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for

IAS EXAMINATION



From

01st Jun to 06th Jun 2026

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POLITY & GOVERNANCE

1.1. GOA CELEBRATED ITS STATEHOOD DAY ON MAY 30

Context:

- On **May 30**, Goa celebrated its **Statehood Day**, marking its transition into a full-fledged state of the Indian Union in 1987.

Historical Background: The Colonial Enclave

While the British East India Company gradually took over most of India, the coastal enclave of Goa had a different colonial master.



- Portuguese Conquest:** Conquered in **1510** by Afonso de Albuquerque, who defeated the Sultan of Bijapur (Adil Shah), Goa became the nerve center of the *Estado da Índia*.
- The Post-1947 Anomalies:** When India gained independence in 1947, the Portuguese government under dictator António de Oliveira Salazar refused to leave, claiming Goa was an integral overseas province of Portugal, rather than a colony.

The Liberation Movement & Post-Independence Struggle

The struggle to free Goa did not pick up only after 1947; it was deeply intertwined with the broader Indian national movement.

1. Civil Disobedience & Satyagraha

- Ram Manohar Lohia's Spark:** On **June 18, 1946**, socialist leader Dr. Ram Manohar Lohia launched a historic civil disobedience movement in Margao against the restriction of civil liberties. This day is observed annually as **Goa Revolution Day**.
- Mass Satyagrahas (1954–1955):** Non-violent Indian and Goan activists attempted peaceful marches into Goa. Portuguese forces opened fire, killing dozens. This forced India to sever diplomatic ties and impose an economic blockade.

2. Operation Vijay (December 1961)

Because diplomatic talks failed and Portugal belonged to NATO, Prime Minister Jawaharlal Nehru hesitated to use force. However, after Portuguese troops fired on Indian merchant ships and fishermen in late 1961, the military option became necessary.

- Tri-Service Integration:** Launched on December 17–18, 1961, **Operation Vijay** was India's first fully integrated tri-service operation (Army, Navy, and Air Force).
- The Surrender:** Outmatched, Portuguese Governor-General Manuel António Vassalo e Silva defied orders from Lisbon to fight to the death. He signed the instrument of surrender on **December 19, 1961**, ending 451 years of Portuguese rule. This date is celebrated as **Goa Liberation Day**.

The Constitutional Path

Following its liberation, Goa faced structural changes before it reached its modern political status.

- **The 12th Constitutional Amendment Act, 1962:** This amendment integrated Goa, Daman, and Diu into the Indian Union as a single Union Territory. .
- **Full Statehood (1987):** Passed by Parliament, the **Goa, Daman and Diu Reorganisation Act, 1987** officially separated the territories. On **May 30, 1987**, Goa became the **25th state** of India, while Daman and Diu remained a Union Territory.

High-Yield Quick Facts

Feature	Key Details
Important Days	May 30: Statehood Day December 19: Liberation Day June 18: Revolution Day
Official Language	Konkani (Recognized as official language in Feb 1987; added to the 8th Schedule via the 71st Amendment Act, 1992)
Geographic Trivia	Smallest Indian state by area; bounded by the Western Ghats to the east and the Arabian Sea to the west.
Major Rivers	Mandovi (the lifeline of Goa) and Zuari .
Civil Code Heritage	The only state in India that follows a Uniform Civil Code (the Portuguese Civil Code of 1867), which was retained after liberation.

Q. With reference to Goa, consider the following statements:

1. Goa was integrated into the Indian Union through the 12th Constitutional Amendment Act, 1962 as part of a Union Territory comprising Goa, Daman and Diu.
2. Operation Vijay (1961) was India's first fully integrated tri-service military operation.
3. Konkani was included in the Eighth Schedule of the Constitution through the 71st Constitutional Amendment Act, 1992.
4. Goa became a full-fledged state of India on December 19, 1961.

Which of the statements given above are correct?

A. 1, 2 and 3 only

B. 1 and 4 only

C. 2 and 3 only

D. 1, 2, 3 and 4

Answer: A. 1, 2 and 3 only

Explanation:

- **Statement 1:** Correct. The **12th Constitutional Amendment Act, 1962** incorporated Goa, Daman and Diu as a Union Territory.
- **Statement 2:** Correct. **Operation Vijay (December 1961)** was India's first integrated **Army-Navy-Air Force** operation.
- **Statement 3:** Correct. **Konkani** was added to the **Eighth Schedule** by the **71st Constitutional Amendment Act, 1992**.
- **Statement 4:** Incorrect. **December 19, 1961** marks **Goa Liberation Day**. Goa attained **statehood on May 30, 1987** and became India's **25th state**.

1.2. CHIEF OF DEFENCE STAFF (CDS)

Context:

Recently, General N.S. Raja Subramani took charge as India's third Chief of Defence Staff (CDS) on May 31, 2026, following the completion of General Anil Chauhan's tenure. According to reports, this high-level transition is aimed at accelerating tri-service integration and advancing the implementation of integrated theatre commands.



1. Evolution of the Post

- **Kargil Review Committee (1999):** First officially proposed a unified military head to bridge inter-service coordination gaps.
- **Group of Ministers (GoM) Report (2001):** Formally recommended the establishment of the CDS.
- **Naresh Chandra Task Force (2012):** Suggested a permanent Chairman of the Chiefs of Staff Committee (CoSC) as a midway solution.
- **Lt. Gen. D.B. Shekatkar Committee (2016):** Reiterated the urgent need for a four-star CDS to enhance joint combat readiness.
- **Creation:** Formally approved by the Union Cabinet on December 24, 2019. General Bipin Rawat took charge as India's first CDS on January 1, 2020.

2. Status and Rank

- **Nature of Post:** It is neither a constitutional nor a statutory body. It is an executive position created via amendments to the Government of India (Allocation of Business) Rules, 1961.
- **Rank:** A four-star military officer who is "**first among equals**" inside the Chiefs of Staff Committee. The CDS carries the same rank and pay scale as the three Service Chiefs but outranks them in the official Order of Precedence (12th rank).

3. Eligibility and Tenure

- **Appointing Authority:** Appointments Committee of the Cabinet (ACC), chaired by the Prime Minister.
- **Eligibility:** Serving or retired three-star (Lieutenant General/equivalent) or four-star (General/equivalent) military officers. The candidate must be below 62 years of age at the time of appointment.
- **Tenure:** No fixed term is specified, but the upper age limit to serve in the office is strictly capped at **65 years**.

