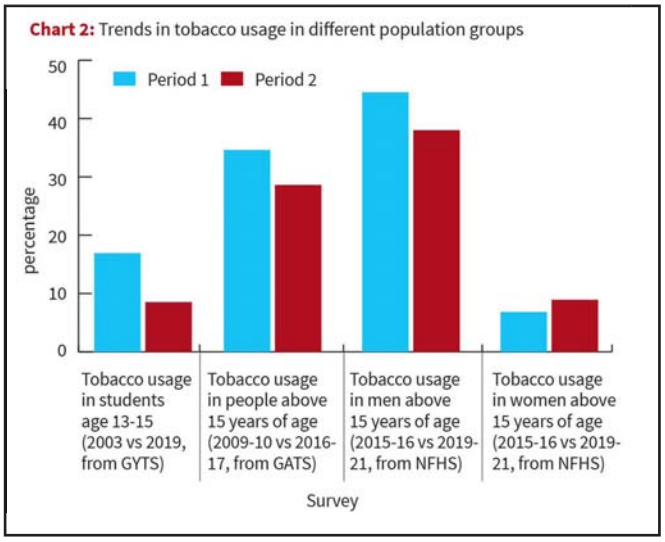
May 31st marks World No Tobacco Day, WHO's global campaign to raise awareness about the dangers of tobacco use and advocate for effective policies to reduce consumption. This year's theme, ***"Protecting Children from Tobacco Industry Interference,"*** underscores the critical need to safeguard people from the manipulative tactics of the tobacco industry.

The Impact of Tobacco

- Tobacco is the leading preventable cause of disease and death worldwide.
- **Health**: In India, nearly 26 crore people consume tobacco, and over 60 lakh people employed in the tobacco industry are at risk of health issues due to skin absorption of tobacco.
- **Environmental Cost:** Beyond human health, tobacco cultivation depletes **soil nutrients, requiring more fertilizers and causing deforestation.** Processing 1 kg of tobacco requires 5.4 kg of wood.
- **Economic Costs**: A 2021 study estimated that tobacco's health impacts cost India over Rs 1.7 lakh crore in 2017-2018, compared to the Union Budget's health allocation of Rs 48,000 crore that year.
  - Cleaning up tobacco waste costs an additional Rs 6,367 crore annually. These figures exclude the environmental costs of soil erosion and deforestation.

- Annually, tobacco production and consumption generate around 1.7 lakh tonnes of waste.

- **Child labour:** Indian *bidis* feature on the US's 2022 List of Goods Produced by Child Labor or Forced Labor.



Awareness and Control Programs

- India is a signatory to the **WHO's Framework Convention on Tobacco Control (FCTC)** since 2005.
- **The Cigarettes and Other Tobacco Products Act (COTPA) 2003** regulates tobacco production, advertisement, and consumption.
- **The National Tobacco Control Program (NTCP),** launched in 2007, aims to enforce COTPA and FCTC, raise awareness about tobacco harms, and support cessation efforts. Tobacco taxation is also used to control consumption.
- India banned **foreign direct investment (FDI)** in tobacco manufacturing in 2010.

Implementation Challenges

- Despite existing measures, enforcement is weak. Smokeless tobacco products often do not comply with **COTPA** packaging guidelines, and smuggled products are poorly regulated.
- Fines for COTPA violations have not been updated since 2003, remaining low and ineffective. Indirect advertising through surrogate products like elaichi allows tobacco brands to bypass direct advertisement bans.
- **Proposed Amendments:** Amendments to COTPA proposed in 2015 and 2020 aimed to regulate surrogate advertisements, increase fines, and require licensing for tobacco production and distribution. However, these amendments have not been passed.
- **Taxation and Affordability:** India's low tobacco taxes have not kept pace with rising incomes, making tobacco products more affordable. The tax burden is 51% for cigarettes, 22% for bidis, and 64% for smokeless tobacco products, below the FCTC's recommended 75%. Despite efforts, tax evasion and illegal trade persist.
- **Lobbying and Policy Interference**: Effective lobbying by the tobacco industry has led to tax exemptions and policy influence.

FACT BOX

Prevalence in India

- India remains the **world's second largest consumer, producer and exporter of tobacco.**
- Smoking prevalence in India is **10.7%.** However, the most popular form of tobacco in India is **smokeless tobacco (SLT)**, with use prevalence of 21.4%.
- India has the second highest number of oral cancer cases globally, accounting for a third of the total.
- More than 90% of India's oral cancer cases are caused by tobacco use and of these, more than half are caused by SLT.

INSOLVENCY AND BANKRUPTCY CODE (IBC)

CONTEXT

Since the introduction of the **Insolvency and Bankruptcy Code (IBC) in 2016**, creditors have successfully recovered Rs 3.36 trillion from defaulting corporations. This marks a significant improvement over the previous **Board for Industrial and Financial Reconstruction (BIFR) regime.**

Key Accomplishments

- **Rescue of Distressed Companies**: The IBC has facilitated the rescue of 3,171 distressed companies between 2016 and March 2024. It has also helped in the efficient shutdown of unviable businesses.
- The recovery under IBC represents around one-third of the amounts claimed by creditors and 162% of the liquidation value of the assets.
- **Resolution of the Twin Balance Sheet Problem**: The IBC has been instrumental in addressing the twin balance sheet problem, where banks were stressed, and firms were overleveraged due to liberal lending practices following the global financial crisis of 2008-09.
- **Reduction in Non-Performing Assets (NPAs)**: Post-reform, the gross non-performing assets ratio of banks has decreased to a multi-year low of 3%, and the net non-performing assets ratio (excluding provisions for potential losses) has dropped to 0.7% as of December 2023.
- It has helped in tackling a major development challenge for the government—the twin balance sheet problem – when banks are stressed and firms are overleveraged, due to liberal lending practices meant to boost economic growth after the global financial crisis of 2008-09.

What is IBC?

- Insolvency and Bankruptcy Code (IBC) is India's bankruptcy law.
- The IBC consolidates the existing framework by creating a **single law for insolvency and bankruptcy**.
- **Prime objective:** to rescue corporate debtors in distress. The IBC specifies a time-bound insolvency resolution process, including any litigation, which must be completed within 330 days. The primary objective of the IBC is to rescue corporate debtors in distress swiftly.
- Previously, the process of winding up companies was regulated by the **Companies Act, 1956**, under court supervision, leading to **undue delays.**
- With the enforcement of the IBC, the winding-up procedure is now under the supervision of the **National Company Law Tribunal (NCLT).** This ensures prompt action at the early stage of debt default, resulting in an optimal recovery rate.
- After the reform, the gross non-performing assets ratio of banks dipped to a multi-year low of 3% and the net non-performing assets ratio (which excludes the provisions set aside for covering potential losses) to 0.7% as of December 2023.

FACT BOX

About Non-Performing Assets (NPAs)

- The Reserve Bank of India (RBI) defines Non-Performing Assets (NPAs) as loans or advances that are overdue for more than 90 days.
- **Types of NPAs**
  - **Sub-Standard Assets**: These are NPAs that have been overdue for less than or equal to 12 months.
  - **Doubtful Assets:** These are NPAs that have been overdue for more than 12 months.
  - **Loss Assets**: These are assets that are considered "uncollectible" and have little value, though some recovery may still be possible. These assets have not yet been fully written off by the bank.

About National Company Law Tribunal (NCLT)

- **Formed:** 2016
- NCLT is a **quasi-judicial body** in India. It was constituted under section 408 of the Companies Act, 2013.
- It has the authority to adjudicate issues related to Indian companies. This includes:
  - Proceedings related to arbitration.
  - Compromise and arrangements.
  - Reconstructions and winding up of companies.
  - Insolvency resolution processes for companies.
  - Insolvency resolution for limited liability partnerships under the Insolvency and Bankruptcy Code, 2016.

UPSC PYQ

Q: Consider the following statements: (2018)

Non-performing assets (NPAs) decline in value when-

1. Demand revives in the economy
2. Capacity utilisation increases
3. Capacity utilisation, through substantive, is yet optimal
4. Capacity utilisation decreases consequently upon merger of unit.

Which of the above statements are correct?

(a) 1, 3 and 4 only
(b) 1, 2 and 4 only
(c) 1, 2 and 3 only
(d) 1, 2, 3, 4

Solution: (c)

ADDRESSING POOR ELECTRICITY SUPPLY FOR FARMERS

CONTEXT

The Centre for Energy, Environment and People (CEEP) organized a dialogue called **'Vidyut Samvad'** to discuss the systemic issues of poor electricity supply faced by farmers in Rajasthan. The panel suggested establishing a **farmers' cooperative-based distribution model** under the **Electricity Act, 2003**, to address regulatory accountability and improve electricity supply. The role of **solar and energy-efficient pumps** for irrigation was also emphasized as a potential solution.

Issues faced by Farmers

- The farmers suffers from the inadequate electricity supply, with only four hours of power against the mandated six hours, causing voltage fluctuations that damage irrigation motors and transformers.
- This results in crop losses and increased farming costs, posing a significant concern for farmers.

Significance of farmers' cooperative-based distribution model

- A farmers' cooperative-based distribution model involves organizing farmers into cooperatives to collectively manage and distribute electricity in rural areas.
- In this model, farmers work together to address their common energy needs, such as irrigation and powering agricultural equipment, by establishing their own electricity distribution system.

- Overall, the farmers' cooperative-based distribution model empowers rural communities to take control of their energy resources, improve access to electricity, and address the specific challenges they face in agricultural production.
- It also promotes local economic development and resilience.

FACT BOX

The Electricity Act, 2003

- The Electricity Act, 2003 aims to foster growth and development in the electricity sector by reducing government involvement in regulation.
- **Objectives:** The Act seeks to create a liberal framework for the power sector's development.
- **Establishment of Regulatory Commissions**:
  - The Act sets up Electricity Regulatory Commissions at both central (CERC) and state levels (SERCs).
  - Their functions include regulating tariffs, issuing licenses for transmission and distribution, and resolving disputes.
- **Central Electricity Regulatory Commission (CERC):**
  - CERC is India's power sector regulator.
  - Its goals are to promote competition, efficiency, and economy in bulk power markets, improve supply quality, and advise the government on addressing demand-supply gaps.
  - CERC operates as a statutory body with quasi-judicial authority under the Electricity Act, 2003.
- **Offences under the Act:** Theft of electricity, tampering with electric meters, and theft of electric lines and materials.

Current State of Power Sector

- India is the **third-largest producer and consumer** of electricity worldwide, with an installed power capacity of 429.96 GW as of January 31, 2024.
- As of January 31, 2024, India's installed renewable energy capacity (including hydro) stood at 182.05 GW, representing 42.3% of the overall installed power capacity. As of January 31, 2024, Solar energy contributed 72.31 GW, followed by 44.95 GW from wind power, 10.26 GW from biomass, 4.99 GW from small hydropower, 0.58 from waste to energy, and 46.93 GW from hydropower.
- The non-hydro renewable energy capacity addition stood at 15.27 GW in FY23, up from 14.07 GW in FY22.

Overview of India's Electricity Sector:

- India ranks as the **world's third-largest producer and consumer of electricity**.
- By January 31, 2024, India had an installed power capacity of 429.96 GW.
- **Renewable Energy Capacity:** As of January 31, 2024, India's renewable energy capacity (including hydro) reached 182.05 GW, accounting for 42.3% of the total installed power capacity.
  - Solar energy contributed the most with 72.31 GW, followed by
    - wind power with 44.95 GW
    - biomass with 10.26 GW
    - small hydropower with 4.99 GW
    - waste to energy with 0.58 GW
    - hydropower with 46.93 GW
- **Capacity Addition:** In the fiscal year 2022-23, non-hydro renewable energy capacity increased by 15.27 GW, compared to 14.07 GW in the previous fiscal year (2021-22).

Government Schemes for Power Sector:

- **Pradhan Mantri Sahaj Bijli Har Ghar Yojana (SAUBHAGYA):** To achieve universal household electrification by providing last mile connectivity and electricity connections
- **Deen Dayal Upadhyaya Gram Jyoti Yojana (DDUGJY)**: It was launched in 2014 to improve the quality and reliability of power supply in rural areas.
- **Restructured Distribution Sector Scheme (RDSS):** It was launched to enhance the efficiency of power distribution, the government has implemented initiatives.
- **Ujwal Discom Assurance Yojana (UDAY) Scheme:** To ensure the availability of affordable and accessible 24x7 power supply to all citizens.
- **100% FDI** allowed in the power sector has boosted FDI inflow in this sector.
- **Other Schemes:**
  - Deen Dayal Upadhyay Gram Jyoti Yojana (DDUGJY)
  - Integrated Power Development Scheme (IPDS)
  - PM-Surya Ghar: Muft Bijli Yojana

PYQ

Q: Which one of the following is a purpose of 'UDAY', a scheme of the Government? (2016)

(a) Providing technical and financial assistance to start- up entrepreneurs in the field of renewable sources of energy

(b) Providing electricity to every household in the country by 2018

(c) Replacing the coal-based power plants with natural gas, nuclear, solar, wind and tidal power plants over a period of time

(d) Providing for financial turnaround and revival of power distribution companies

Solution: (d)

AMENDMENTS TO IHR 2005

CONTEXT

In a landmark development, the **77th World Health Assembly** recently approved a series of amendments to the **International Health Regulations (IHR 2005),** responding to lessons learned from the Covid-19 pandemic. These amendments aim to enhance countries' readiness to tackle **Public Health Emergencies of International Concern (PHEIC) and Pandemic Emergencies (PE).**

The Amendments:

- **Need:** The amendments were prompted by the challenges faced during the Covid-19 pandemic, highlighting the need for a more robust global health security framework.
- The amendments focus on improving countries' preparedness and response capabilities during health emergencies.
- **They include provisions for**
  - equitable access to health products during emergencies
  - mobilization of financial resources to support developing countries in strengthening their core capacities under the IHR (2005)
- **Significance:**
  - The adoption of these amendments marks a significant step towards enhancing **global health security** and promoting equity in pandemic response efforts.
  - India played a constructive role in the negotiations, contributing to the crafting of an instrument that prioritizes equity and enables developing countries to respond effectively to health emergencies.

What is Global Health Security?

- Global health security focuses on **preventing, detecting, and responding to infectious disease threats** that can easily spread across borders.
- **Major Risks**: Globalization and advancements in medicine have introduced new risks to health security:
  - **Emergence and Spread of Infectious Diseases**: Diseases like the novel coronavirus identified in 2019 can quickly spread across continents.
  - **Globalization of Trade and Travel**: Faster trade and travel allow diseases to spread more rapidly.
  - **Rise of Drug-Resistant Pathogens**: Antibiotic-resistant bacteria, such as E. coli, pose a significant threat.
  - **Risk of Pathogen Release:** There's a risk of intentional or accidental release of dangerous pathogens.
- **Role of IHR**: IHR play a crucial role in global health security by providing a framework for countries to prevent, detect, and respond to international health threats. They promote collaboration and information sharing among countries, strengthening the global response to infectious diseases and other health emergencies.

Is India's Healthcare Ready for Future Pandemics?