4. Core Mandates and Responsibilities

- **Head of Department of Military Affairs (DMA):** Functions as the administrative Secretary of the DMA within the Ministry of Defence, handling tri-service logistics, deployments, and promotional structures.
- **Principal Military Advisor:** Advises the Union Defence Minister on all tri-service matters. (Note: Individual Service Chiefs continue to advise the Minister on matters exclusive to their respective forces).

- **Military Advisor to Nuclear Command Authority (NCA):** Serves as the designated military advisor to the PM-led Political Council of the NCA.
- **Permanent Chairman of CoSC:** Heads the Chiefs of Staff Committee to ensure structural continuity across services.
- **Theaterisation:** Mandated to restructure the armed forces into integrated joint theatre commands to optimize operational efficiency.
- **Command Restrictions:** The CDS **does not** exercise direct operational military command over the individual Service Chiefs.

Q. Consider the following statements regarding the office of the Chief of Defence Staff (CDS) in India:

1. The office of the Chief of Defence Staff was created as a statutory body under an amendment to the National Security Act.
2. The maximum age limit up to which an officer can serve as the Chief of Defence Staff is 65 years.
3. The Chief of Defence Staff exercises direct operational and administrative command over the individual Chiefs of the Army, Navy, and Air Force.

Which of the statements given above is/are correct?

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

Solution and Explanation

Correct Answer: (b) 2 only

- **STATEMENT 1 IS INCORRECT:** The office of the Chief of Defence Staff is an executive position created via amendments to the Government of India (Allocation of Business) Rules, 1961, rather than a statutory body.
- **STATEMENT 2 IS CORRECT:** As per the updated military service regulations, the maximum service age limit for holding the post of CDS is capped at 65 years.
- **STATEMENT 3 IS INCORRECT:** The CDS does not exercise direct operational or military command over the individual Service Chiefs, who retain direct operational control over their respective forces.

1.3. RIGHT TO BE FORGOTTEN

Context:

- Recently, the Right to be Forgotten came into the spotlight after a major High Court judgment ruled that a person's past legal issues should not permanently ruin their life online. The court decided that individuals who have been proven innocent, or those involved in settled private family disputes, have a right to privacy under Article 21 of the Constitution.



- To protect their reputation and future opportunities, internet search engines and legal websites were ordered to remove their names from public search results so that a casual online search does not follow them like a permanent shadow.

1. Concept and Mechanism

- **Definition:** The Right to be Forgotten (RTBF) enables individuals to seek the restriction, masking, or removal of personal information from public digital availability when it becomes irrelevant or no longer serves a legitimate public purpose.
- **De-indexing vs. Erasure:** De-indexing does not mean erasing the case record from official archives. It modifies online search engines so that an individual's name ceases to act as a primary keyword to fetch the record, protecting personal privacy while upholding institutional records.
- **Origin:** Formally recognized globally by the European Court of Justice in *Google Spain (2014)* and codified under the EU's General Data Protection Regulation (GDPR).

2. Legal Status in India

- **Constitutional Basis:** It is an un-enumerated right implicitly included under **Article 21 (Right to Life and Personal Liberty)** via the Supreme Court's landmark *K.S. Puttaswamy v. Union of India (2017)* privacy judgment.
- **Statutory Framework:** While the judiciary notes a lack of an explicit, comprehensive statutory code dedicated solely to de-indexing court records, the underlying principle of personal data erasure is supported by provisions within the **Digital Personal Data Protection (DPDP) Act, 2023**.
- **Intermediary Duty:** Under the **IT Rules, 2021**, digital intermediaries must restrict or de-index specific content when ordered by a court of law.

3. Key Judicial Exceptions (Not an Absolute Right)

The RTBF is subject to reasonable restrictions and is **denied** by courts in the following scenarios:

- Convictions for heinous crimes or offences against women and children.
- Financial fraud, corruption, or systemic breaches of public trust by public officials.
- Matters where a continuous public interest exists, or where deletion would distort historical records.
- **Geographical Scope:** Courts hold that to be effective against digital borderlessness, verified de-indexing mandates must apply **globally** across all regional domain extensions of a search engine.

Q. Consider the following statements regarding the Right to be Forgotten in India:

Statement I: The Right to be Forgotten is an absolute fundamental right explicitly codified under Part III of the Constitution of India.

Statement II: De-indexing a judicial record under the Right to be Forgotten permanently erases the judgment from public legal databases and court archives.

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) Both Statement I and Statement II are incorrect

Solution & Answer

Correct Answer: (d)

- **STATEMENT I IS INCORRECT:** The Right to be Forgotten is not an absolute right, nor is it explicitly written into Part III. It is an un-enumerated right derived through the judicial interpretation of Article 21 (*K.S. Puttaswamy* case) and is limited by exceptions like open justice and public interest.
- **STATEMENT II IS INCORRECT:** De-indexing does not mean permanent deletion or erasure of a judgment from official repositories. It simply stops the individual's name from pulling up the case on public search engines, while keeping the case records fully intact via direct legal citations or case numbers.

1.4. AADHAAR NOT MANDATORY FOR ADMISSION TO SCHOOLS

Context

- Recently, the Deputy Director of Education (DDE), Ernakulam (Kerala), has issued a strict directive ensuring that **no student is denied school admission due to the lack of an Aadhaar card.**

This instruction emphasizes that denying enrollment violates core provisions of the Right of Children to Free and Compulsory Education (RTE) Act.



Key Highlights

- **Admission vs. Benefits:** While children can be enrolled in schools without an Aadhaar card, the lack of an Aadhaar card may still create hurdles in making them eligible for state-backed welfare benefits such as **free uniforms, textbooks, and midday meals.**
- **Impact on Migrants:** The directive specifically addresses the plight of migrant children, who frequently face institutional denial of education when missing standard documentation like Aadhaar.
- **Administrative Oversight:** Local administrative bodies, including the **District Child Protection Office (DCPO)** and District Collectors, are actively intervening to track and enroll students lacking documentation to guarantee compliance with constitutional mandates.

About Aadhaar: Fundamental Framework

- **What it is:** A 12-digit unique identity number issued to residents of India based on their biometric and demographic data.
- **Statutory Body:** Issued by the **Unique Identification Authority of India (UIDAI)**, established under the **Aadhaar (Targeted Delivery of Financial and Other Subsidies, Benefits and Services) Act, 2016**. It functions under the *Ministry of Electronics and Information Technology (MeitY)*.

- **Mandatory Provisions:** The Aadhaar number is **mandatory** for various services and government schemes, including **PAN card applications, income tax filing**, and certain government subsidies.
- **Commonly Used but Not Always Mandatory:** Bank account KYC, Government services and welfare schemes.
- **Not Mandatory in Several Cases:** Birth and death registration, Many examinations and admissions.
- **Legal Position on Children & Welfare (Supreme Court Judgments):**
 - In the landmark *K.S. Puttaswamy v. Union of India (2018)* case, the Supreme Court ruled that **Aadhaar is not mandatory for school admissions**, as education is a fundamental right.
 - No child can be denied benefits from any welfare scheme (like the midday meal scheme) merely for lack of an Aadhaar number. The State must provide alternative means of identification.

About Right of Children to Free and Compulsory Education (RTE) Act, 2009

- **Constitutional Backing:** The RTE Act gives legal effect to **Article 21A** of the Indian Constitution, which makes free and compulsory education for children between the ages of **6 and 14 years** a Fundamental Right.
- **Key Important Provisions:**
 - **No Denial of Admission:** A child cannot be denied admission for lack of age proof, transfer certificates, or identity proof like Aadhaar.
 - Prescribes minimum teacher qualifications and maintains specified pupil-teacher ratios.
 - **Private unaided schools** must reserve **25% of entry-level** seats for children from economically weaker sections (EWS) and disadvantaged groups.
 - Places responsibility on the Central Government, State Governments, and local authorities for implementation and funding.

About District Child Protection Unit / Office (DCPU / DCPO)

- **Statutory Origin:** Set up in every district under the **Juvenile Justice (Care and Protection of Children) Act, 2015** (amended in 2021).
- **Nodal Scheme:** It is the key implementing arm at the district level under **Mission Vatsalya** (formerly Child Protection Services/Integrated Child Protection Scheme) administered by the *Ministry of Women and Child Development*.
- **Functions:**
 - Identifies vulnerable children (migrants, orphans, street children) and ensures their rehabilitation.
 - Coordinates with Child Welfare Committees (CWCs) and Juvenile Justice Boards (JJBs).
 - Ensures institutional and non-institutional care (foster care, adoption processes) is properly managed at the grassroots level.

Q. With reference to the Right to Education (RTE) Act, 2009 and institutional mandates in India, consider the following statements:

1. Under the RTE Act, no child can be denied admission to an elementary school due to the lack of identity documentation or age proof.
2. The District Child Protection Unit (DCPU) is a statutory body established under the Protection of Children from Sexual Offences (POCSO) Act.
3. According to the Supreme Court rulings, Aadhaar cannot be made mandatory for school admissions or accessing basic fundamental rights like education.

Which of the statements given above are correct?

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

Answer: C) 1 and 3 only

Explanation: Statement 1 and 3 are correct. Statement 2 is incorrect because the District Child Protection Unit (DCPU) is established under the Juvenile Justice (Care and Protection of Children) Act, not the POCSO Act.

1.5. LEADER OF THE OPPOSITION (LoP)

Context

- Recently, an expelled political leader was officially appointed as the Leader of the Opposition (LoP) in the West Bengal Legislative Assembly after proving the physical support of a majority faction of 58 MLAs to the Assembly Speaker.
- This internal party shift and subsequent recognition by the Speaker highlights the critical procedural powers wielded by the Presiding Officer in deciding the official status and leadership of the opposition in a legislative house.



1. Legal Status & Evolution

- **Status:** It is a **statutory post**, not a constitutional one.
- **Origin:** Formally recognized under **The Salary and Allowances of Leaders of Opposition in Parliament Act, 1977**.
- **History:** First officially recognized in **1969**. The post remained vacant at the central level between 2014 and 2024 as no single opposition party secured the required threshold.
- **Rank:** Enjoys the rank, salary, and perks equivalent to a **Cabinet Minister**.

2. Numerical Criteria

- **The 10% Quorum Rule:** Based on the directions of the Presiding Officers, a party must win at least **one-tenth (10%) of the total seats** of the House to claim the post.

- **No Alliance Aggregation:** This 10% requirement must be met by a single political party, not a pre-poll or post-poll coalition.
- **Deciding Authority:** The **Speaker** (Lok Sabha/Legislative Assembly) and the **Chairman** (Rajya Sabha/Legislative Council) hold final recognition powers based on numerical strength and internal party support.

3. Key Functions & Appointment Committees

- **Role:** Acts as the "Alternative Prime Minister" (or Alternative Chief Minister at the state level), standing ready to form a government if the ruling setup falls.
- **Appointment Panels:** The LoP of the Lok Sabha is a mandatory member of critical statutory selection committees:
 - **Lokpal**
 - **Central Vigilance Commission (CVC)**
 - **Central Information Commission (CIC)**
 - **National Human Rights Commission (NHRC)**
 - **CBI Director**
- **The Single Largest Group Rule:** If there is no official LoP due to the 10% rule, amended central acts permit the leader of the **single largest opposition party** to sit on these panels instead.

4. Global Comparison

- **UK System:** The United Kingdom uses an official "**Shadow Cabinet**" where opposition MPs track and scrutinize individual ministerial portfolios.
- **Indian System:** India does not have an officially instituted or statutory Shadow Cabinet system at either the Central or State levels.

Q: Consider the following statements regarding the office of the Leader of the Opposition (LoP) in India:

Statement-I: The Leader of the Opposition in the Lok Sabha is a constitutional office that must be mandatorily filled after every general election.

Statement-II: The Leader of the Opposition receives statutory recognition and enjoys the rank and status equivalent to a Cabinet Minister under an Act passed in 1977.

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

Answer: (d)

Solution

- **STATEMENT I IS INCORRECT:** The position is statutory, not constitutional. It can remain vacant, and it did remain vacant at the federal level from 2014 to 2024 because no single opposition party secured the necessary 10% seats of the total strength of the House.
- **STATEMENT II IS CORRECT:** The position was officially defined and granted Cabinet Minister rank under *The Salary and Allowances of Leaders of Opposition in Parliament Act, 1977*.

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INTERNATIONAL RELATIONS

2.1. INDIA-NEPAL BOUNDARY DISPUTES

Context:

- Recently, Nepal's Prime Minister Balendra Shah stated in Parliament on Sunday that Nepal too has encroached upon Indian territories in many places. This statement, marking the first time a Nepalese head of government has made such an admission, was delivered in response to a lawmaker's query regarding the disputed Kalapani region and triggered a significant political uproar from opposition parties like the Nepali Congress and the Nepali Communist Party.
- The long-standing boundary dispute over **Lipulekh, Limpiyadhura, and Kalapani** recently resurfaced after India announced the revival of the Kailash Mansarovar Yatra pilgrimage via the Lipulekh route, prompting Nepal to send diplomatic notes to both India and China, while India maintains that these territories are an integral part of Uttarakhand.