- **Current Status:** India's Global Health Security Index score dropped from 43.6 in 2019 to 42.8 in 2021, lower than some other countries like Japan, Brazil, and Russia. However, India is actively taking steps to improve its readiness.
- **Initiatives Taken:**
  - **PRET Initiative:** India launched the **Preparedness and Resilience for Emerging Threats (PRET) initiative** to develop a **National Pandemic Preparedness Plan for Respiratory Viruses**, offering guidance for integrated planning.
  - **One Health Approach**: One Health is an interdisciplinary approach recognizing the link between human, animal, and environmental health. India is implementing One Health through various initiatives:
    - Pradhan Mantri Ayushman Bharat Health Infrastructure Mission (PM-ABHIM)
    - National Institute for One Health
    - Establishment of a network for genomic surveillance
    - Ayushman Bharat Digital Health Mission

FACT BOX

About International Health Regulations (IHR)

- International Health Regulations (IHR) were initially adopted by the World Health Assembly in 1969 and last revised in 2005.
- They serve to enhance global efforts in managing public health events while minimizing disruptions to travel and trade.
- Currently, the IHR has **196 State Parties**, including all **194 WHO Member States**, as well as **Liechtenstein** and the **Holy See.**
- India is **signatory** to the International Health Regulations -2005.

Related PYQ

Q: Critically examine the role of WHO in providing global health security during the Covid-19 pandemic. (2020)

INDIA'S AGRICULTURAL SUBSIDIES

CONTEXT

Several member countries of the **World Trade Organization (WTO)** are questioning India over its **50% increase in support to farmers in 2022-23.** India's allocation for **public stockholding for food security** has also come under scrutiny, especially with a **21% increase from the previous year**.

India's Subsidies for Low-Income Farmers:

- India reported a significant increase in subsidies for "**low-income or resource-poor" farmers**, reaching $48.1 billion in 2022-23, a 50% rise from the previous year.
- The subsidies cover various inputs like **irrigation, fertilizers, and electricity,** benefiting nearly all farm holdings in India according to the Agricultural Census.
- WTO's member countries have been seeking a cut in India's ***de minimis*** entitlement under the WTO's Agreement on Agriculture (AoA).

Importance of Indian Farm Subsidies:

- India's farm subsidies are vital for its marginal farmers and ensure food security for millions. The demand for a cut in subsidies by developed countries seems unjust considering their lifeline status for Indian farmers.
- **Agricultural Realities in Developing Nations:** Developing countries have a **higher number of people engaged in agriculture**, with the sector contributing significantly to their GDP. Moreover, the majority of farmers in these nations are low-income or resource-poor, necessitating government support.
- **Disparity in Total Domestic Support:** Developed countries offer significantly higher total domestic support to their farmers compared to developing nations like India. For instance, while the US provides $61,286 per farmer, India's support stands at just $282.
- **AMS Entitlement and Discrimination:** Developed countries benefit from the Aggregate Measurement of Support (AMS) entitlement, allowing them to offer higher support. In contrast, developing countries face policy constraints due to restricted entitlements, leading to unfair trade practices.
- **Addressing Unfairness in Trade:** India invoked the **WTO peace clause** after exceeding the ceiling for farm support, highlighting the challenges faced by developing nations.

FACT BOX

What is WTO Agreement?

- The **Agreement on Agriculture** is being implemented through the formation of the World Trade Organisation (WTO) in 1995.
- According to the **WTO's Agreement on Agriculture,** member countries are to reduce the support they provide their respective agriculture sectors in a bid to create a **level playing field across the world.**
- However, one of the exemptions from these reduction commitments for developing countries is the subsidy provided to **low-income and resource-poor farmers** in these countries.
- It is in this exempt category that India has seen the 50 percent jump in the subsidy it provided, and which drew the questions of the other WTO member countries.

Government Subsidies for Farmers:

- **Seeds:** Implemented through Sub-Mission on Seeds & Planting Materials (SMSP) to promote quality seed production. Financial assistance provided for distributing foundation/certified seeds at subsidized rates.
- **Mechanization & Technology:** Sub Mission on Agricultural Mechanization (SMAM) focuses on inclusive growth in mechanization.
- **Irrigation:** Pradhan Mantri Krishi Sinchai Yojana (PMKSY)
- **Godowns:** Agricultural Marketing Infrastructure (AMI) scheme
- **Fertilizer:** Urea provided at subsidized rates to farmers, with the difference between production cost and market price subsidized by the government.
  - **Nutrient Based Subsidy Policy** implemented for **Phosphatic and Potassic (P&K) fertilizers**, providing fixed subsidies based on nutrient content.
- **Other Subsidized Schemes:** National Food Security Mission (NFSM), Mission for Integrated Development of Horticulture (MIDH), Rashtriya Krishi Vikas Yojana (RKVY), and Paramparagat Krishi Vikas Yojana (PKVY)

PYQ

Q: What are the direct and indirect subsidies provided to farm sector in India? Discuss the issues raised by the World Trade Organization (WTO) in relation to agricultural subsidies. (2023)

Q: WTO is an important international institution where decisions taken affect countries in a profound manner. What is the mandate of WTO and how binding are their decisions? Critically analyse India's stand on the latest round of talks on Food security. (2014)

INEQUALITY AND GROWTH

CONTEXT

The recent debate on inequality has gained attention after contrasting views on inequality's advantages and disadvantages. Researchers have highlighted that modern India exhibits **greater inequality than in colonial times**. While some argue that **inequality incentivizes entrepreneurship**, others contend that **excessive inequality can harm economic growth and welfare**, advocating for wealth redistribution measures.

Impact of Inequality:

- **Direct impacts**: Decreased economic growth, increased poverty levels, and greater social unrest.
- **Inequality can undermine democratic processes**, posing challenges to social cohesion and economic stability.
- **Monopoly Power and Consumption**: Billionaires derive wealth from monopolistic control, allowing them to set higher prices, reducing real wages and consumption power. This leads to lower output and investment, impacting overall economic welfare.
- **Sluggish economic expansion**: Inequality results in reduced consumption power, weakening multiplier effect of investment. Lesser consumption by those with lower incomes leads to sluggish economic expansion.

The other side of the coin (Positive impacts)

- **Employment and welfare:** Some argue that a certain level of inequality incentivizes entrepreneurship, which in turn boosts employment and welfare.
- **Investment:** The prospect of greater financial rewards encourages risk-taking and investment in new ventures.
- **Innovation and growth**: Entrepreneurial endeavors spurred by income inequality can contribute to economic growth. Innovation leads to the creation of new businesses, technologies, and job opportunities.
- **Savings:** Higher-income individuals tend to save and invest a larger portion of their income. Increased savings and investment can fuel economic development and prosperity.
- **Efficiency and Productivity:** Income inequality may foster competition and drive efficiency in the economy. Individuals strive for higher earnings, leading to increased productivity and innovation.

Why Redistribution is Necessary:

- Only a small percentage of the population (0.68%) effectively pays income tax, with a significant portion of taxable income being declared by the ultra-rich (0.016%).
- The majority of unorganized sector workers (90%) earn less than Rs 10,000 per month, indicating widespread poverty.
- **Disparity and Its Causes:**
  - Wealth disparity is exacerbated by factors like black incomes and undeclared wealth.
  - Inequality is a result of the economic and political system, not inherent in nature.
  - The Role of the System: Economic success isn't solely due to individual effort; systemic factors like education and opportunity play a crucial role. Many wealthy individuals have benefitted from cronyism and bending rules rather than solely hard work.
- **Approaches to Addressing Inequality:** Wealth redistribution isn't about government seizure but through fair taxation. Direct taxes should be based on the ability to pay, with higher rates for the wealthy, including a wealth tax and inheritance tax.

Negative impact of Redistribution on 'Growth':

- Governments play a role in increasing or reducing income inequality through taxes (e.g. tax exemptions) and transfers (e.g. allowances or subsidies).
- Redistributive measures may hamper job creation by reducing incentives for wealth accumulation. However, taxing wealth does not necessarily deter investment, as it depends on future profit expectations rather than past wealth accumulation.
  - Redistribution can enhance growth by strengthening the multiplier effect and encouraging investment where purchasing power is high.
  - Policies like taxing billionaire wealth and providing basic income, as proposed by **Thomas Piketty**, can foster entrepreneurship and spur economic growth.

FACT BOX

Poverty in India

- **Report title:** "Income and Wealth Inequality in India" reveals stark disparities:
- In 2022, the wealthiest **1% of Indians** received **22.6% of the national income**, up from 11.5% in 1951 and 6% in the 1980s.
- The top 10% now earn **57.7% of the national income**, rising from 36.7% in 1951.
- Conversely, the bottom 50% saw their share drop to **15% in 2022** from 20.6% in 1951.
- The middle 40% also experienced a decline, with their share falling from 42.8% to 27.3%.
- The top 0.001%, comprising 10,000 of the richest Indians, earned 2.1% of the national income, while the top 0.01% and top 0.1% earned 4.3% and 9.6%, respectively.

PYQ

Q: Capitalism has guided the world economy to unprecedented prosperity. However, it often encourages shortsightedness and contributes to the wide disparities between the rich and the poor. In this light, would it be correct to believe and adopt capitalism driving inclusive growth in India? Discuss. (2014)

SOCIAL PROTECTION IN LOW-INCOME NATIONS

CONTEXT

The **International Labour Organization (ILO)** has identified a significant financial challenge for **low- and middle-income countries** to achieve **universal social protection**. According to a working paper by the ILO, an additional **$1.4 trillion per year** is needed globally to provide universal access to essential social protection guarantees, including support for children, persons with severe disabilities, mothers of newborns, older persons, unemployed, and essential health care.

Key-highlights of ILO's Working Paper

- Among all regions, **Africa faces the most substantial challenge** in reaching universal social protection coverage. The financing gap for low-income countries is particularly stark, amounting to more than half (52.3%) of their annual **gross domestic product (GDP),** underscoring the immense financial burden these countries face.
- The ILO document presents detailed estimates of the funding required at global, regional, and national levels. It emphasizes the critical need for international solidarity to bridge these financing gaps, highlighting that many low-income countries cannot achieve these goals without significant external support.
- The ILO paper underscores a formidable financial challenge in achieving universal social protection, especially for low-income countries.
- Astonishingly, these nations face a funding gap that exceeds half of their annual GDP—52.3%. This stark reality highlights an urgent need: only through international solidarity and cooperation can this immense gap be bridged, ensuring that essential social protections become a global reality.

Here is a table summarizing the distribution of funds needed for universal social protection and the basis for calculating the financing gaps for child benefits and old-age pensions:

Category	Percentage of Total Funds Needed	Basis for Calculation
Essential Health Care	60.1%	-
Child Benefits	17.8%	Individuals aged 0 to 14 not receiving any child benefits
Old-age Pensions	8.3%	Individuals aged 65 and up not receiving any old-age pension
Disability Benefits	7.1%	-
Unemployment Benefits	5.2%	-
Maternity Benefits	1.5%	-

Global and Regional Financing Gaps

- **Overall Gap:** The overall financing gap for universal social protection in low- and middle-income countries is 3.3% of GDP per year. This gap comprises 2% of GDP for essential health care and 1.3% for key social protection cash benefits (covering children, persons with severe disabilities, mothers of newborns, older persons, and the unemployed).
- **Regional Disparities:**
  - **Africa**: Faces the most significant challenge with a financing gap of 17.6% of the region's annual GDP. This high percentage reflects severe financial constraints and substantial needs in the continent.
  - **Arab States**: The financing gap stands at 11.4% of GDP, indicating significant financial hurdles in achieving universal coverage.
  - **Latin America and the Caribbean**: The gap is relatively lower at 2.7% of GDP, suggesting more manageable, yet still significant, financial challenges.
  - **Asia and the Pacific:** With a gap of 2% of GDP, this region faces moderate financial needs for universal social protection.
  - **Europe and Central Asia**: The lowest among the regions, the financing gap here is 1.9% of GDP, indicating relatively better financial capacity to address social protection needs.

Measures required to address the financing gap

Achieving universal social protection in low- and middle-income countries necessitates a significant increase in government spending, estimated at 10.6% of total annual spending. This ambitious goal requires a multifaceted approach involving domestic resource mobilization, better debt management, and international support.

- **Increased Government Spending**: To bridge the financing gap, low- and middle-income countries must increase government spending by 10.6% of their total

annual expenditure. This increase can be sourced from domestic resources, such as improved taxation systems and social security contributions, alongside better sovereign debt management practices.

- **Domestic Resource Mobilization**:
  - **Taxation**: Implementing more effective and progressive taxation policies is crucial. This includes higher taxes on higher income groups and corporations, particularly those that contribute most to carbon emissions.
  - **Social Security Contributions**: Expanding the base for social security contributions can provide a steady source of funding for social protection schemes.
- **Sovereign Debt Management**: Effective debt management strategies can free up resources for social protection. This includes renegotiating debt terms and improving fiscal policies to reduce debt burdens.
- **Climate Crisis Mitigation**: The working paper highlights the role of universal social protection in mitigating the impacts of the climate crisis by reducing vulnerabilities and providing a safety net against climate shocks. Social protection systems can help communities adapt to climate change, safeguarding livelihoods and enhancing resilience against environmental stresses.
- **Progressive Taxation and Carbon Pricing**: To address climate change and its unequal impacts, progressive taxation is essential. This includes taxes on high carbon dioxide producers and consumers.
- **International Climate Financing**: International climate financing can play a pivotal role in strengthening and adapting social protection systems in low- and middle-income countries.

Conclusion

To achieve universal social protection, low- and middle-income countries must undertake significant fiscal reforms, including increasing government spending and enhancing domestic resource mobilization through progressive taxation and better debt management. Additionally, addressing the climate crisis through targeted policies like carbon taxes and eliminating fossil fuel subsidies is crucial. International climate financing can bolster these efforts, ensuring that social protection systems are resilient and capable of mitigating the adverse effects of climate change. This comprehensive approach not only supports social equity but also promotes sustainable economic growth and environmental stewardship.

FACT BOX

What is Universal social protection?

- Universal social protection refers to a comprehensive system that ensures all individuals have access to essential social protection throughout their lives, regardless of their circumstances. This concept aims to provide a safety net that covers various risks and life stages, such as childhood, working age, and old age, ensuring that everyone can maintain a basic standard of living and dignity.

What is Financial Gap?

- The concept of a "financial gap" typically refers to the difference between an individual or household's income and their expenses or financial needs. Social protection programs aim to bridge this gap by providing various forms of assistance to vulnerable populations.

PYQ

Q: It is argued that the strategy of inclusive growth is intended to meet the objectives of inclusiveness and sustainability together. Comment on this statement. (2019)

Practice Question

Q: Define universal social protection and the significance of achieving it for low- and middle-income countries

THE DARK WEB

CONTEXT

The recent arrest by the **Enforcement Directorate (ED)** of a resident of Uttarakhand under the **Prevention of Money Laundering Act** sheds light on the pervasive nature of **illicit activities thriving on the Dark Web**. This underscores the international scope of criminal operations facilitated by the anonymity of online platforms.

What is the Dark Web?

- The Dark Web refers to online content accessible only through specialized software or configurations on overlay networks.
- It's a part of the deep web, which search engines don't index, making it less visible to regular internet users.
- **Anonymity and Encryption:** Dark net users' identities and locations are mostly unknown due to layers of security and encryption. This anonymity makes tracing individuals challenging for law enforcement agencies.

Implication of dark web

- **Anonymity and Privacy Concerns**: The dark web allows anonymous access, aiding privacy but posing challenges for identifying malicious actors.