Historical Genesis of the Border

- **The Treaty of Sugauli (1816):** This treaty was signed between the Kingdom of Nepal and the British East India Company following the Anglo-Nepalese War of 1814–1816, establishing the modern territorial limits of Nepal.
- **Border Rivers:** The treaty designated the **Kali River** (Mahakali) as Nepal's western boundary with India and the **Mechi River** as its eastern boundary.
- **The Root Cause:** The treaty text did not include a definitive map or clarify the exact geographic source of the Kali River, creating room for conflicting cartographic interpretations.

Major Disputed Sectors

1. The Northwestern Tri-Junction (Kalapani, Lipulekh, Limpiyadhura)

- **Limpiyadhura:** Nepal claims the Kali River originates further northwest at Limpiyadhura, asserting that all land east of this stream belongs to it.
- **Kalapani:** India maintains the river originates from a different set of springs at Kalapani, placing the border along the ridge line east of the springs.
- **Lipulekh Pass:** This strategic high-altitude pass is controlled by India and serves as a vital trade and pilgrimage route to Tibet, but it is claimed by Nepal as part of its territory.

2. The Susta Sector

- **The Location:** Susta is situated in the southern Terai plains along the border between Bihar and Nepal.
- **The Dispute:** The boundary was originally defined by the course of the **Gandak River** (Narayani). Over the decades, the river shifted its course southward due to flooding, leading to conflicting claims over the newly exposed lands.

Divergent Positions of India and Nepal

- **Nepal's Stance:** Kathmandu relies strictly on the text of the 1816 Treaty of Sugauli. In 2020, Nepal passed a constitutional amendment adopting a new political map that includes Kalapani, Lipulekh, and Limpiyadhura within its borders.
- **India's Stance:** New Delhi relies on British administrative survey maps drawn after 1860, which depict Kalapani within Indian territory. India maintains continuous administrative control and security presence in the region and rejects unilateral cartographic changes.

Mechanisms for Resolution

- **Joint Technical Level Boundary Committee (JTB):** This body successfully mapped and agreed upon nearly 97% of the 1,850 km border, leaving only Kalapani and Susta unresolved.
- **Fixed Boundary Principle:** To counter the shifting nature of the Gandak and Mechi rivers, both nations agreed to lock the boundary at fixed geographic coordinates based on historical surveys, ensuring river migration does not alter sovereign titles.

Q. Consider the following statements regarding the boundary alignment between India and Nepal:

STATEMENT I: The Treaty of Sugauli, signed in 1816 between the Kingdom of Nepal and British India, established the Kali River as the natural western boundary of Nepal.

STATEMENT II: The recent territorial dispute over the Susta sector in the southern plains is primarily caused by the shifting course of the Mechi River over several decades.

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

- Both Statement I and Statement II are correct and Statement II is the correct explanation for Statement I
- Both Statement I and Statement II are correct and Statement II is not the correct explanation for Statement I
- Statement I is correct but Statement II is incorrect
- Statement I is incorrect but Statement II is correct

Solution & Explanation

Correct Answer: (c)

- **STATEMENT I IS CORRECT:** The 1816 Treaty of Sugauli officially concluded the Anglo-Nepalese War and designated the Kali River as the western international boundary of Nepal, separating it from India's Kumaon region.
- **STATEMENT II IS INCORRECT:** The territorial dispute in the Susta sector is caused by the changing course of the **Gandak River** (also known as the Narayani River), not the Mechi River. The Mechi River defines a portion of the eastern border of Nepal, whereas Susta lies in the south adjacent to Bihar.

2.2. SEA OF AZOV: GEOGRAPHY, ECOLOGY, AND STRATEGIC CHOKEPOINTS

Context:

- A recent drone attack on foreign-flagged cargo vessels has spotlighted the Sea of Azov, underscoring its status as a highly contested and volatile maritime zone caught in the geopolitical crossfire between Russia and Ukraine.



Geographical Extent and Mapping

- **Bordering Territories:** The inland sea is bordered by **Ukraine** to the north and northwest, **Russia** to the east and southeast, and the **Crimean Peninsula** to the west.
- **Strategic Chokepoint:** The **Kerch Strait** serves as the exclusive maritime gateway, connecting the Sea of Azov southward to the Black Sea. Following the 2014 annexation of Crimea, Russia assumed authority over both sides of this critical passage.
- **Bathymetry:** Covering roughly 37,600 square kilometers, it holds the geographical distinction of being the **shallowest sea in the world**, with a maximum depth of only 14 meters.

Hydrology and Oceanography

- **Drainage System:** The basin is primarily fed by the **Don** and **Kuban** rivers. The heavy deposition of sand and silt from these rivers actively shapes the coastline, forming numerous bays, limans, and narrow spits (e.g., the Fedotova Spit).
- **Salinity and Ecology:** The massive freshwater influx ensures **low salinity levels**. Sitting in a transition zone between steppe and forest-steppe ecosystems, the nutrient-rich waters support abundant plant life, such as green algae, and highly productive fisheries.
- **Climatology:** The region experiences a temperate continental climate with regular winter fogs. Extreme frosts lead to stationary ice formation along the northern shores between December and March, necessitating the deployment of icebreakers for navigation.

Economic Corridors and Infrastructure

- **Major Port Cities:** The coastline hosts critical freight and passenger hubs, including **Taganrog**, **Yeysk**, **Mariupol**, and **Berdyansk**.
- **Inland Connectivity:** The regional network is augmented by the **Volga-Don Canal**, a vital artificial waterway that links the Caspian Sea basin to Central Asia, highlighting the broader economic reliance on this maritime corridor.

Q. With respect to the Sea of Azov consider the following statements:

- The Kerch Strait acts as its exclusive maritime connection to the Black Sea.
- The Don and Kuban rivers are the primary drainage systems emptying into it.
- High freshwater influx from surrounding rivers results in exceptionally high salinity levels.

How many of the above statements are correct?

A. Only one

- B. Only two
- C. All three
- D. None

Answer: B

Explanation:

Statement I is correct: The **Kerch Strait** is the sole maritime gateway that physically connects the Sea of Azov southward to the **Black Sea**, making it a critical geopolitical chokepoint.

Statement II is correct: The hydrological profile of the sea is primarily sustained by the **Don and Kuban rivers**, which discharge massive amounts of freshwater, silt, and sand into the basin.

Statement III is incorrect: Due to the massive freshwater influx from primary rivers, the Sea of Azov is characterized by **exceptionally low salinity levels**, not high salinity.

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3.1. REMITTANCES & BoP ACCOUNTING

Context:

- Recently, inward remittances have emerged as a vital macroeconomic anchor for India's external sector, doing the heavy lifting to finance the structural trade deficit and protect the Indian rupee from aggressive depreciation. While net Foreign Direct Investment (FDI) and net Foreign Portfolio Investment (FPI) flows have dropped into negative territory due to global economic disruptions and energy crises, steady net secondary income inflows—amounting to \$138 billion—have consistently financed more than half of India's total trade deficit, serving as a highly resilient stabilizer against external sector vulnerabilities.



1. BoP Accounting Framework

- **Classification:** Remittances are recorded under the **Current Account** (not the Capital/Financial Account).
- **Sub-category:** They are explicitly classified under **Invisibles \rightarrow Net Secondary Income (NSI) surplus**, which accounts for India's huge net positive private transfers.
- **Nature:** They function as **unrequited unilateral transfers** (transfers and not claims). Unlike FDI or FPI, they do not generate future liability outflows or investment income outflows.

2. Key Trends & Core Data

- **Global Standing:** India attracts the highest volume of remittances globally by a wide margin, securing \$138 billion in 2024.
- **Proportion to GDP:** Net remittances average about **3% of India's Gross Domestic Product (GDP)**, making them substantially higher than net FDI and FPI flows during economic slowdowns.
- **Stability Factor:** Unlike foreign portfolio investments, remittances are not prone to sudden halts or capital flight; they are driven by the resilient income and savings decisions of the overseas Indian diaspora.
- **Deficit Cushioning:** Since mid-2013, remittances have on average financed **more than half of India's total trade deficit**.

3. Macroeconomic Impact

- **Countervailing Depreciation:** As the Indian rupee faces downward pressure (losing nearly 12% against the U.S. dollar between May 2025 and early 2026), remittances act as a vital shock absorber.
- **CAD Management:** They directly bridge the gap left by a persistent merchandise trade deficit, keeping the CAD within manageable parameters.

- **Insulation from Capital Ebbing:** When the Financial Account faces stress due to declining or negative net FDI and FPI, steady remittance flows prevent severe balance-of-payments vulnerabilities.

Q. Consider the following statements regarding the external sector of India:

Statement I: Personal remittances received from the Indian diaspora overseas are recorded under the Capital Account of the Balance of Payments framework.

Statement II: Remittances into India function as unrequited unilateral transfers that do not create future debt or repayment liabilities for the country.

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 & Answer

Correct Answer: (d)

- **STATEMENT I IS INCORRECT:** Personal remittances are systematically classified under the **Current Account** (specifically under the Net Secondary Income surplus) because they represent current unilateral income transfers rather than changes in the asset or liability positions of the nation.
- **STATEMENT II IS CORRECT:** Remittances are explicitly classified as unrequited unilateral transfers (they are transfers and not claims). They represent one-way financial flows sent home by workers without any concurrent entry of corresponding economic balances or goods, meaning they create zero future debt obligations or repayment liabilities for India.

3.2. PURCHASING MANAGERS' INDEX (PMI) AND SECTORAL GROWTH TRACKING

Context

- **Recently**, India's manufacturing sector recorded stronger growth in May 2026, supported by rising domestic demand, infrastructure development, and increased new orders.
- The seasonally adjusted **HSBC India Manufacturing PMI** rose to **55.0 in May 2026** from **54.7 in April**, reaching a three-month high. The sector continued to expand despite higher costs of fuel, transportation, and raw materials due to global inflationary pressures.



1. What is the Purchasing Managers' Index (PMI)?

- **Definition:** It is a survey-based economic indicator designed to track and gauge the month-on-month changes in business and economic conditions.

- **Compilation:** For India, it is compiled monthly by **S&P Global** (sponsored by HSBC) based on questionnaires sent to senior executives/purchasing managers at roughly 400 to 500 private manufacturing firms.
- **Types of PMI:** It is calculated separately for the **Manufacturing sector** and the **Services sector**, which are subsequently aggregated into a **Composite PMI**.

2. How to Interpret the PMI Score?

The PMI is expressed as a headline number ranging from **0 to 100**:

- **Score > 50:** Indicates an **expansion** in economic activity compared to the previous month.
- **Score < 50:** Indicates a **contraction** in activity compared to the previous month.
- **Score = 50:** Represents **no change** or status quo in business conditions.

3. PMI vs. IIP

Feature Parameter /	Purchasing Managers' Index (PMI)	Index of Industrial Production (IIP)
Compiled By	Private entity (S&P Global / HSBC).	Government entity (National Statistical Office - NSO , Ministry of Statistics & Programme Implementation - MoSPI).
Nature of Indicator	Leading Indicator: Reflects forward-looking business expectations and sentiment.	Lagging Indicator: Reflects actual, historical physical output from a past period.
Basis of Measurement	Month-on-Month (m-o-m): Compares the current month's conditions directly to the preceding month.	Year-on-Year (y-o-y): Compares production volumes against a fixed base year (Current Base Year: 2022-23).
Sectoral Coverage	Covers Manufacturing and Services sectors.	Covers Mining, Manufacturing, and Electricity (broad industrial sector).
Formal vs. Informal	Under-represents small and medium enterprises (SMEs) and informal units; leans toward large firms.	Broader, more formal, statistical representation via fixed commodity baskets.

With reference to the Purchasing Managers' Index (PMI), consider the following statements:

1. It is a survey-based economic indicator.
2. It measures month-on-month changes in business conditions.
3. It is compiled by the National Statistical Office (NSO).

Which of the statements given above are correct?

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

Answer: A

Explanation:

Statement 1 is correct: PMI is a **survey-based economic indicator** that assesses business activity and economic conditions.

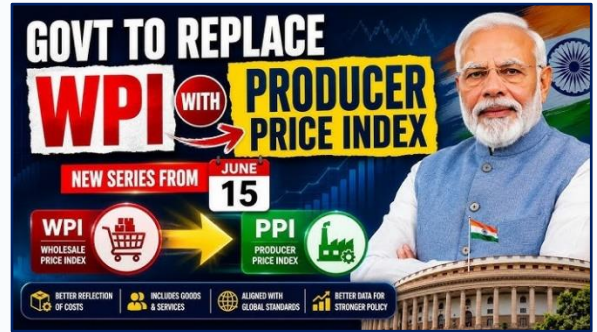
Statement 2 is correct: It tracks **month-on-month changes** in business conditions such as output, new orders, employment, and prices.

Statement 3 is incorrect: In India, PMI is compiled by **S&P Global (sponsored by HSBC)**, not by the **National Statistical Office (NSO)**. NSO compiles the **Index of Industrial Production (IIP)**.