- **Cybercriminal Activity**: Illegal activities like data selling, drug trade, and hacking services thrive, posing significant cybersecurity threats.
- **Data Breaches and Leaks**: Stolen data from breaches is sold on the dark web, leading to identity theft and further exploitation.
- **Marketplace for Malware**: Cybercriminals buy malware and hacking tools, making it easier to launch attacks on vulnerable systems.
- **Collaboration and Information Sharing**: While used for crime, the dark web also facilitates information exchange on cybersecurity threats.
- **Recruitment and Insider Threats**: Malicious actors recruit insiders or coax employees to leak sensitive data, undermining cybersecurity.
- **DDoS Attacks**: Dark web offers DDoS-for-hire services, enabling large-scale attacks disrupting online services.
- **Law Enforcement Challenges**: Dark web's anonymity and encryption make tracking and prosecuting cybercriminals difficult.

Legality in India:

- Accessing the dark web is legal in India, as it falls under the **constitutional right to access the internet (Article 21).**
- However, the lack of stringent laws governing cyberspace poses unique challenges.
- **Illegal Activities on the Dark Web:**
  - **Child pornography** is a severe offense under **Section 67(B) of the Information Technology Act, 2000**, and **Section 14 and 15B of the POCSO Act, 2012.**
  - **Human Trafficking:** The Indian Penal Code addresses offenses related to trafficking and sexual exploitation of minors. **Sections 372 and 373** prohibit the buying and selling of girls for prostitution, a form of human trafficking.
  - **Selling and purchasing weapons and drugs** on the dark web are illegal. **Section 24 of the Narcotics Drugs and Psychotropic Substances Act, 1985**, imposes punishment for drug trafficking, even if conducted externally.

PYQ

Q: Use of internet and social media by non-state actors for subversive activities is a major security concern. How have these been misused in the recent past? Suggest effective guidelines to curb the above threat. (2016)

CHINA'S OFFENSIVE AIR CAPABILITIES ALONG LAC

CONTEXT

New satellite imagery reveals China's deployment of **J-20 stealth fighters** to **Shigatse airfield**, near the Sikkim border.

How China is using its airbases?

- China uses its airbases on the **Tibetan Plateau** strategically. These bases feature long runways, essential because high-altitude takeoffs reduce fighter payload capabilities. This advantage isn't shared by the Indian Air Force, whose bases are mostly in lower-altitude plains.
- Satellite images of **Shigatse Airport** reveal a significant presence of fighters, drones, refuelers, and early warning aircraft.
- These bases typically house various military assets like fighter jets, helicopters, and drones capable of launching air attacks and reconnaissance missions into neighboring areas.
- **China's Air Power Expansion:**
  - Shigatse airfield, close to the Sikkim border, hosts several J-20s, indicating China's strategic move.
  - China strengthens air power in Tibet and border areas with new bases and upgraded infrastructure.
  - **Deployment includes** J-20 and H-6 bombers, enhancing border defense.

Indian Response:

- India enhances airbases and deploys **S-400 missile system** for defense.
- S-400's effectiveness questioned after being targeted in Ukraine conflict. Both China and India use the S-400 system, despite its vulnerabilities.

FACT BOX

About Shigatse Airfield

- Shigatse is the second largest city in Tibet. It is located at an altitude of 12,408 feet.
- Shigatse airfield has a dual-use airport for civil and military use.
- The airport, located around 150 kilometers north of India's frontier with Tibet, has a runway stretching 5,000 meters. It is the third longest runway in the world.
- **Hasimara Air Base:** Hosts the Indian Air Force's second squadron of **Rafale fighter aircraft** tasked with defending the Himalayan frontier over Eastern India.

J-20 Overview:

- China's most advanced fighter, the J-20, is operational since 2017.
- It is capable of air superiority with advanced sensors and long-range missiles.
- It operates within a networked force with drones and electronic platforms.

About S-400 Missile System

- The S-400 Triumf is a mobile medium- and long-range air defense system developed in the 1990s and deployed in 2007.
- It uses four different missiles (48N6E3, 40N6, 9M96E, 9M96E2) to destroy airborne threats, including legacy S-300 missiles.
- Considered equivalent to the **US Patriot system**, it's the top Russian air defense system.

PYQ

Q: How is S-400 air defence system technically superior to any other system presently available in the world? (2021)

MODIFIED NEWTONIAN DYNAMICS (MOND)

CONTEXT

In the realm of **astrophysics**, Scientists are puzzled by how galaxies move. They spin faster than expected based on normal gravity rules or they does not align with predictions based on **Newton's laws of gravity** when applied to visible matter. Galaxies rotate at **velocities** far exceeding what Newtonian physics anticipates, suggesting the presence of additional, unseen mass. To explain this, they came up with **dark matter**, an invisible substance. Another idea is **MOND,** a tweak to gravity's rules.

Dark Matter vs. MOND

1. Dark Matter Theory

- It says invisible stuff called dark matter holds galaxies together. Even though it's successful, we haven't seen dark matter directly.
- Dark matter serves as a theoretical solution to the discrepancy in galactic rotation rates. It proposes the existence of invisible mass that provides the necessary gravitational pull to prevent galaxies from flying apart.
- Despite its success in explaining various astrophysical phenomena, dark matter remains elusive, with no direct observational evidence.

2. MOND Theory

- Modified Newtonian Dynamics (MOND), proposed by Mordehai Milgrom, is an alternative theory to explain galactic dynamics. It suggests a modification of gravity's behavior at low accelerations, particularly at the edges of galaxies.
- It suggests gravity works differently in weak places like galaxy edges.
- **Testing MOND:** The **Cassini mission**, orbiting Saturn, provided an opportunity to test MOND's predictions through precise measurements of Saturn's orbit. However, analysis of Cassini's data did not reveal the expected deviations, reinforcing the efficacy of Newtonian physics in explaining Saturn's orbit.

Recent Studies and Challenges to MOND

- **Galactic Mass Calculations:** A study explored the possibility of adjusting galactic mass calculations to accommodate MOND's predictions. Despite these adjustments, MOND still failed to align with Cassini's data.
- **Binary Star Orbits:** Another study scrutinized the orbits of wide binary stars, finding no support for MOND's prediction of faster orbital speeds. The results strongly contradict MOND's expectations.
- **Outer Solar System and Galaxy Clusters:** MOND also faces challenges in explaining the behavior of small bodies in the outer Solar System and the motions within galaxy clusters. Newtonian gravity, coupled with the presence of dark matter, offers a more consistent explanation for these phenomena.

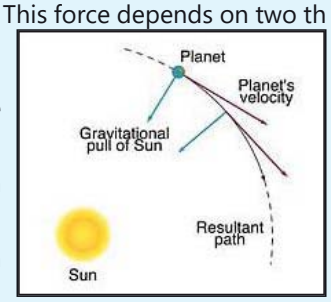
Conclusion

While the concept of dark matter presents its own set of challenges, MOND, in its current form, fails to provide a viable alternative. Despite its initial promise, recent studies and observations highlight significant discrepancies between MOND's predictions and empirical data. Thus, the enigma of dark matter persists, suggesting that our understanding of the universe's gravitational dynamics remains incomplete.

FACT BOX

Newton's Law of Universal Gravitation:

- It says that every object in the universe attracts every other object with a force. This force depends on two th ings:
  - the masses of the objects
  - the distance between them



- Every object pulls on every other object with a force. This force is called gravity.
- It applies to everything from falling apples to the orbits of celestial bodies like the Moon around the Earth.

Dark Matter:

- Dark matter is an invisible substance proposed to explain the discrepancy in galactic rotation rates. It provides the additional gravity needed to prevent galaxies from flying apart.

PYQ

Q: Consider the following phenomena: (2018)

1. Light is affected by gravity.
2. The Universe is constantly expanding.
3. Matter warps its surrounding spacetime.

Which of the above is/are the predictions/ predictions of Albert Einstein's General Theory of Relativity, often discussed in the media?

(a) 1 and 2 only
(b) 3 only
(c) 1 and 3 only
(d) 1, 2 and 3

Solution: (d)

Q: The known forces of nature can be divided into four classes, viz. gravity, electromagnetism, weak nuclear force and strong nuclear force. With reference to them, which one of the following statements is not correct? (2013)

(a) Gravity is the strongest of the four
(b) Electromagnetism acts only on particles with an electric charge
(c) Weak nuclear force causes radioactivity
(d) Strong nuclear force holds protons and neutrons inside the nucleus of an atom

Solution: (a)

CLIMATE HELL

CONTEXT

The recent report by the European Union's climate change monitoring service indicates a worrying trend: each of the past 12 months has been the warmest on record. This sustained rise in temperatures, culminating in a 12-month average of 1.63 degrees Celsius above pre-industrial levels, calls for urgent action to avert "climate hell".

What is climate change?

- Climate change is not just a natural science problem. It is a social, economic, geopolitical, and national security problem, besides being an ethical and justice issue.
- Over the last decade, the world was on average around 1.2C warmer than during the late 19th Century.
- It has now been confirmed that global warming exceeded 1.5C across the 12 month period between February 2023 and January 2024. That followed 2023 being declared the warmest year on record.
- The temperature increase was driven by human-caused climate change and boosted by the natural El Niño weather phenomenon.

Effects of climate change

- more frequent and intense extreme weather, such as heatwaves and heavy rainfall
- rapid melting of glaciers and ice sheets, contributing to sea-level rise
- huge declines in Arctic sea-ice
- Economic crisis, Affected global health, Migration
- Rising Temperatures, Shifting Rainfall Patterns, Thawing Permafrost
- Impact on Ecosystems (disrupting biodiversity and ecological balance)
- Human Health Impacts
- Ocean Acidification (endangering marine life and ecosystems)
- Food System Disruption
- Threat to Animals (habitat loss, altered migration patterns, and changing ecosystems)

Imminent Risk of Exceeding Critical Threshold:

- The UN's World Meteorological Organization (WMO) warns that there's an 80% chance of surpassing the critical 1.5-degree mark within the next five years.
- **12-month heat streak:** Every single month from June 2023 to May 2024 was the world's hottest such month on record.
- In India, dozens have dies over the past few weeks as temperatures pushed towards **50 degrees Celsius.**

- **Hotter air and oceans** also fuel **heavier rainfall and destructive storms** like those that have battered the **United States, Brazil, Kenya and the United Arab Emirates**, among other nations, this year.
- **Call for Drastic Reduction in Fossil Fuel Usage:** To address this urgent situation, there is a pressing need for a significant reduction in **global fossil fuel production** and usage by 2030. The call for a **30% cut** underscores the severity of the situation and the necessity for decisive action to curb greenhouse gas emissions.
- **Urgent Need to Mitigate Economic and Environmental Costs:** The repercussions of failing to address climate change are dire. Urgent action is needed to mitigate the economic costs, environmental damage, and increased vulnerability to extreme weather events that result from rising global temperatures.

Challenges:

- The world is "decades behind" in the transition to clean energy.
- **Discrepancy Between Commitments and Actions:** Despite global agreements and efforts to curb carbon dioxide emissions, the reality paints a different picture. Carbon emissions from fossil fuels reached a record high last year, indicating a significant gap between commitments and actions in the fight against climate change.
- **Temporary Respite vs. Long-term Trend:** While temporary cooling effects like **La Nina** may provide brief relief, they do not alter the overall upward trajectory of global temperatures. It's crucial to recognize these fluctuations as mere deviations from the long-term trend of escalating climate change.
- **Projection of Worsening Conditions:** Projections indicate that at least one of the next five years could surpass the record-breaking temperatures observed in 2023. This projection underscores the urgency of the situation and the need for immediate action to address climate change.
- **Concerning Developments and Future Outlook:** Scientists highlight alarming developments, such as the rapid loss of Antarctic sea ice, which further exacerbates the climate crisis. It's imperative to acknowledge these developments and take decisive action to reverse the trend of rising global temperatures.

FACT BOX

India's Measures to combat climate change

- **Solar Alliance (ISA):** Launched in 2015, ISA is a collaboration between solar energy-rich countries to promote solar energy use and reduce reliance on fossil fuels.
- **One Sun, One World, One Grid (OSOWOG) Project:** Proposed by Prime Minister Narendra Modi, OSOWOG aims to create a global solar power grid to provide energy to 140 countries.
- **Swachh Bharat Mission:** Launched by Prime Minister Modi, this initiative aims to achieve cleanliness and sanitation in Indian towns and villages, including building over 100 million toilets.
- **COP26 Glasgow Summit Commitments**: India is committed to-
  - achieving net zero emissions by 2070
  - meeting 50% of energy needs from renewables by 2030
  - reducing carbon emissions by one billion tonnes by 2030
  - reaching 500 GW of non-fossil energy capacity by 2030
  - reducing carbon intensity by 45% by 2030

Imminent Risk of Exceeding Critical Threshold:

AT A GLOBAL TIPPING POINT

- 2023 was **1.43°C warmer** than the **1850 to 1900** average
- Of this, **1.13°C** came from human activity
- **8%** was caused by El Niño and other weather events
- Increased fossil fuel burning can cause Earth to get warmer by **1.5°C in 4.5 years**
- **Reduction of sulphur pollution** was cancelled out by Canadian wildfires

1.5°C target limit may be surpassed by 2028: WMO

The UN weather agency is predicting an 80 per cent chance that average global temperatures will surpass the 1.5°C target within the next five years. The World Meteorological Organisation (WMO) said Wednesday that the global mean near-surface temperature for each year from 2024 to 2028 is expected to range between 1.1 and 1.9°C hotter than at the start of the industrial era. There's nearly a one-in-two chance — 47 per cent — that the average global temperatures over that entire five-year span could top 1.5°C. AP/PTI

India's Role in International Climate Diplomacy:

- India provides leadership to other emerging markets and developing economies, demonstrated through initiatives like the **International Solar Alliance, One Sun One World One Grid, and the Coalition for Disaster Resilient Infrastructure (CDRI).**
- India's approach to achieving **global net zero emissions** is guided by the principle of Common but Differentiated Responsibilities, advocating for developed countries and international financial institutions to finance the clean transition of the developing world.
- As part of the **Like-Minded Developing Countries (LMDC),** India advocates for greater control over how finance is used for adaptation and mitigation, aiming to prevent future loss and damage.

NGT'S SUO MOTU CASE ON TREE COVER LOSS

CONTEXT

India has lost 2.33 million hectares of tree cover between 2000 and 2023, with significant loss in northeastern states. The **National Green Tribunal (NGT)** took *suo motu* cognizance of this issue and summoned government departments for explanation.

Key-highlights

- India lost 2.33 million hectares of tree cover from 2000 to 2023, slightly larger than Meghalaya.
- About 18% of this loss (414,000 hectares) happened in primary forests.
- Northeast India bore 60% of this loss, with **Assam, Mizoram, Arunachal Pradesh, Nagaland, and Manipur** losing significant tree cover.
- Between 2013 and 2023, 95% of the tree cover loss occurred in natural forests.
- 2016, 2017, and 2023 were the worst years, with 1.75 million, 1.44 million, and 1.89 million hectares lost, respectively.
- This loss emitted 51.0 million tons of carbon dioxide equivalent annually, totaling 1.12 gigatons from 2000 to 2023.
- The tree cover loss across the country has emitted a huge amount of carbon into the atmosphere – exactly what India is trying to prevent as per its **Nationally Determined Contributions** as submitted to the **United Nations under the Paris Agreement.**
- Here's a list of how much area of tree over these states lost:

State	Tree cover loss (hectares)
Assam	3,24,000
Mizoram	3,12,000
Arunachal Pradesh	2,62,000
Nagaland	2,59,000
Manipur	2,40,000

NGT's Action:

- NGT noted the violation of environmental laws and summoned key government bodies to explain the tree cover loss.
- Notices were issued to the **Central Pollution Control Board, Ministry of Environment and Forest, and the Survey of India.**
- The loss of tree cover is a violation of the **Forest Conservation Act (1980), or FCA**. While the FCA is one of India's most important legislations that protects forest cover in India, the union government has drastically diluted several provisions of the Act recently.
- The newly **amended Act** would take away the protection afforded to forest lands such as **deemed forests and community forests** (that are not officially recorded as forests) and open them up to human activities under the garb of "national security" and "defence" purposes.
- NGT highlights violations of the Forest Conservation Act, 1980, amidst recent amendments.
- **Contradictions in ISFR and GFW data:** NGT raises concerns over **discrepancies between official forest surveys and data from Global Forest Watch (GFW).**

FSI's ISFR Report	Global Forest Watch (GFW)
India's forest and tree cover has increased by 2,261 sq. km (around 2.26 lakh hectares) since the last assessment in 2019.	18 per cent (4,14,000 hectares) of the total 2.33 million hectares of tree cover loss occurred in humid primary forests in the country.
There is a decline in forest cover in the country's hill and tribal districts as well as across the northeastern states	There is tree cover loss in northeast India

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SECTION-B
QUICK BYTES

WORLD'S LARGEST ASTRONOMY CAMERA

CONTEXT

Chile is all set to install the largest digital camera for astronomy (resolution above 3.2 gigapixels), on the edge of Atacama desert.

Key Details:

- **Location:** Cerro Pachón in the Coquimbo region, Chile.
- **Camera:** It's massive, weighing almost three tons, with a resolution of over 3.2 gigapixels.
- **Purpose:** The camera is part of a decade-long exploration to study **dark energy, dark matter**, and potential **asteroid collisions.**
- **Data:** It will generate 20 terabytes of data nightly, creating a 15 petabyte database over the decade.
- **Aim:** Understand how the universe began and its future development.
- **Operator**: The observatory is managed by AURA, a consortium of U.S. and international institutions.
- **Location Choice:** Chile's Atacama Desert offers clear skies, ideal for astronomy. Chile hosts much of the world's investment in astronomy due to the clear skies of its Atacama Desert, the driest desert on earth.

FACT BOX

About Atacama Desert

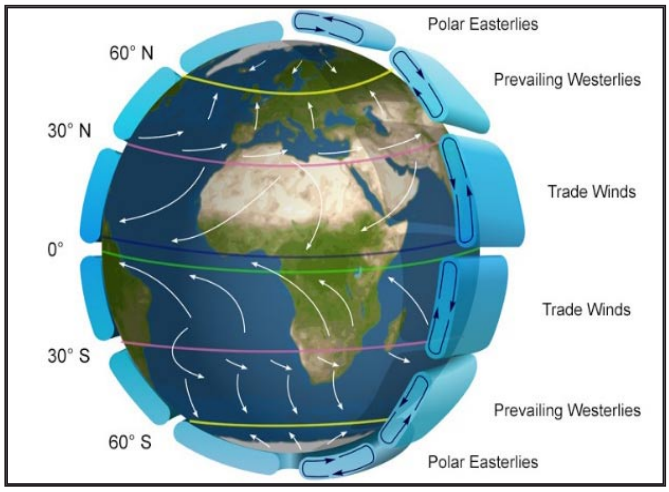
- **Atacama Desert** is a 600-mile-long (1,000 kilometers) plateau in northern Chile, near **Peru, Bolivia, and Argentina.**
- Climate: It's the driest nonpolar desert globally and receives less rainfall than polar deserts.
- **Geography:** Surrounded by the **Andes Mountains and the Chilean Coastal Range**, which block moisture, creating a harsh environment for plants.
- **Vegetation:** The lack of water and nutrients makes it difficult for plants to survive, earning it the nickname "**death zone for vegetation."**
- **Sodium Nitrate**: It contains the world's largest reserve of sodium nitrate, a valuable mineral.

WESTERLIES TO TRIGGER RAINS

CONTEXT

Under the influence of **strong westerly winds** along the Kerala coast, the State is likely to experience widespread rainfall.

Air Circulation Pattern



- The **equatorial regions of Earth** receive more heat from the Sun compared to other parts of the world. This results in differences in air temperature, density, and pressure, which cause air to move, **creating wind.**
- This movement of air is part of the **general circulation of the atmosphere**, which plays a crucial role in **transporting heat from the equatorial regions to the poles and returning cooler air to the tropics.**
- Due to Earth's rotation, winds do not travel directly from high-pressure to low-pressure areas.
- The **Coriolis force** influences the direction of the wind, causing it to deflect to the right in the northern hemisphere and to the left in the southern hemisphere.
- There are **six major air circulation patterns**, three in each hemisphere. Each one of them rules roughly 30 degrees of latitude, like wind belts around the Earth.
  - **Polar Easterlies:** These winds form between 90 degrees (the North and South Poles) and 60 degrees latitude. Cold air at the poles moves towards 60 degrees, where it heats up, expands, rises, and then cycles back in a **counterclockwise loop.**
  - **Trade Winds:** These winds occur between the Equator (0 degrees) and 30 degrees latitude in both hemispheres. Warm air at the Equator rises, moves towards 30 degrees, cools down, and sinks, creating a **consistent wind pattern.**
  - **Prevailing Westerlies:** These winds form between 30 degrees and 60 degrees latitude in both hemispheres. Air trapped between these latitudes forms a new convection current, moving in a **clockwise direction.**

FACT BOX

Jet Stream

- The collision between the **Polar Easterlies (high-pressure air)** and the **Prevailing Westerlies (lower pressure air)** forms a **fast, powerful wind** that moves from the west to the east - the Jet Stream.
- The Jet Stream moves in a **swirl pattern** and changes on a daily basis.
- It is responsible for the **transportation of weather systems**.

RED FLAG EXERCISE AND RIMPAC EXERCISE

CONTEXT

Indian military prowess was on display as the **Indian Air Force (IAF)** and the **Indian Navy** joined multinational war games hosted by their U.S. counterparts.

IAF's Participation in Red Flag Exercise:

- Red Flag is a **two-week training exercise** focused on advanced aerial combat, aiming to integrate aircrew in a multinational environment.
- It simulates realistic and challenging combat scenarios, bringing together aircrew and equipment from different nations and services.
- **Objectives:** to enhance combat readiness and interoperability among international participants. By replicating realistic combat situations, it creates a comprehensive learning environment for aircrew.
- **Locations:** Red Flag exercises take place at two main locations:
  - **Nellis Air Force Base in Nevada:** organized by the United States Air Force Warfare Center (USAFWC)
  - **Eielson Air Force Base in Alaska:** managed by the Pacific Air Forces (PACAF).
- **Red Flag-Alaska (RF-A):** RF-A is a series of field training exercises directed by the Pacific Air Forces commander. It involves U.S. and partner nation forces, focusing on enhancing their combat capabilities in the Pacific region.

Indian Navy's Participation in RIMPAC Exercise:

- **Began in:** 1971
- RIMPAC is the world's **largest international maritime warfare exercise.** It is a **biennial international military exercise** hosted by the Commander of the United States Pacific Fleet.

- **RIMPAC 2024** marks the **29th installment** of this renowned international maritime exercise.
- **Key Features:** RIMPAC combines force capabilities within a dynamic maritime setting, showcasing enduring interoperability across a wide range of military operations.
- **Theme for RIMPAC 2024**: *"Partners: Integrated and Prepared"*
- The Indian Navy deployed the indigenous stealth frigate **INS Shivalik** for **Ex RIMPAC (Rim of the Pacific),** scheduled in Hawaii from June 25 to August 2.
- The INS Shivalik, on a mission in the South China Sea and Pacific Ocean, departed to participate in the **Japan-India maritime exercise JIMEX-24** before heading to **RIMPAC-24**.
- This deployment aims to enhance interoperability with the **Japan Maritime Self-Defense Force (JMSDF), U.S. Navy,** and other partner navies.

AUSTRALIA'S MILITARY TO RECRUIT FOREIGNERS

CONTEXT

In a significant policy shift, the Australian military has announced plans to recruit non-citizen residents from select countries to address personnel shortages and bolster troop numbers. This move comes as Australia seeks to enhance its defense capabilities and strengthen resilience against potential threats to its national security.

Key Highlights:

- **Eligibility Criteria:** Non-citizen residents from countries within the **Five Eyes intelligence**-sharing partnership, holding Australian permanent residency, will be eligible for recruitment into the Australian Defense Force (ADF).
- **Strategic Imperative**: The decision to recruit non-citizen residents is driven by the strategic imperative to build a military force capable of countering foreign coercion, particularly through disrupted trade routes, in the future.
- **Vulnerability to Coercion**: Australia's reliance on open sea and air routes for international trade makes it susceptible to coercion from foreign militaries. Strengthening defense capabilities is essential to safeguard national interests and ensure strategic autonomy.
- **Personnel Shortfall**: The Australian Defense Force currently faces a shortfall of 4,400 personnel against its target strength of 63,600 full-time personnel. The government aims to increase troop numbers to 80,000 by 2040 to meet evolving security challenges.

FACT BOX

About Five Eyes Alliance:

- The Five Eyes alliance is a coalition of five English-speaking countries, namely the **United States, the United Kingdom, Canada, Australia, and New Zealand**.
- Established after **World War II**, the alliance aims to facilitate intelligence sharing and cooperation to address shared security threats.

TELE MANAS CELL FOR ARMED FORCES

CONTEXT

The **Ministry of Health and Family Welfare (MoHFW)** and the **Ministry of Defence (MoD)** signed an agreement (MoU) to establish **Tele MANAS Cell** in Pune. The military faces unique challenges that can affect mental health. These challenges need special attention and support.

What is Tele MANAS?

- Tele Mental Health Assistance and Networking Across States (Tele-MANAS) is a service that provides **mental health support** over the phone. It's part of a larger program called the **District Mental Health Programme (DMHP).**
- **National Apex Centre:** National Institute of Mental Health and Neuro Sciences (NIMHANS), Bengaluru
- **Current Situation:**
  - There are already 51 Tele MANAS cells working across all States and UTs, offering services in 20 languages.
  - Since it started in October 2022, Tele MANAS has received over 10 lakh calls (a lakh is 100,000) and handles more than 3,500 calls every day.
  - This shows there's a big need for mental health support, especially in places like the Armed Forces.

Scenario of Mental Health

- Mental health comprises emotional, psychological, and social well-being.
- **Types of mental health issues:** Anxiety Disorder, Depression, Bipolar Disorder, Post-Traumatic Stress Disorder (PTSD), Schizophrenia, Eating Disorders, Disruptive behaviour and dissocial disorders, Neurodevelopmental disorders
- **Factors increasing vulnerability**: emotional skills, substance use and genetics.
- **Numbers:**
  - 1 in every 5 individuals suffers from some form of mental health illness symptoms.

- 50% of mental health conditions begin by age 14 and 75% of mental health conditions develop by age 24.
- 970 million people around the world struggle with some mental illness.
- One in four people are affected by a mental illness at some point in their lives.
- 14.3% of deaths worldwide, or approximately 8 million deaths each year, are attributable to mental disorders

- **Challenges:**
  - Stigmatisation of mental illness, social exclusion and isolation
  - Financial barriers
  - Limited availability of mental health education and awareness
  - Lack of good mental health care professionals and services
- **Government Health Initiatives:**
  - India's Mental Healthcare Act, 2017
  - National Mental Health Programme (NMHP)
  - National Tele Mental Health Programme
  - NIMHANS and iGOT-Diksha Collaboration
  - Ayushman Bharat - Health and Wellness Centres (AB-HWCs)
  - World Health Day
  - Kiran Helpline, Manodarpan Initiative

WOMEN IN POLITICS

CONTEXT

The 33% reservation of seats in the Lok Sabha and state legislatures for women has long been a subject of debate and deliberation in India's political arena. However, the stark reality of **underrepresentation** persists, with only **13% of elected MPs in the 18th Lok Sabha being women**, reflecting a decline from the previous term.

Key Highlights:

- **Gender Disparity in Elected Representatives**: Despite the provision for reservation, the number of women elected to the Lok Sabha remains significantly lower than their male counterparts. In the 18th Lok Sabha, only **73 out of 543 elected MPs are women**.
- **Challenges in Candidate Representation:** The disparity among candidates further exacerbates the gender gap, with only **797 out of 8,337 candidates being women**. While there was a marginal increase in the number of women candidates from the previous elections, their share among total candidates remains disproportionately low.
- **India's Global Ranking:** India's recent global ranking for women's representation in the lower house of Parliament, dropping to **148 out of 185 countries.**

Schemes to Promote Women Empowerment:

- **National Commission for Women:** Established in 1992, this statutory body is tasked with monitoring and addressing issues related to women's rights and welfare, including political representation.
- **Reservation for Women in Local Self-Government**: The 73rd Constitutional Amendment Act of 1992 mandates one-third reservation for women in all elected offices in local bodies, aiming to enhance their participation in grassroots governance.
- **Women's Reservation Bill, 2023**: This landmark legislation seeks to reserve one-third of seats in the Lok Sabha and state legislative assemblies for women, ensuring greater representation and inclusivity in higher echelons of governance.
- **Other Initiatives**: Various government schemes and programs, such as
  - Beti Bachao Beti Padhao
  - Pradhan Mantri Awas Yojana
  - National Social Assistance Programme
  - Samagra Shiksha

OPEC+ EXTENDS OIL OUTPUT CUTS

CONTEXT

OPEC+ extended deep oil output cuts until 2025 due to tepid demand growth and rising U.S. production. Current cuts of 3.66 million bpd were extended until end of 2025. Additional cuts of 2.2 million bpd extended until September 2024. These cuts will be gradually phased out from October 2024 to September 2025.

What are OPEC and OPEC+?

- **OPEC Formation:** Established in 1960 by **Iraq, Iran, Kuwait, Saudi Arabia, and Venezuela**, OPEC aimed to coordinate petroleum policies and stabilize prices.
- **Membership**: Currently comprises 12 countries, primarily from the Middle East and Africa, collectively representing about 30% of global oil production.
  - **OPEC Current Members**: Saudi Arabia, United Arab Emirates, Kuwait, Iraq, Iran, Algeria, Libya, Nigeria, Congo, Equatorial Guinea, Gabon, and Venezuela.
  - **OPEC+ Partners**: Russia, Azerbaijan, Kazakhstan, Bahrain, Brunei, Malaysia, Mexico, Oman, South Sudan, and Sudan.
- **OPEC+:** Formed at the end of 2016, OPEC+ is a coalition including 10 non-OPEC oil exporters like Russia.
- **Objective:** Together, OPEC and OPEC+ aim to regulate global oil supply, accounting for approximately 41% of global oil production.

Influence on Global Oil Prices:

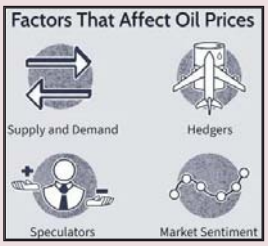
- **Market Share:** OPEC member states' exports make up nearly 49% of global crude exports. They also possess approximately 80% of the world's proven oil reserves.
- **Decision Making**: Regular meetings determine the amount of oil to sell on global markets. Adjusting supply in response to demand fluctuations impacts global oil prices.

FACT BOX

Working of Crude Oil Market

- **Production:** Oil is extracted from wells worldwide by both OPEC and non-OPEC countries, with production influenced by factors like technological advancements and geopolitical tensions.
- **Demand:** Global demand for oil fluctuates due to economic growth, industrial activities, transportation needs, and seasonal variations.