3.3. INDIA'S STRUCTURAL SHIFT FROM WPI TO PPI

Context

- The Ministry of Commerce and Industry is executing a major structural reform in India's inflation-mapping architecture. Over the next five years, the traditional **Wholesale Price Index (WPI)** will be systematically phased out and entirely replaced by the globally standardized **Producer Price Index (PPI)**.



1. The Transition Roadmap

To prevent economic disruptions, the Department for Promotion of Industry and Internal Trade (DPIIT) is executing a dual-track parallel release starting June 15:

- Base Year Revision:** The temporary WPI series updates its base year from **2011-12 to 2022-23**.
- The 5-Year Parallel Run:** Because WPI is legally embedded in corporate and government price-escalation contracts, it will be published alongside the new PPI for five years. This allows commercial entities a smooth operational transition before WPI is permanently discontinued.

2. The New PPI Architecture

Unlike the single-metric approach of the wholesale index, the new PPI tracks price changes at different entry and exit points of production through three separate indices:

- Output PPI:** Captures the average change in basic prices received by domestic producers when the finished goods leave the factory floor.
- Trial Input PPI:** Measures the price fluctuations of raw materials and intermediate inputs as they enter the production pipeline.
- Services PPI:** Brings the services economy into production-level inflation tracking for the first time.

Phase 1 Services Basket: The index initiates tracking across **seven** foundational service sectors: **Banking, Securities Transactions, Insurance, Management of Pension Funds, Railways, Air (Passenger), and Telecom**.

3. WPI vs. PPI

Parameter	Wholesale Price Index (WPI)	Producer Price Index (PPI)
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Core Measurement	Tracks price changes of goods traded in bulk at the wholesale level.	Tracks average change in prices received by domestic producers for their output/input.
Services Sector	Completely excluded.	Included (7 sectors in Phase 1, expanding later).
Global Alignment	Out of sync with advanced economies; criticized for omitting consumer-facing services.	Aligned with International Monetary Fund (IMF) best practices.
Margins & Taxes	Includes trade and transport margins between the producer and wholesaler.	Measures basic prices received by the producer, eliminating trade/transport distortions.

4. About the WPI Framework

- **Compiling Authority:** Published on a monthly basis by the **Office of the Economic Adviser, DPIIT, Ministry of Commerce and Industry.**
- **The Three Pillars of WPI Weightage:**
 - **Manufactured Products (64.23%):** The largest component, encompassing metals, chemicals, machinery, and textiles.
 - **Primary Articles (22.62%):** Covers raw food items, non-food agricultural items, and crude petroleum.
 - **Fuel & Power (13.15%):** Tracks corporate energy inputs like electricity, petrol, diesel, and LPG.
- **The WPI Food Index:** This is a distinct sub-index calculated by combining the weightage of 'food articles' from the Primary Articles group and 'food products' from the Manufactured Products group.

Q. With respect to the transition from the Wholesale Price Index (WPI) to the Producer Price Index (PPI), consider the following statements:

- The Wholesale Price Index completely excludes the services sector, whereas the newly introduced Producer Price Index integrates it.
- The Producer Price Index measures the basic prices received by producers by including trade margins and transport costs.

Which of the statements given above is/are correct?

- I only
- II only
- Both I and II
- Neither I nor II

Answer: A

Explanation:

Statement I is Correct: The **Wholesale Price Index (WPI)** primarily tracks price changes in goods and **does not cover the services sector**. The proposed **Producer Price Index (PPI)** is intended to provide broader coverage and include **services alongside goods**, making it a more comprehensive measure of producer-level inflation.

Statement II is Incorrect: The **Producer Price Index (PPI)** measures the **basic prices received by producers**. These prices **exclude trade margins, transport costs, and product taxes**, as they are not part of the amount retained by the producer.

3.4. CABINET APPROVES PRICE STABILIZATION FUND

Context

- Recently, the Union Cabinet, chaired by the honourable PM, approved a one-time financial support of up to ₹10,000 crores for Oil Marketing Companies (OMCs).
- This support will help stabilize Aviation Turbine Fuel (ATF) prices for scheduled Indian airlines operating domestic and international flights.



Key Components of the ATF Price Stabilisation Fund

- ₹10,000 Crore Interest-Free Support:** OMCs will receive interest-free advances to compensate for losses when international ATF prices rise above a benchmark level.
- Recovery Mechanism:** When international ATF prices fall, OMCs will repay the support amount to the Consolidated Fund of India until the entire advance is fully recovered.
- Coverage of Domestic and International Operations:** Available to all willing scheduled Indian airlines for both domestic and international operations.
- Fixed ATF Pricing:** Provides airlines with predictable fuel costs and protection from sudden price spikes.
- Exclusive rights of ATF supply to OMCs:** Participating airlines will buy ATF only from OMCs for up to 3 years or until the support amount is fully recovered.
- Monitoring & Audit:** A Monitoring Committee comprising representatives of the Ministry of Civil Aviation, Ministry of Petroleum & Natural Gas and Department of Expenditure shall oversee implementation, claim verification, reconciliation and settlement.
- Duration of Price Stabilization support:** The scheme will operate for 36 months, subject to annual review, and may be extended if required.

Expected outcome

- The proposed mechanism will provide enhanced stability and predictability in ATF pricing for Indian airlines, enabling better operational and financial planning.
- It will shield Oil Marketing Companies (OMCs) from losses arising from volatile and elevated ATF prices during the ongoing West Asia crisis.

- The measure will help protect and sustain domestic and international air connectivity, ensuring continuity of air services.
- It will reduce the pass-through of fuel price shocks to passengers, thereby helping to moderate fare volatility.
- The arrangement will support continued air connectivity to remote, regional, Tier-II and Tier-III cities, promoting balanced regional development and inclusive growth.

Key Benefits

- Stable airline operations help sustain employment across airlines, airports, ground handling agencies, MROs, travel agencies, hospitality and logistics sectors.
- Continued air connectivity will facilitate movement of passengers, high-value cargo, business travellers and tourists, thereby supporting economic activity across sectors.
- The measure will have positive spill-over effects on tourism, hospitality, trade, exports, regional development and investment.
- It will help ensure optimum utilisation of airport infrastructure developed across the country, including airports operationalised under the **UDAN scheme**.
- By preserving domestic and international connectivity, the initiative will strengthen India's integration with global markets and support long-term economic growth.

Consider the following statements regarding the ATF Price Stabilisation Fund:

1. It provides interest-free financial support to Oil Marketing Companies (OMCs).
2. The scheme is applicable only to domestic airline operations.
3. The support amount will be recovered when international ATF prices moderate.

Which of the statements given above are correct?

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

Statement 1 is Correct: The ATF Price Stabilisation Fund provides **interest-free financial support to Oil Marketing Companies (OMCs)**.

Statement 2 is Incorrect: The scheme covers **both domestic and international operations** of scheduled Indian airlines, not just domestic flights.

Statement 3 is Correct: When international ATF prices decline, the support amount will be **recovered from OMCs and returned to the Consolidated Fund of India**.

3.5. WHEAT CULTIVATION

Context:

- Recently, a report by the Press Trust of India highlighted that India's wheat procurement for the 2026-27 rabi marketing season surged by 17% to cross 35 million tonnes (MT), successfully exceeding the government's target of 34.5 MT and surpassing the previous year's procurement of 30 MT.
- This higher procurement was primarily driven by a robust domestic production of 120.65 MT—which sustained despite localized damage from unseasonal rain and hailstorms—causing market mandi rates to rule below the Minimum Support Price (MSP).
- State-wise trends show that Punjab led the procurement at 12.1 MT, while Madhya Pradesh witnessed a sharp jump to 10.4 MT, ensuring ample reserves for the Food Corporation of India (FCI) to meet national food security mandates.



Agro-Climatic Requirements for Wheat Cultivation

Wheat is a primary staple food grain and is classified as the second most crucial cereal crop in India after rice. It is fundamentally a Rabi crop, which means it is sown during the onset of winter and harvested during the spring season.

1. Temperature and Weather Conditions

- **Sowing Stage:** The crop requires a cool, moist climate during its early vegetative phase, with ideal sowing temperatures ranging between 10°C and 15°C.
- **Ripening and Harvesting Stage:** The crop necessitates warm, sunny, and dry conditions during its ripening and harvesting periods, with optimal temperatures ranging between 21°C and 26°C.
- **Frost and Weather Vulnerability:** Sudden temperature spikes or heatwaves during the grain-filling stage can compress the lifecycle, leading to shriveled grains, while heavy frost during the flowering stage can damage the yield.

2. Rainfall and Irrigation

- **Water Requirement:** Wheat requires a moderate annual rainfall between 50 cm and 75 cm distributed evenly across the growing period.
- **Critical Irrigation Window:** The crop can be grown successfully in low-rainfall zones if supported by timely irrigation, especially during the critical Crown Root Initiation (CRI) stage.
- **Winter Showers:** The light winter rains caused by Western Disturbances in the northwestern plains of India are highly beneficial for the vegetative growth of wheat.

3. Soil Profile

- **Ideal Soil Type:** The crop grows best in well-drained loamy, clayey-loamy, or alluvial soils that possess a high moisture-retention capacity.

- **Unsuitable Conditions:** Heavy black soil or overly sandy soils that do not drain effectively can restrict root development and trigger waterlogging, which severely undermines wheat health.

Production and Geographical Distribution in India

India stands as the second-largest producer of wheat globally, trailing only behind China, and the crop accounts for a significant share of the total foodgrain production in the country.

Major Producing Zones

- **The Indo-Gangetic Plains:** The fertile alluvial tract stretching across the northern and northwestern parts of India forms the primary wheat bowl of the country.
- **Leading States:** Punjab consistently leads in terms of productivity and per-hectare yield due to extensive irrigation coverage. Madhya Pradesh, Haryana, Uttar Pradesh, and Rajasthan follow as the other top-tier producers.
- **Procurement Dynamics:** According to the latest data from the Department of Food and Public Distribution, Punjab and Madhya Pradesh contributed the highest volumes to the central pool during the recent procurement drive, with Madhya Pradesh experiencing a sharp increase to 10.4 million tonnes.

Governance, Procurement, and Institutional Support

The government closely monitors and regulates the supply chain of wheat to ensure national food security and to shield domestic farmers from extreme price fluctuations.

1. Minimum Support Price (MSP)

- **Price Guarantee:** The central government announces the Minimum Support Price (MSP) for wheat ahead of the Rabi sowing season based on the recommendations of the Commission for Agricultural Costs and Prices (CACP).
- **Cost Structure:** The CACP recommends the price keeping in view the principle of ensuring a minimum of 50 percent margin over the all-India weighted average cost of production (measured via the A2+FL cost formulation).

2. Procurement and Buffer Norms

- **Implementing Agencies:** The Food Corporation of India (FCI), along with designated state agencies, executes open-ended procurement at the designated MSP.
- **Food Security Mandate:** The procured wheat is maintained in the Central Pool to fulfill the requirements of the National Food Security Act (NFSA), the Pradhan Mantri Garib Kalyan Anna Yojana (PMGKAY), and other welfare schemes.
- **Buffer Stock Status:** The government maintains quarterly buffer stock norms to handle emergency shortfalls, and current reserves are well above the statutory requirement of 275.80 lakh metric tonnes set for the start of July.

3. Trade and Export Framework

- **Regulatory Stance:** To balance domestic prices and prevent retail inflation, India maintains a restrictive export policy under the "Prohibited" category of the Foreign Trade Policy.

- **Calibrated Relaxations:** The Directorate General of Foreign Trade (DGFT) periodically permits exceptions, such as approving controlled export quotas to friendly nations under Government-to-Government (G2G) agreements to support global food security.

Q. Consider the following statements regarding wheat cultivation and procurement in India:

STATEMENT I: The growth of the wheat crop in the northern plains of India is highly favored by light winter rains resulting from Western Disturbances.

STATEMENT II: The Minimum Support Price (MSP) for wheat is legally mandated by the National Food Security Act (NFSA) and is declared by the Commission for Agricultural Costs and Prices (CACP).

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

Correct Answer: (c)

- **STATEMENT I IS CORRECT:** Western Disturbances originate in the Mediterranean region and bring vital winter rainfall to northwestern India during the Rabi season. This rainfall provides timely moisture that is highly beneficial for the vegetative phase of the wheat crop, thereby improving grain quality and total yield.
- **STATEMENT II IS INCORRECT:** The Minimum Support Price (MSP) is an administrative mechanism announced by the Cabinet Committee on Economic Affairs (CCEA) based on the advisory recommendations of the Commission for Agricultural Costs and Prices (CACP). It is not legally mandated by the National Food Security Act (NFSA), nor does the CACP declare it directly; the CACP only recommends it, while the CCEA makes the final decision.

3.6. THE GREAT NICOBAR PROJECT: STRATEGIC IMPERATIVES AND ECOLOGICAL REALITIES

Context:

Recently, the **International Container Transshipment Port (ICTP) at Galathea Bay, Great Nicobar Island**, was designated a **strategic project** by the Ministry of Defence. The **₹81,000-crore** project aims to strengthen India's maritime security in the **Indian Ocean**, boost transshipment cargo capacity, and counter growing foreign naval influence in the region.