Market Players:



  - **Producers:** Countries like Saudi Arabia, Russia, the United States, and others extract and supply crude oil to the market.
  - **Consumers**: Industries, transportation sectors, and households worldwide consume crude oil for various purposes.
- **Pricing Mechanism:**
  - **Benchmark Pricing**: Brent crude and West Texas Intermediate (WTI) are two widely used benchmarks for pricing crude oil.
  - **Supply and Demand Balance**: Fluctuations in supply and demand, influenced by geopolitical events, **production decisions by OPEC and non-OPEC countries**, and economic factors, impact crude oil prices.
- **Market Regulation:**
  - **OPEC and OPEC+:** These organizations regulate oil production levels among member and partner countries to stabilize prices.
  - **Government Policies**: National governments may implement policies affecting oil production, consumption, and trade.
- **Volatility:** Crude oil prices can experience significant fluctuations due to supply disruptions, geopolitical tensions, economic factors, and changes in demand.
- **Risk Mitigation**: Hedging strategies, such as **futures contracts, options, and derivatives**, are used by market participants to manage price risk.
- **Impact on Global Economy:**
  - **Inflation and Deflation**: Fluctuations in crude oil prices can impact inflation rates and consumer purchasing power.
  - **Economic Growth:** High oil prices can dampen economic growth, while low prices may stimulate economic activity, particularly in oil-importing countries.

RBI'S INCOME AND EXPENDITURE

CONTEXT

The **Reserve Bank of India (RBI**) announced a **record surplus transfer** to the government for the fiscal year 2024 (FY24), amounting to Rs 2,10,874 crore. This represents a significant increase compared to the previous year's surplus transfer.

Income and Expenditure Overview

- **Income**: The RBI's total income saw a notable rise, driven primarily by an increase in interest income from both domestic and foreign sources.
  - **Interest income** includes earnings from **rupee securities, liquidity operations, and foreign securities.** Despite a decline in other income categories, the overall income growth remained robust.
- **Expenditure**: A sharp decline in provisions, which are funds set aside for contingencies, significantly reduced the RBI's overall expenditure.
  - Other expenses such as the **cost of printing notes, agency charges, employee costs**, and miscellaneous expenses also saw reductions.

Balance Sheet Highlights

- **Asset Growth**: The RBI's balance sheet grew due to increases in foreign investments, gold reserves, and loans and advances.
- **Increase in Gold Reserves**: The RBI's gold reserves grew, with significant additions during the year. The gold is held as backing for notes issued and as an asset of the **Banking Department (BD).**
- **Available Realised Equity**: The RBI's realised equity, which includes **capital, reserve funds, the Contingency Fund, and the Asset Development Fund**, increased as a percentage of the balance sheet, indicating a stronger financial position.

Components of Income	Components of Expenditure
• **Interest Income**: Derived from domestic and foreign sources, including interest on rupee securities, loans and advances, and foreign securities. • **Other Income**: Includes earnings from commissions, profits or losses on the sale of securities, and exchange gains or losses from foreign exchange transactions.	• **Provisions**: Allocations to the Contingency Fund (CF) for unexpected financial contingencies and risks associated with monetary and exchange rate policies. • **Other Expenses**: Costs related to printing currency notes, agency charges, employee expenses, and miscellaneous costs.

INDIA'S GOLD RESERVES

CONTEXT

In fiscal year 2023-24, the **Reserve Bank of India (RBI)** initiated a substantial transfer of **gold reserves** from the UK to domestic vaults, marking one of India's largest movements of gold since 1991.

India's Gold Reserves

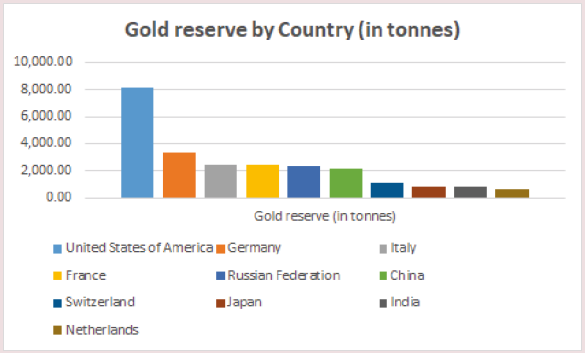
- As of March 2024, RBI's total gold reserves amount to 822.10 metric tonnes. Historically, a significant portion of this reserve was stored abroad, including with the Bank of England.
- However, the recent transfer of 100 metric tonnes to India brings the local holding to over 408 metric tonnes, almost equalizing the distribution between domestic and foreign storage.
- **Breakdown of Gold Holdings**: According to RBI's annual report for FY24, over 308 metric tonnes of gold serves as backing for issued currency notes, while an additional 100.28 tonnes is held domestically as an asset of the banking department.
- **India's Global Ranking**: India ranks **9th globally in terms of gold reserves**. This substantial holding reflects India's cultural affinity for gold and its historical significance as a store of value, contributing to the country's economic stability.

Purpose of Gold Reserves

- **Store of Value:** Gold is perceived as stable and reliable, instilling confidence in economic stability during uncertainty.
- **Currency Stability**: While the gold standard is no longer prevalent, gold reserves can still support a country's currency stability.
- **Diversification:** Gold diversifies a country's asset portfolio, mitigating risks associated with market fluctuations.
- **Inverse Correlation with USD**: Gold's value often increases when the US dollar declines, providing a safeguard during market volatility.
- **International Trade and Finance**: Some countries use gold for trade settlement or as collateral, enhancing creditworthiness and global standing.
- **Hedge during Crises**: Gold serves as a hedge against economic downturns or geopolitical uncertainties, protecting against inflation and currency devaluation.

FACT BOX

What is a Gold Reserve?



- A gold reserve is the **gold held by a national central bank**, intended mainly as a guarantee to redeem promises to pay depositors, note holders (e.g. paper money), or trading peers, during the eras of the gold standard, and also as a store of value, or to support the value of the national currency.
- India, like many other countries, stores a significant portion of its gold reserves in **foreign vaults.**
- The top 10 countries with the most gold reserves include the **United States, Germany, Italy, France, Russia, China, Switzerland, Japan, India and Netherlands (estimates by World Gold Council)**.

PYQ

Q: Consider the following statements: (2023)

Statement – I: Switzerland is one of the leading exporters of gold in terms of value. **Statement – II:** Switzerland has the second largest gold reserves in the world.

Which one of the following is correct in respect of the above statements?

(a) Both statement-I and Statement-II are correct and Statement-II is the correct explanation for Statement-I

(b) Both Statement-I and Statement-II are correct and Statement-II is not the correct explanation for Statement-I

(c) Statement-I is correct but Statement-II is incorrect.

(d) Statement-I- is incorrect but Statement-II is correct.

Solution: (c)

PRESTON CURVE

CONTEXT

The Preston Curve illuminates a crucial relationship between **life expectancy** and **per capita income** in countries worldwide. Preston's groundbreaking research revealed a pattern where wealthier nations generally enjoy **longer life spans** compared to their less affluent counterparts. This connection underscores the profound influence of economic prosperity on public health outcomes.

About the Preston Curve:

- **Proposed by:** American sociologist Samuel H. Preston in 1975
- The essence of the Preston Curve lies in its observation that as a **country's per capita income increases**, so does its **average life expectancy**.
- This correlation is attributed to various factors associated with higher income levels, including
  - improved access to healthcare
  - better education
  - cleaner environments
  - enhanced nutrition
- For instance, India's journey from an average per capita income of Rs 9,000 in 1947 to approximately Rs 55,000 in 2011 corresponded with a remarkable increase in life expectancy from a mere 32 years to over 66 years.
- **Patterns in Development Indicators:** The Preston Curve extends beyond life expectancy, encompassing a range of development indicators such as **infant and maternal mortality rates, education, and healthcare access.** These indicators tend to improve alongside rising per capita income, reflecting broader societal advancements facilitated by economic growth.
- **Debates and Perspectives**: Despite the compelling correlation between income levels and development outcomes, experts diverge on the causal relationship between the two.
  - Some economists advocate for prioritizing economic growth as the pathway to improving development indicators, citing examples like India and China's rapid progress.
  - However, others argue that improvements in life expectancy and other indicators are not solely driven by economic growth. Instead, advancements in **medical technology, including life-saving vaccines,** play a significant role in enhancing public health even in low-income settings.

FACT BOX

- **Per Capita Income:** Per capita income measures the average amount of money earned per person in a nation or region. It can also be called income per person in an economic unit.
  - **Calculation:** Per Capita Income = National Income / Population
- **Net National Income (NNI):** NNI serves as an indicator of the total economic activity within a country. It's calculated by subtracting the **depreciation** of fixed capital assets from the gross national income. Fixed capital assets include dwellings, buildings, machinery, transport equipment, and physical infrastructure. Essentially, NNI reflects the nation's income after accounting for the wear and tear and obsolescence of its capital assets.
- **Gross National Product (GNP)**: It is the total value of all finished goods and services produced by a country's citizens in a given financial year, irrespective of their location (located domestically or abroad).
  - **GNP = GDP + Net factor income from abroad**

Related PYQ

Q: Increase in absolute and per capita real GNP do not connote a higher level of economic development, if

(a) industrial output fails to keep pace with agricultural output

(b) agricultural output fails to keep pace with industrial output

(c) poverty and unemployment increase

(d) imports grow faster than exports

Solution: (c)

CHINA'S OFFSHORE LISTING CHALLENGES

CONTEXT

Chinese firms aiming for **offshore listings** have hit a **regulatory roadblock**, leading to **prolonged delays and lower valuations**.

- Offshore listings are critical fundraising channels for Chinese companies. These deals also account for a bulk of the revenue global investment banks make in Asia.

About Initial Public Offering (IPO)

- An **Initial Public Offering (IPO),** is when a privately held company, or a government-owned entity like **LIC**, raises funds by **selling shares** to the **public or new investors**.

- Through the IPO, the company gets its name listed on the **stock exchange.**
- **Filing with SEBI**: Before launching an IPO, the company must file its offer document with the **Securities and Exchange Board of India (SEBI),** the market regulator.
- **SEBI Criteria:** To safeguard investors, SEBI has set rules that companies must meet before conducting an IPO. These criteria include:
  - Having net tangible assets of at least Rs 3 crore.
  - Maintaining a net worth of Rs 1 crore in each of the preceding three full years.
  - Achieving a minimum average pre-tax profit of Rs 15 crore in at least three of the last five years.

EXTERNAL COMMERCIAL BORROWINGS (ECBS)

CONTEXT

Shriram Finance Ltd. (private **non-banking financial company (NBFC)),** has recently announced the raising of funds totaling $425 million and EUR 40 million through a **syndicated term loan transaction**. The three-year **external commercial borrowing facility** was structured as a social loan.

About External Commercial Borrowings (ECBs)

- ECBs are **commercial loans** obtained by **eligible resident entities** from **recognized non-resident entities**. These loans serve as a source of funding for various business activities.
- **Parameters:** ECBs must adhere to specific parameters, including minimum maturity periods, permitted and non-permitted end uses, maximum all-in-cost ceiling, and other regulatory requirements.
- **Routes for ECBs**: ECBs can be raised through either the **automatic route** or the approval route, depending on certain criteria.
- **Approval Route**: Under the approval route, prospective borrowers submit their requests to the **Reserve Bank of India (RBI)** through an **Authorized Dealer (AD) category-I Bank.**

INDIA'S ECONOMIC GROWTH ACCELERATES IN 2023-24: NSO

CONTEXT

India's economy witnessed a significant upswing in the fiscal year 2023-24, with a robust GDP growth of 8.2%, surpassing the 7% growth recorded in the previous fiscal year, according to data released by the **National Statistical Office (NSO).** This growth marks the fastest pace since 2016-17, excluding the rebound from the COVID-19 lockdown in 2021-22.

Key-highlights:

- **Industrial Sector:** The manufacturing sector led the charge with a remarkable growth of 9.9% in 2023-24, a notable improvement from the 2.2% contraction in the previous year. However, growth in the fourth quarter slowed compared to earlier quarters. The construction sector also thrived, expanding by 9.9%, building upon a strong base from the preceding year.
  - Manufacturing exports have registered highest ever annual exports of US$ 447.46 billion with 6.03% growth during FY23.
  - **Factors responsible for growth:** Competitive advantage of a skilled workforce, lower cost of labour, increased inflow of capex.
  - **Government's support:** Production Linked Incentive (PLI) scheme, Make in India, Investment Clearance Cell (ICC), One District One Product (ODOP), Setting up Special Economic Zones (SEZs)
- **Agriculture:** In contrast, the agriculture sector experienced a notable slowdown, growing at only 2.1% in 2023-24, likely due to erratic monsoon patterns. This marks a significant deceleration from the 4.4% growth recorded in the prior fiscal year.
  - **Largest producer of:** milk, coconuts, black tea, ginger, and turmeric; and the 2nd largest producer of cashew nuts, and tea in the world
  - **2nd largest producer of:** fruits and vegetables, rice, wheat, groundnuts, cashew, and tea globally; and accounts for 10% of the world's fruit production with first rank in the production of mango, bananas, sapota, and acid lime
  - **Factor responsible for slowdown**: climate change, reduced water levels, saturation of employment, poverty.
  - **Impact of slowdown**: food inflation, threatened food security
  - **Government support**: Growing institutional credit, Increasing MSP, Paramparagat Krishi Vikas Yojana, Pradhanmantri Gram, Sinchai Yojana, and Sansad Adarsh Gram Yojana, Inception of Agri Infrastructure Fund, e-NAM, promotion of agricultural mechanization and subsidy for machines and supports drones.
- **Tertiary Sector**: The tertiary sector, comprising services, exhibited a sturdy growth of 7.6% in 2023-24, albeit slower than the previous year's 10% growth. Notably, the financial, real estate, and professional services segment led the growth, although at a slightly reduced pace compared to the previous year.
  - In September 2023, India retains to 40th rank in the Global Innovation Index (GII), d
  - **Government support**: Start-up India, Stand-up India, Digital India and Skill India.
  - **Household Consumption and Capital Formation**: Contribution of household consumption to the

economy decreased further, with private final consumption expenditure accounting for 55.8% of GDP in 2023-24, down from 58% in the previous fiscal year. Conversely, the contribution of capital formation remained stable at 33.5% of GDP.

- **Current economic challenges:** Geopolitical tensions, geoeconomic fragmentation, global financial market volatility, international commodity price movements and erratic weather developments
- This data underscores the shifting dynamics within India's economic landscape, with manufacturing and construction sectors driving growth, while agriculture faces challenges from weather fluctuations.

BREAKTHROUGH IN NIPAH VIRUS RESEARCH

CONTEXT

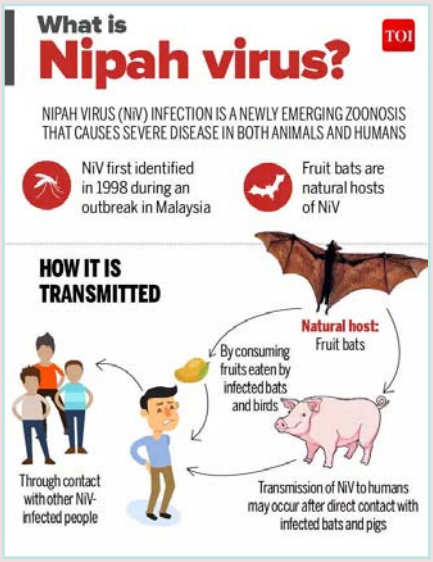
Scientists at the **Institute of Advanced Virology (IAV)** developed a safe and effective way to generate **non-infectious Nipah virus-like particles (VLPs)** in the laboratory.

Key-highlights of the research:

- This breakthrough provides a **safer platform** for research and development of treatments against the deadly Nipah virus (NiV) in a **BSL-2 laboratory.**
- It brings researchers closer to developing monoclonal antibodies and antivirals against NiV and similar pathogens.
- **Characteristics of VLPs:**
  - VLPs closely resemble viruses but are non-infectious as they contain no viral genetic material.
  - They carry most of the virus's characteristics, making them valuable tools for studying viral binding, entry kinetics, and immune responses.
- **HiBiT-Tagged NiV-VLPs:**
  - Scientists created "HiBiT-tagged" Nipah virus-like particles (NiV-VLPs) using **plasmid-based expression systems.**
  - These VLPs are identical to the native virus but **cannot replicate.**
  - The inclusion of a **highly sensitive HiBiT tag** accelerates their potential in **antiviral drug** screening and vaccine development.
  - **HiBiT-tagged VLPs** offer **reduced risks** compared to using native viruses in research assays.
  - This method is applicable to **other virulent pathogens** and is advantageous for studying **BSL-3/BSL-4 level viruses** in lower **bio-containment levels.**

FACT BOX

About Nipah Virus



- **Transmission:** Nipah virus is a zoonotic virus, meaning it can spread from animals to humans. It can also be transmitted through contaminated food or directly between people.
- **Pathogenicity:** This virus is highly dangerous, with a fatality rate of up to 80% in humans.
- **Hosts: Fruit bats (**family *Pteropodidae***)**, especially those from the ***Pteropus*** genus, are the natural hosts for Nipah virus. Interestingly, fruit bats don't seem to get sick from it.
- **Treatment:** Currently, there are no specific drugs or vaccines for Nipah virus infection. However, the **World Health Organization (WHO)** has recognized Nipah as a **priority disease for research and development.**
  - Research on Nipah virus has been limited because of the strict biosafety precautions required for handling this dangerous pathogen, which is classified as a **BSL-4 pathogen.**

PRAVAHA

CONTEXT

The **Indian Space Research Organisation (ISRO)** has developed **Computational Fluid Dynamics (CFD) software** named **Parallel RANS Solver for Aerospace Vehicle Aero-thermo-dynamic Analysis (PraVaHa).**

About PraVaHa:

- PraVaHa is a **Computational Fluid Dynamics (CFD) software** developed by the **Indian Space Research Organisation (ISRO)** at the **Vikram Sarabhai Space Centre (VSSC).**

- It's designed to **simulate airflow** around various aerospace vehicles, including **launch vehicles, re-entry vehicles with and without wings, and internal flows.**
- Currently, it can simulate airflow under both **Perfect Gas and Real Gas conditions**. Work is ongoing to simulate chemical reactions during **air dissociation and combustion**, particularly relevant for **scramjet vehicles.**
- In the **Gaganyaan program**, PraVaHa has been extensively used for the aerodynamic analysis of human-rated launch vehicles, including **HLVM3, Crew Escape System (CES), and Crew Module (CM).**

Need of PraVaHa

- Aerospace vehicles face **severe aerodynamic and aerothermal loads** during launch and re-entry due to external pressure and heat flux. PraVaHa helps in understanding and predicting these loads.
- It's vital for designing the **shape, structure, and Thermal Protection System (TPS)** required for these vehicles.

CHINA'S CHANG'E-6 MISSION

CONTEXT

In a monumental feat for space exploration, **China's Chang'e-6 spacecraft** has successfully landed on the far side of the Moon, marking the first-ever attempt to collect samples from this uncharted territory.

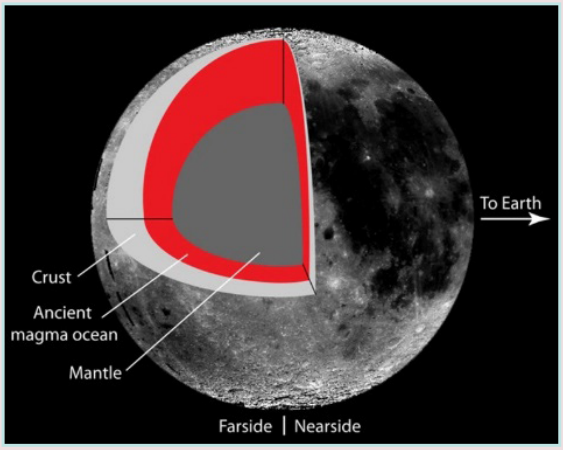
Key Highlights:

- **Mission Objective:** Chang'e-6's primary mission is to collect and return samples from the Moon's far side, a pioneering endeavor in space exploration.
- **Landing Site**: The chosen landing area within the **South Pole-Aitken Basin**, specifically the **Apollo Basin,** was selected based on its potential for scientific exploration and favorable landing conditions, including flat terrain and communication suitability.
- **Technological Advancements:** Chang'e-6's lander is equipped with advanced sensors, including **microwave, laser, and optical imaging sensors**, enabling precise measurements and obstacle detection on the lunar surface. To ensure a smooth landing, **gamma-ray sensors** are employed to accurately measure height despite lunar dust interference.
- **Sampling Process:** The probe is set to complete sampling within two days, utilizing both drilling for subsurface samples and a robotic arm for surface sample collection. Despite challenges, including limited communication windows due to the Moon's obstruction, the mission aims for efficient sample retrieval within a reduced timeframe.
- **International Collaboration**: The mission incorporates scientific instruments from France, Italy, the European Space Agency/Sweden, and notably, a payload from Pakistan, marking the first inclusion of a Pakistani orbiter in a **Chinese lunar mission**.

FACT BOX

Far Side of the Moon

- The far side of the Moon is the side **not visible from Earth**, a result of a phenomenon called "tidal locking."
- In contrast, the near side, which constitutes 60% of the Moon's surface, is always visible from Earth.
- **This side isn't actually dark;** it receives ample sunlight and experiences lunar day and night cycles, just like the near side.



- **Differences:** Despite being lesser-known, the **far side of the Moon** is distinct from the near side in appearance and geological features.
- **Day and Night:** A lunar day lasts over 29 Earth days, while a lunar night is roughly two weeks long. This extended cycle is due to the Moon's rotation around its axis and its orbit around Earth, resulting in the same side always facing our planet.
- **Exploration:** Throughout history, human exploration has focused on the near side, with several lunar expeditions visiting its familiar terrain. However, recent missions, like China's Chang'e-6, are pioneering efforts to explore and understand the mysteries of the far side.

Indian Achievement:

- Last year, India made its mark by becoming the first country to land near the **lunar south pole region** with its Chandrayaan-3 mission, showcasing Asia's growing prowess in lunar exploration.

PYQ

Q: Assertion (A): The same face of the moon is always presented to the earth. [2005]

Reason (R): The moon rotates about its own axis in 23 and half days which is about the same time that it takes to orbit the earth.

(a) Both A and R are true and R is the correct explanation of A

(b) Both A and R are true but R is NOT a correct explanation of A

(c) A is true but R is false

(d) A is false but R is true

Solution: (c)

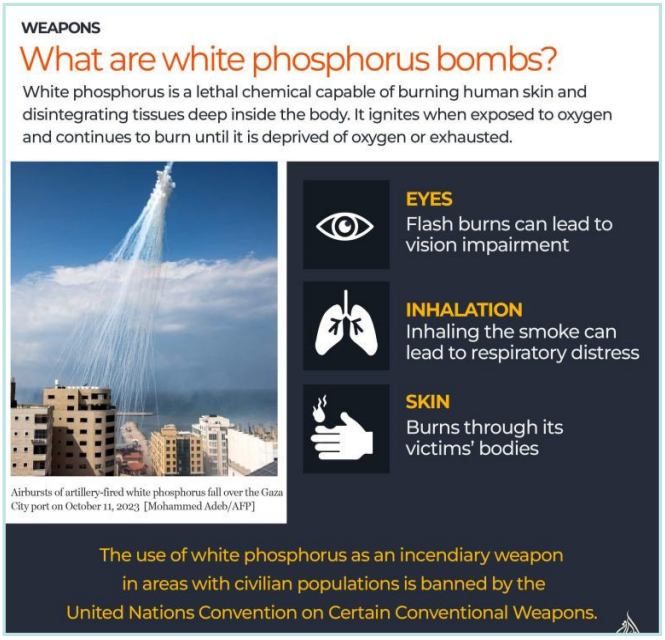
WHITE PHOSPHORUS

CONTEXT

A **global human rights group** accused Israel of using **white phosphorus** incendiary shells on residential buildings in conflict-hit southern Lebanon, possibly harming civilians and violating international law.

What is White Phosphorus?

- White phosphorus is a solid waxy substance that looks yellowish or colorless.
- It has a distinct garlic-like smell.
- **Uses and Properties:**
  - White phosphorus ignites instantly when it touches oxygen.
  - Militaries use it for lighting up battlefields, creating smoke screens, and as an incendiary.



  - Once ignited, it's hard to put out, and it sticks to surfaces like skin and clothes.
- **Health Risks:** White phosphorus is harmful to humans in all forms of contact.
- Its smoke contains **phosphoric acids and phosphine**, which can harm the eyes and respiratory system.
- Contact with white phosphorus can cause **deep and severe burns**, even penetrating through bone.
- **Ban:** The incendiary substance is not banned, but its use in densely populated areas has been widely condemned.

International Law and White Phosphorus:

- While international law **doesn't outright ban incendiary weapons** like white phosphorus, its use in densely populated areas has been widely condemned.
- When white phosphorus is used as an incendiary weapon (not for chemical warfare), it's regulated by **Protocol III of the Convention on Certain Conventional Weapons.**
- Violation of the convention happens only if it's deliberately used as an incendiary weapon against humans in civilian areas like cities or residential areas.

FACT BOX

Convention on Certain Conventional Weapons:

- In 1980, the **Convention on Prohibitions or Restrictions** on the use of **certain conventional weapons** was established. This convention aims to ban or restrict weapons causing undue suffering or indiscriminate harm.
  - **Protocol III:** Protocol III of this convention is crucial for limiting incendiary weapons. Its main goal is to protect civilians and civilian infrastructure from these harmful weapons.
  - It prohibits deliberately targeting civilians and imposes restrictions on using incendiary weapons in populated areas.

1000 DAYS IN SPACE

CONTEXT

Oleg Kononenko, a Russian cosmonaut, became the first person to spend 1,000 days in space, according to the Russian space agency **Roscosmos.** He achieved this milestone during his current trip to the **International Space Station (ISS)**, which began on September 15, 2023.

International Space Station (ISS):

- The ISS serves as a spacecraft, observatory, laboratory, and living quarters for astronauts.
- It floats approximately 240 miles above the Earth's surface and can accommodate up to 10 people at once.
- **Objective:** to facilitate long-term exploration of space and provide tangible benefits to people on Earth through scientific research.
- **Collaborative Effort**: Built and operated by 15 countries, including the US, Russia, and Japan, the ISS was initiated in 1998 to serve as a hub for various space-based research initiatives.

- **Orbital Dynamics:** The ISS orbits the Earth 16 times a day, traveling at a staggering speed of 28,000 km/h, which is equivalent to ten times the speed of a bullet on Earth's surface.
- **Bright Night Sky Object**: As it orbits the Earth, the ISS is the third brightest object visible in the night sky and can be observed with the naked eye by people on the ground.

DISCOVERY OF EARLIEST-KNOWN GALAXY BY JWST

CONTEXT

NASA's James Webb Space Telescope (JWST) has uncovered a remarkable find - the **earliest-known galaxy**, challenging previous assumptions about the universe's infancy. This galaxy, named **JADES-GS-z14-0**, was observed approximately 290 million years after the **Big Bang**, during a period known as **cosmic dawn**.

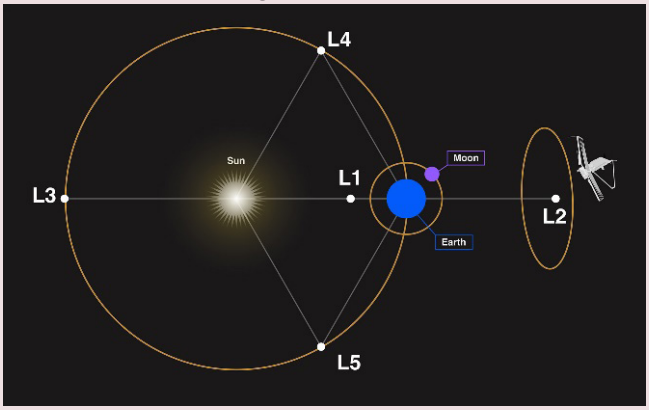
Key Findings:

- JADES-GS-z14-0 measures about 1,**700 light years** across and possesses a mass equivalent to 500 million stars like sun.
- Despite its early formation, it was rapidly generating stars, approximately 20 per year.
- **Surprising Brightness**: The brightness and size of this early galaxy defy previous expectations. Scientists were astonished by its **luminosity**, as it was larger and brighter than anticipated for a galaxy at this early stage.
- **Comparison:** While notable for its time, JADES-GS-z14-0 is **dwarfed** by present-day galaxies like **Milky Way**, which spans about 100,000 light years and contains the mass of around 10 billion sun-sized stars.
- **Second Discovery**: In addition to JADES-GS-z14-0, the JWST also identified the second oldest-known galaxy, **JADES-GS-z14-1**, dating back approximately 303 million years post-Big Bang. This galaxy, although smaller, still exhibited significant star formation.
- **Implications:** These discoveries challenge existing theories about early galaxy formation. They hint at a **denser, more gas-rich environment** in the early universe, with star formation processes differing markedly from those seen today.

FACT BOX

About James Webb Space Telescope (JWST)

- JWST is a cutting-edge observatory designed for **infrared observations**, equipped with advanced instruments to address key questions in astronomy.
- Named after former NASA administrator James E. Webb, it represents a collaboration between **NASA, the European Space Agency (ESA), and the Canadian Space Agency**.
- **Key Features:**
  - **Optimized for Infrared**: JWST boasts a large aperture telescope tailored for infrared observations, enabling it to explore a wide range of astronomical phenomena.
  - **Operational Orbit**: Positioned at the **Earth-Sun L2 Lagrange point**, about 1.5 million kilometers away from Earth, JWST benefits from simplified operation, pointing, and stability requirements compared to the Hubble Space Telescope.
  - **Temperature Control**: Operating at an ultra-low temperature of -233°C (-387°F), JWST's instruments are kept cold to prevent their own infrared emissions from interfering with astronomical signals.



L2 Point Explanation:

- Lagrange Points are regions where the gravitational forces of the Sun and Earth balance the orbital motion of a satellite, allowing it to maintain a fixed position relative to both celestial bodies with minimal energy expenditure.
- **L2 Point:** Specifically, the second **Lagrange Point (L2)** is one of five such points in space. Placing a spacecraft at L2 enables it to remain in a stable position relative to the Earth and Sun.

AGNIBAAN SORTED

CONTEXT

In a major milestone for India's private space sector, **Agnikul Cosmos** has successfully launched its **SOrTeD mission.** The mission featured a **single-stage launch vehicle demonstration** powered by the **world's first single-piece 3D-printed semi-cryogenic engine, Agnilet.**

Key highlights of the mission:

- Agnibaan SOrTeD (SubOrbital Technological Demonstrator) is a **single-stage rocket** fueled by a **semi-cryogenic engine.**
- **Launch Site:** The SOrTeD mission took off from ALP-01, India's first private launchpad, located at the Satish Dhawan Space Centre in Sriharikota.
- The **Agnibaan rocket** is capable of carrying up to 300 kg payload to a 700 km high orbit.
- **Mission Maneuvers**: The mission included precise maneuvers such as a pitch-over maneuver and wind biasing before splashing down in the Bay of Bengal.
- The data collected from the SOrTeD mission will be instrumental in fine-tuning the development of the Agnibaan launch vehicle, which is expected to be highly customizable and capable of carrying a 300kg payload to a 700km orbit.

FACT BOX

Launch vehicle:

- SOrTeD used Agnilet, India's first semi-cryogenic engine, which uses a mix of liquid and gas for propellant. It is the world's first single-piece 3D-printed semi-cryogenic rocket engine.
- **Vehicle Specs:** The launch vehicle was a 6.2-meter-tall single-stage rocket with an elliptical nose cone.
- It was equipped with advanced avionics architecture and autopilot software.
- This engine runs on sub-cooled **Liquid Oxygen (LOX)** and **Aviation Turbine Fuel (ATF).**

Semi-cryogenic engine vs Cryogenic engines

Semi-cryogenic engine	Cryogenic engines
It uses liquid oxygen (which is very cold) and regular fuel, like kerosene or ATF	It uses both liquid oxygen and liquid hydrogen, both of which are extremely cold.
They use less cold fuel, making them simpler and cheaper to handle and store compared to cryogenic engines.	It uses extremely cold fuel. They are more powerful as liquid hydrogen provides higher impulse, meaning more thrust per unit of fuel.
Less powerful and efficient as compared to cryogenic engine.	More efficient for long-distance missions or heavier payloads.
They are often used in the initial stages of a rocket for their cost-effectiveness and simpler handling	They are used in the later stages for their higher efficiency and greater power needed to place satellites into higher orbits or for deep space missions

About 3D printing

- 3D printing is a process where a machine creates objects **layer by layer** from a digital model, using materials like plastic or metal. This method can make the **part stronger and more reliable**
- Single piece using 3D printing means that the entire part was made as one continuous piece using a 3D printer, rather than being assembled from multiple parts.

ESA'S EARTHCARE MISSION

CONTEXT

A **Falcon 9 rocket** by SpaceX recently launched an **Earth science mission** jointly led by the **European Space Agency (ESA) and Japan**. This launch marks ESA's temporary collaboration with SpaceX for space access.

Mission Details:

- Named EarthCARE, the mission is valued at 800 million euros ($870 million) and focuses on **studying clouds and aerosols in the atmosphere.**
- The spacecraft is equipped with four instruments, including a **cloud profiling radar** provided by the Japanese space agency JAXA, costing 8.3 billion yen ($53 million).
- **Mission Objectives:**
  - EarthCARE, weighing 2,200 kilograms, orbits at an altitude of 393 kilometers in a sun-synchronous orbit.
  - Its primary goal is to gather data on **clouds, aerosols, reflected sunlight, and radiated heat in the atmosphere.**

- This data will contribute to atmospheric science, aiding in climate and weather modeling.

- While other spacecraft, like **NASA's PACE spacecraft** launched in February, also conduct similar measurements, EarthCARE's mission enhances the **global understanding of Earth's atmosphere and climate dynamics.**

ICMR'S INITIATIVE FOR SICKLE CELL DISEASE

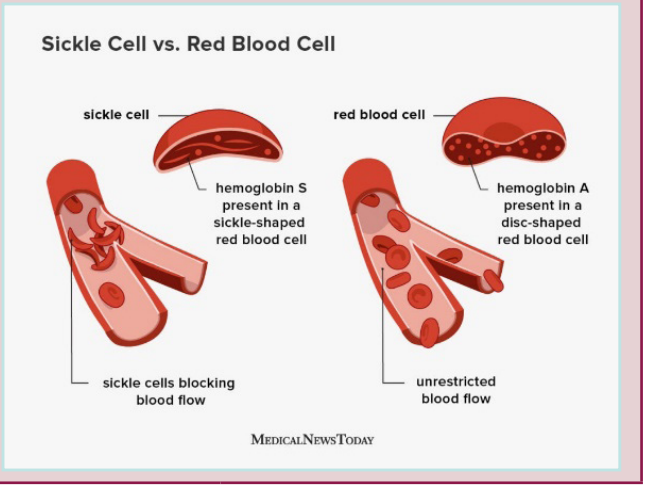
CONTEXT

The **Indian Council of Medical Research (ICMR)** has embarked on a critical mission to **combat sickle cell disease**, a prevalent health concern in India. A key obstacle in this fight is the **lack of hydroxyurea formulations** specifically designed for paediatric patients, making precise dosing a challenge. To address this pressing issue, the ICMR has issued a call to collaborate on the joint development and **commercialization of paediatric formulations of hydroxyurea.**

About Sickle Cell Disease:

- Sickle cell disease is one of India's most **prevalent monogenic disorders**, posing substantial health risks.
- India faces a significant burden of sickle cell disease, with over **20 million affected individuals.**
- It is an **inherited blood disorder** marked by **defective hemoglobin.**
- It **inhibits the ability of hemoglobin in red blood cells to carry oxygen.**
- Sickle cells tend to stick together, blocking small blood vessels causing painful and damaging complications.
- **Symptoms:** Anemia, Pain crisis, or sickle crisis, acute chest syndrome, splenic sequestration (pooling). stroke, jaundice, priapism (painful obstruction of the blood vessels in the penis by sickle cells)
- **Treatment:** Blood transfusions, Vaccinations and antibiotics, Folic acid, Hydroxyurea, Bone marrow transplant.

Red Blood Cells (normal Haemoglobin)	Cells with Sickle Cell Haemoglobin
They are smooth, disk-shaped, and flexible, like doughnuts without holes.	They are stiff and sticky. When they lose their oxygen, they form into the shape of a sickle or crescent, like the letter C.
They can move through the blood vessels easily.	These cells stick together and can't easily move through the blood vessels. This can block small blood vessels and the movement of healthy, normal oxygen-carrying blood. The blockage can cause pain.
Normal red blood cells can live up to 120 days.	Sickle cells only live for about 10 to 20 days. They may be destroyed by the spleen because of their shape and stiffness. The spleen helps filter the blood of infections.



Hydroxyurea's Role:

- Hydroxyurea, a **myelosuppressive agent**, shows promise in treating **sickle cell disease and thalassemia**.
- However, current hydroxyurea formulations are not suitable for **paediatric use**, complicating treatment protocols. This gap complicates treatment, as administering appropriate doses to children becomes cumbersome and less accurate.
- ICMR has now called for joint development and commercialization of low-dose or paediatric oral formulations of hydroxyurea.
- The aim is to facilitate better titration of the drug, reducing dose-related side effects and ensuring more accurate administration.
- This move aligns with the launch of the **National Mission to eliminate Sickle Cell Anaemia/SCD by 2047**, highlighting the government's commitment to tackling this health challenge.

Government Interventions

- **National Health Mission:** Under NHM, the government supports the states for prevention and management of sickle cell disease.
- **National Mission to eliminate SCD by 2047**: The mission entails focus on awareness creation, universal screening of approximately seven crore people in the 0-40 years age group in affected tribal areas and counselling through collaborative efforts of central ministries and state governments.
- **Anaemin Mukt Bharat Strategy:** It is a flagship programme of **Ministry of Health and Family Welfare (MoHFW)** under **POSHAN Abhiyaan**. Under this iron and folic acid supplements are distributed to pregnant and lactating women and adolescent girls to improve their iron levels.

PYQ

Q: Consider the following statements in the context interventions being undertaken under Anaemin Mukt Bharat Strategy : (2023)

1. It provides prophylactic calcium supplementation for pre-school children, adolescents and pregnant women.
2. It runs a campaign for delayed cord clamping at the time of child-birth.
3. It provides for periodic deworming to children and adolescents.
4. It addresses non-nutritional causes of anaemia in endemic pockets with special focus on malaria, hemoglobinopathies and fluorosis.

How many of the statements given above are correct?

(a) Only one
(b) Only two
(c) Only three
(d) All four

Solution: (c)

PAEDIATRIC INFLAMMATORY BOWEL DISEASE

CONTEXT

Inflammatory Bowel Disease (IBD) is making headlines due to increasing awareness and diagnosis among children in India.

What is IBD?

- IBD is a chronic condition where the **body's immune system** mistakenly attacks the **cells of the digestive tract**, causing **inflammation and ulcers.**
- **Symptoms:** This chronic autoimmune condition affects the digestive tract, causing symptoms like fever, abdominal pain, diarrhea (sometimes bloody), and weight loss.
- **Types:** There are two main types of IBD:
  - **Ulcerative Colitis**: Affects only the large intestine (colon).
  - **Crohn's Disease**: Can affect any part of the digestive tract, from the mouth to the anus.
- **Causes of IBD:** The exact cause is still unknown, but several factors contribute to its development:

  - **Immune System Dysregulation**: Children with IBD often have a weak or overactive immune system that responds inappropriately to environmental triggers like viruses or bacteria.
  - **Genetics**: There may be a genetic predisposition, as IBD sometimes runs in families.
  - **Gut Microbiota**: The millions of microorganisms in the human gut play a crucial role. Changes in the gut microbiota, influenced by frequent antibiotic use or westernized diets, are linked to IBD.
  - **Environmental Factors**: Lifestyle changes and dietary habits can also trigger or exacerbate IBD.

GREEN-BEARD GENES

CONTEXT

Recent research has delved into the fascinating phenomenon of **altruism** across various species, sparking interest among scientists seeking to unravel its genetic and behavioral underpinnings. One notable area of investigation focuses on social amoebae like ***Dictyostelium discoideum***, providing valuable insights into the evolution of cooperative behavior in nature.

Key-findings of the Research

- Studies on social amoebae, particularly *Dictyostelium discoideum*, have uncovered significant findings regarding the genetic basis of altruism.
- Researchers have identified "green-beard" genes that enable individuals carrying the same gene variant to recognize and cooperate with each other preferentially.
- Furthermore, mechanisms such as **gene expression and protein binding** have been observed to facilitate cooperation and deter exploitation within social groups of amoebae.
  - Green-beard genes, named for their hypothetical ability to "recognize" and cooperate with others bearing the same gene, play a crucial role in fostering altruistic behavior.
  - Alternatively, these genes can induce harmful behavior towards those with different gene variants.
- **The Role of Tgr Genes:** Two genes, **tgrB1 and tgrC1**, have been identified in *Dictyostelium discoideum,* which

regulate altruistic behavior. These genes facilitate cell recognition and cooperation, ensuring that altruistic amoebae recognize and cooperate with their kin.

- These findings not only shed light on the **genetic mechanisms driving altruism** but also offer broader insights into the evolution of cooperation and sociality across diverse species.

FACT BOX

About Altruism:

- Altruism is the selfless act of helping others without expecting anything in return. This feature is observed across various species in nature.
- **Examples**: Altruism is widespread in nature. Worker honey bees sacrifice their reproductive capabilities to care for their queen and her offspring, and meerkats assuming sentinel roles to alert their clan of potential threats.
- Altruism often involves individuals sacrificing their own interests for the benefit of their kin or social group.

CHANGING RIVERS IN ALASKA

CONTEXT

Rivers and streams in Alaska are undergoing a **noticeable change in color**, shifting from a clear blue to a rusty **orange hue**. This transformation has occurred over the past five to 10 years, raising concerns about the health of these water bodies.

Causes of Discoloration:

- **Thawing permafrost** is releasing toxic metals such as **iron, zinc, copper, nickel, and lead** into the waterways.
- These metals, harmful to river and stream ecosystems, were previously locked away underground for thousands of years.
- **Impact of Thawing Permafrost:**
  - Arctic soils, including permafrost, naturally contain organic carbon, nutrients, and metals like mercury.
  - As permafrost melts due to rising temperatures, these minerals and metals are exposed and leach into nearby water sources.
- **Climate Change Factor**: The Arctic is warming at a rate four times faster than the global average, exacerbating permafrost thawing and its associated impacts on water quality.
- **Similar Case in Colorado:** Colorado's Rocky Mountains are also experiencing a similar phenomenon, attributed to a warming climate and other environmental factors.

FACT BOX

Alaska's river systems

- Alaska's major interior river systems include the **Yukon/Koyukuk and the Kuskokwim.**
- Alaska has approximately **365,000 miles of river,** of which 3,193 miles are designated as wild & scenic—less than 1% of the state's river miles.

"PAINTING WITH LIGHT" PROJECT ON AIR POLLUTION

CONTEXT

Researchers and artists teamed up for a project called "**Painting with Light**" to visualize air pollution in India and other countries. They used digital light painting and low-cost air pollution sensors to create striking images showing pollution levels.

Key Findings:

- In India, they found significant differences in air quality between urban Delhi and rural Palampur, with Palampur having much lower pollution levels.
- Similar variations were observed in Ethiopia and Wales, highlighting the impact of different environments on air quality.
- Particulate Matter (PM) pollution, particularly PM2.5, was the main focus due to its severe health impacts.

FACT BOX

Extent of Pollution in India:

- An estimated 1.36 billion people in India experience PM2.5 concentrations exceeding the WHO's recommended annual guideline level of 5 micrograms per cubic meter.
- 96% of India's population, or 1.33 billion people, face PM2.5 levels more than seven times the WHO guideline.
- Over 66% of Indian cities report annual PM2.5 averages greater than 35 micrograms per cubic meter.
- **Health Impacts**:
  - Air pollution is a significant threat to human health, responsible for an estimated one in every nine deaths globally.
  - Exposure to PM2.5 pollution can lead to asthma, cancer, stroke, lung disease, and other serious health conditions.
  - Children's cognitive development, mental health, and existing illnesses, like diabetes, can be adversely affected by exposure to fine particles.

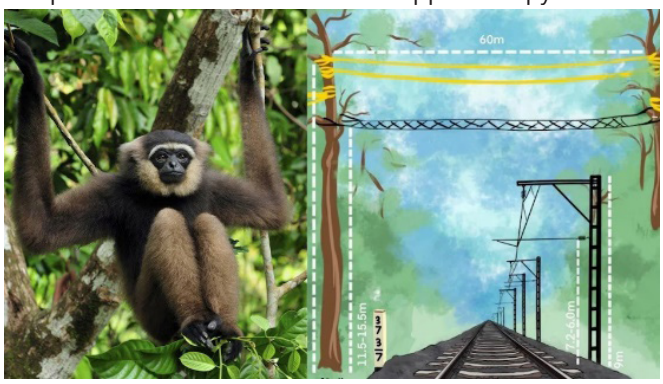
CANOPY BRIDGES FOR INDIA'S ONLY APE

CONTEXT

The **Northeast Frontier Railway (NFR)** in eastern Assam is taking steps to safeguard the hoolock gibbon, India's only ape species. Canopy bridges are being constructed to help the gibbons move safely across a railway track that divides their habitat.

Background

- The **Hollongapar Gibbon Sanctuary** in Jorhat district, spanning 2,098.62 hectares, hosts the largest concentration of hoolock gibbons in India.
- These gibbons are known for their vocalizations and spend much of their time in the upper canopy of trees.



- A **1.65-km-long railway track** cuts through the sanctuary, posing a threat to the **gibbons' arboreal nature.**
- **Canopy bridges** are being built to help them safely cross the track. Safety measures include securing the ends and knots of the bridges and **installing safety nets below**.
- The canopy bridges will be designed to blend with the environment, allowing lianas and creepers to grow along them. This ensures the bridges appear natural and minimizes disruption to the gibbons' habitat.

FACT BOX

About Hoolock Gibbons

- Hoolock gibbons are **smaller than great apes** like **gorillas and orangutans**.
- Genera: *Hoolock* (hoolock gibbons), *Hylobates* (hylobates), *Symphalangus* (siamangs) and *Nomascus* (crested gibbons). Siamangs are the largest gibbon species.
- They are frugivores, primarily eating fruit.
- Found in the forests of Assam and other northeastern states, hoolock gibbons are categorized as **Endangered and Vulnerable species**, highlighting the importance of conservation efforts.
- Conservation Status:
- **IUCN:** Endangered (Western Hoolock Gibbon) and Vulnerable (Eastern Hoolock Gibbon)
- Both the species are listed on Schedule I of the Indian (Wildlife) Protection Act, 1972.

PYQ

Q: Consider the following pairs: (2010)

	Protected area	Well-known for
1.	Bhiterkanika, Orissa	Salt Water Crocodile
2.	Desert National Park, Rajasthan	Great Indian Bustard
3.	Eravikulam, Kerala	Hoolock Gibbon

Which of the pairs given above is/are correctly matched?

(a) 1 only
(b) 1 and 2 only
(c) 2 only
(d) 1, 2 and 3

Solution (b)

GLOBAL SOIL PARTNERSHIP

CONTEXT

The recent Global Soil Partnership Assembly discussed how to meet "ambitious and urgent" target of improving and maintaining health of at least 50 percent of world's soils by 2030.

Soil Map of India

In India, the Indian Council of Agricultural Research (ICAR), has classified soils into 8 categories:

Alluvial Soil:

- **Formation**: Deposited by rivers, particularly originating from the Himalayas**.**
- **Composition:** Contains clay, sand, and silt particles.
- **Characteristics:** Highly fertile due to adequate potash, lime, and phosphoric acid.
- **Types:** Old alluvium (Bangar) and new alluvium (Khadar).
- **Locations:** Northern plains from Punjab to West Bengal, Assam, and delta regions of rivers like Mahanadi, Kaveri, Godavari, and Krishna.
- **Crops:** Wheat, maize, sugarcane, rice, pulses, and oilseeds.

Black Soil (Regur):

- **Formation:** Derived from lava and volcanic rocks.

- **Composition:** Rich in potash, lime, magnesium carbonate, and calcium carbonate.
- **Locations:** Predominantly found in Gujarat, Maharashtra, Madhya Pradesh, Andhra Pradesh, Karnataka, and Tamil Nadu.
- **Characteristics:** High moisture retention and water holding capacity.
- **Crops:** Cotton, wheat, millet, and tobacco.

Peaty Soil:

- **Formation:** Accumulation of organic matter in humid climates.
- **Composition:** High organic matter, low potash, and phosphate content.
- **Locations:** Few districts of Kerala, coastal areas of Tamil Nadu, Bihar, Uttaranchal, and Sundarbans of West Bengal.
- **Characteristics:** Acidic, black soil.
- **Organic Matter Content:** 10-40%.

Saline and Alkaline Soil:

- **Formation:** High sodium, potassium, and magnesium content, poor drainage, and dry climate.
- **Locations:** Arid and semi-arid areas of Punjab, Uttar Pradesh, Bihar, Rajasthan, Haryana, and Maharashtra.
- **Characteristics:** High salt content, calcium, and nitrogen deficiency.
- **Improvement:** Enhanced irrigation, drainage, gypsum application, and cultivation of salt-resistant crops.
- **Suitability:** Leguminous crops.

Red Soil:

- **Formation:** Weathering of metamorphic and igneous rocks, high iron content.
- **Locations:** Parts of Karnataka, Orissa, Jharkhand, Madhya Pradesh, Tamil Nadu, and Maharashtra.
- **Characteristics:** Rich in potash, sandy or clayey texture, deficient in nitrogen, phosphate, and humus.
- **Color:** Red due to iron oxide.

Desert Soil:

- **Formation:** High sand content (90-95%), low clay content, low rainfall.
- **Locations:** Rajasthan, Rann of Kutch in Gujarat, parts of Haryana, and Punjab.
- **Characteristics:** Low water holding capacity, high phosphate content.
- **Vegetation:** Cactus, shrubs; fertility increased temporarily by rainfall and irrigation.

Laterite Soil:

- **Formation:** Heavy rainfall regions, sedimentation of rocks, high iron oxide content.
- **Locations:** Western and Eastern Ghats, Vindhya, Malwa Plateau, Satpura.
- **Characteristics:** Pinkish color, high in nitrogen, acidic.
- **Suitable Crops: Rubber, coconut, coffee, cashew nuts, sugar, ragi, and rice.**

Mountain Soil:

- **Formation:** Accumulation of organic matter from forest growth.
- **Locations:** Himalayan regions, Sikkim, Arunachal Pradesh, peninsular India, Eastern Ghats, and Assam.
- **Characteristics:** Rich in humus.
- **Texture:** Sandy.

Issues

Challenges: low nutrient levels, with the average **soil organic carbon (SOC)** being around 0.54 percent, land degradation, Nutrient depletions and deficiencies in soil, deterioration of soil health.

- **Acidic soil:** Over 30 per cent of cultivable land in India is said to carry acidic soil, impacting plant growth.
- **Sulphur Deficiency**
- Loss of soil inorganic carbon
- 55 percent of the country's soil is deficient in nitrogen, 42 percent in phosphorus and 44 percent in organic carbon (2019-20 Soil Health Survey)

- **Impact:** Negatively affected nutrition intake, declining productivity, threatened food security, soil erosion, reduced soil biodiversity, diminished soil fertility, and compromised water quality and availability, significant risks to human health and ecosystems.

FACT BOX

Indian Government Schemes for Soil

Soil Health Card Scheme
Paramparagat Krishi Vikas Yojana (PKVY)
Neem Coating of Urea
Nutrient-Based Subsidy (NBS) Scheme
Adoption of Zero Budget Natural Farming

Global Soil Partnership

Established in: 2012
Objective: to position soils on the Global Agenda, promote inclusive policies and soil governance as well as sustainable soil management, by bringing together multiple stakeholders.
Achievements:

- annual celebration of UN World Soil Day (5 December)
- International Year of Soils 2015
- Establishment of an Intergovernmental Technical Panel on Soils and related international networks for different soil matters

PYQ

Q: With reference to agricultural soils, consider the following statements: (2018)

1. A high content of organic matter in soil drastically reduces its water holding capacity.
2. Soil does not play any role in the sulphur cycle.
3. Irrigation over a period of time can contribute to the salinization of some agricultural lands.

Which of the statements given above is/are correct?

(a) 1 and 2 only

(b) 3 only

(c) 1 and 3 only

(d) 1, 2 and 3

Solution: (b)

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SECTION-C
TERMS OF THE WEEK

S.No.	Term	About
1.	**Atmospheric circulation**	Atmospheric circulation transports heat over the surface of the Earth that affects the water cycle, including the formation of clouds and precipitation events.
2.	**Conventional Weapons**	Conventional weapons refers to weapons that are fitted with conventional explosives, i.e. do not use nuclear, biological or chemical ordnance. They are traditional weapons such as rifles and explosives.
3.	**Dark web**	The dark web is a subset of the deep web that is intentionally hidden and can only be accessed using specific software like Tor (The Onion Router) or I2P (Invisible Internet Project).
4.	**Deep Web**	The deep web is any part of the Net that is not indexed by search engines. The dark web is only a small fraction (0.01%) of the deep web
5.	**Economic Recession and Slowdown**	An economic recession signifies a drop in the gross domestic product (GDP), while a slowdown is merely a decline in the growth rate of the GDP. It's the difference between a salary cut and a smaller increment. While one reduces an individual's actual income, the other is merely a drop in the growth of that income. A slowdown usually precedes recession, but does not necessarily lead to one.
6.	**Gross domestic product (GDP)**	GDP is the value of the finished domestic goods and services produced within a nation's borders.

7.	**Gross national product (GNP)**	GNP is the value of all finished goods and services produced by a country's citizens, both domestically and abroad.15
8.	**Gross Value Added (GVA)**	GVA is the value of goods and services produced in a country minus input costs, including raw materials. It adjusts GDP by adding subsidies and deducting taxes on products.
9.	**Gold reserve**	Gold reserve refers to the amount of gold held by a country's central bank or government as part of its monetary reserves. These reserves are typically held to support the value of the country's currency, provide stability to the financial system, and serve as a hedge against economic uncertainty.
10.	**Gig Economy**	A gig economy is a free market system in which temporary positions are common and organizations hire independent workers for short-term commitments.
11.	**Like Minded-Group of Developing Countries (LMDC)**	It is a group of developing countries who organize themselves as a block negotiators in international organizations. This group represents more than 50% of the world's population from Asia and other regions. Member countries: Algeria, Bangladesh, Belarus, Bhutan, China, Cuba, Egypt, India, Indonesia, Iran, Malaysia, Myanmar, Nepal, Pakistan, the Philippines, Sri Lanka, Sudan, Syria, Vietnam, and Zimbabwe.
12.	**Non-Banking Financial Company (NBFC)**	NBFC is a company registered under the Companies Act, 1956 engaged in the business of loans and advances, acquisition of shares/stocks/bonds/debentures/securities or other marketable securities. It does not have a full banking license and cannot accept deposits from the public.
13.	**Newton's Law of Gravity**	Newton's law of gravity, which works well in the Solar System, encounters challenges when applied to galaxies. Galaxies rotate faster than predicted, suggesting the need for additional gravitational forces.
14.	**Non-performing asset (NPA)**	NPA is a loan or advance for which the principal or interest payment remained overdue for a period of 90 days.
15.	**Public Health Emergencies of International Concern (PHEIC)**	PHEIC is a formal designation by the World Health Organization (WHO) to signify an extraordinary public health event with international implications. It indicates that a situation is serious, sudden, unusual, or unexpected, with potential to endanger global health security.

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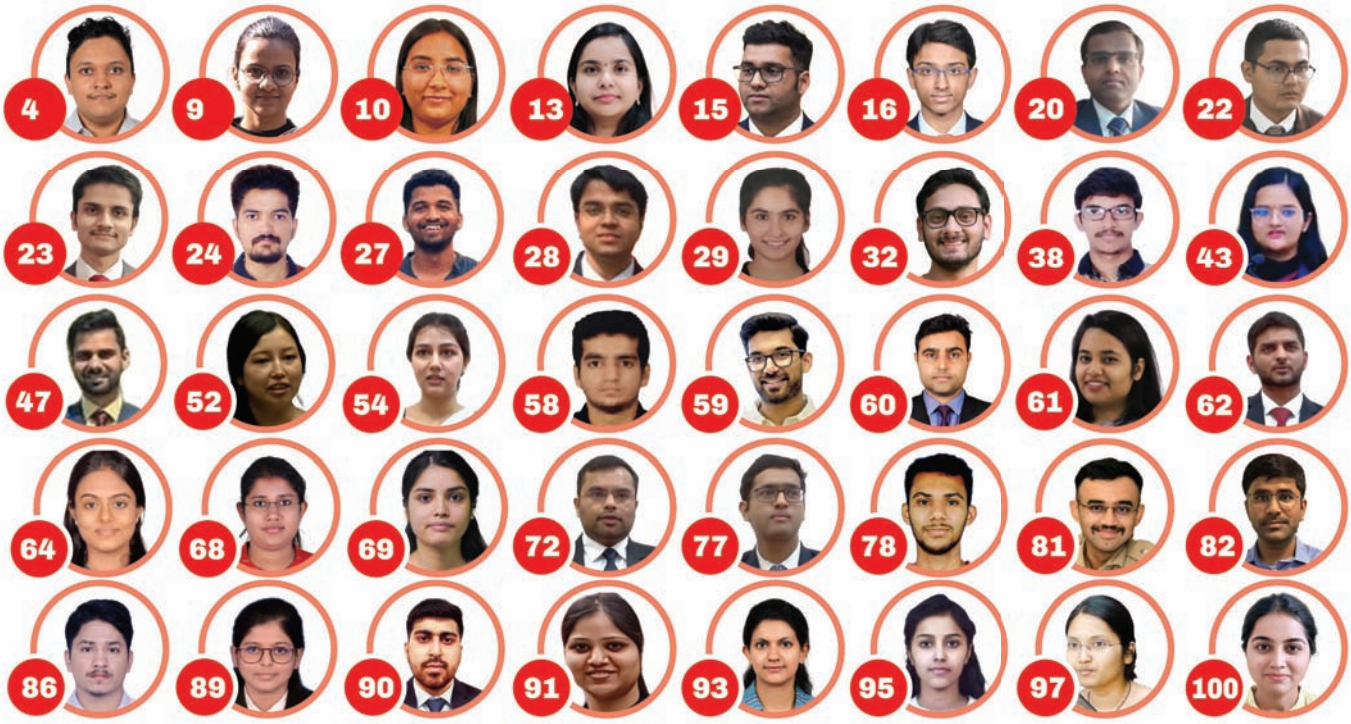

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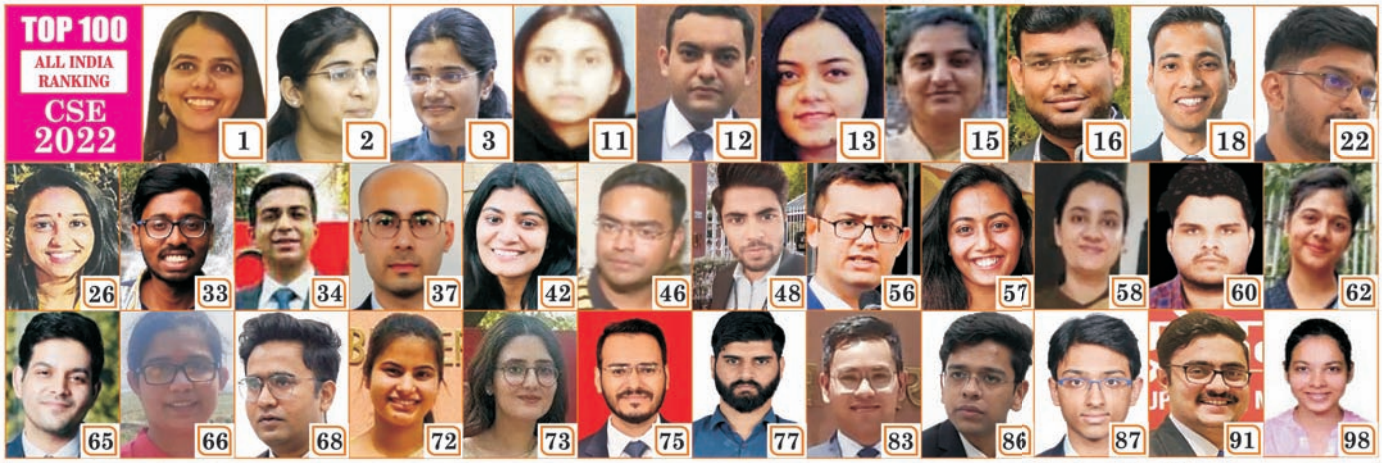

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