Project Overview and Geography

- **Location:** Galathea Bay, Great Nicobar Island (Andaman and Nicobar archipelago).
- **Project Components:** The comprehensive ₹81,000-crore initiative includes the ICTP, a greenfield international airport (for civilian and military use), a township, a gas-powered power plant, and a designated tourism zone.
- **Geopolitical Significance:** Positioned to capture transshipment cargo currently routed through established hubs like Colombo, Singapore, and Port Klang. It is also viewed as a strategic counterweight to Chinese naval expansion in the Indian Ocean and is influenced by broader security dynamics near the Strait of Hormuz.

Institutional Framework and Implementing Agencies

- **ANIIDCO (Andaman and Nicobar Islands Integrated Development Corporation Limited):** The nodal proponent for the overall Great Nicobar Island Development Project and the holder of the environmental clearance.
- **Kamarajar Port Limited (KPL):** The Chennai-based entity acting as the specific implementing agency for the port component (ICTP).
- **Public Investment Board (PIB):** A Finance Ministry body responsible for appraising large public investments.
- **Public-Private Partnership Appraisal Committee (PPPAC):** A Finance Ministry body tasked with vetting project proposals worth ₹500 crore and above that involve private sector partnerships.

Major Environmental and Social Concerns

- **Threat to Indigenous Tribes:** The influx of outsiders threatens the **Shompen**, an isolated hunter-gatherer community recognized as a Particularly Vulnerable Tribal Group (PVTG).
- **Biodiversity Loss:** The project requires clearing nearly 130 square kilometers of pristine tropical rainforest. Compensatory afforestation is planned in mainland states like Haryana, which cannot replace the island's unique ecosystem.
- **Marine Ecology:** Port construction and dredging at Galathea Bay severely threaten the pristine coral reefs and the globally significant nesting grounds of the endangered **Giant Leatherback Sea Turtle**.
- **Disaster Vulnerability:** The island is located in Seismic Zone V (the highest risk category) and is highly prone to mega-earthquakes and tsunamis.

Key Important Facts about Nicobar Islands

- **Archipelago Structure:** The Nicobar group consists of 22 islands (only 10 are inhabited), forming the southern segment of the Andaman and Nicobar Union Territory in the Bay of Bengal.
- **Ten Degree Channel:** The critical maritime channel that separates the Andaman Islands (to the north) from the Nicobar Islands (to the south).
- **Car Nicobar:** The northernmost island of the Nicobar group and its administrative headquarters.
- **Great Channel (Six Degree Channel):** The international maritime boundary separating Great Nicobar Island (India) from Sumatra (Indonesia).

- **Great Nicobar Island:** The largest and southernmost island of the Nicobar archipelago. It is heavily forested and recognized as a UNESCO Biosphere Reserve.
- **Indira Point:** Located on the southern tip of Great Nicobar, it is the southernmost point of India's territory (formerly known as Pygmalion Point).
- **Mount Thullier:** The highest peak in the Nicobar group (642 meters), situated on Great Nicobar Island.
- **Galathea Bay:** A highly sensitive ecological zone on the southeastern coast of Great Nicobar. It is a globally significant nesting site for the Giant Leatherback Sea Turtle.
- **Demography:** The interior tropical forests are inhabited by the **Shompen** (a semi-nomadic Particularly Vulnerable Tribal Group), while the coastal areas are home to the **Nicobarese** (a Scheduled Tribe engaged in agriculture and fishing).

Q. With respect to the geography of the Nicobar archipelago, consider the following statements:

- The Ten Degree Channel separates the Andaman Islands from the Nicobar Islands.
- The Great Channel acts as the international maritime boundary separating Great Nicobar Island from Sumatra.
- Mount Thullier, the highest peak in the Nicobar group, is located on Car Nicobar Island.

How many of the above statements are correct?

- Only one
- Only two
- All three
- None

Answer: B

Explanation:

Statement I is correct: The Ten Degree Channel is the geographical maritime boundary that separates the Andaman Islands to the north from the Nicobar Islands to the south.

Statement II is correct: The Great Channel, also known as the Six Degree Channel, serves as the international maritime boundary separating India's Great Nicobar Island from Indonesia's Sumatra island.

Statement III is incorrect: Mount Thullier is the highest peak in the Nicobar archipelago, but it is situated on Great Nicobar Island, not Car Nicobar Island.

3.7. MONETARY POLICY COMMITTEE (MPC)

Context

- Recently, the Monetary Policy Committee (MPC) of the Reserve Bank of India (RBI) concluded its second bi-monthly meeting for the financial year 2026–27, deciding unanimously to keep the policy repo rate unchanged at 5.25% and maintain its "neutral" stance.



- This decision was influenced by mounting macroeconomic headwinds stemming from the escalated conflict in West Asia, which has pushed international crude oil prices higher and triggered significant foreign capital outflows, exerting persistent pressure on the Indian rupee.
- In response to these supply-side shocks and energy disruptions, the MPC revised its Consumer Price Index (CPI) inflation projection upward for the fiscal year to 5.1% while concurrently scaling down India's real Gross Domestic Product (GDP) growth forecast to 6.6% to balance economic stability with price control.

1. Statutory Genesis and Institutional Evolution

- **Historical Genesis:** Prior to the institutionalization of the MPC, the RBI Governor possessed absolute, unilateral veto power over the determination of key policy interest rates, receiving only non-binding recommendations from a Technical Advisory Committee.
- **Legislative Amending Act:** The Monetary Policy Committee was formally established as a statutory body through an amendment to the **Reserve Bank of India Act, 1934** via the Finance Act, 2016.
- **The Urjit Patel Committee:** The structural shift toward a committee-based framework was explicitly recommended by the Executive Committee headed by Dr. Urjit Patel in 2014 to ensure collective, institutional wisdom, reduce individualized bias, and enhance the transparency of the inflation-targeting framework.

2. Organizational Composition and Structural Balance

The MPC is a balanced, six-member committee designed to bridge institutional experience from central banking with independent academic and market expertise.

Component	Number of Members	Designated Institutional Positions / Selection Method
Internal RBI Ex-Officio Members	3 Members	Includes the Governor of the RBI (serving as the Ex-Officio Chairperson), the Deputy Governor of the RBI in charge of monetary policy, and an officer of the RBI nominated by the Central Board.
External Government Appointees	3 Members	Appointed by the Central Government on the recommendations of a cabinet-headed Search-cum-Selection Committee.

- **Eligibility and Tenure:** External members must be experts in fields related to economics, banking, finance, or monetary policy, and they hold office for a **fixed term of four years** without any provision for reappointment.
- **Prohibitions on Office:** Members of Parliament, members of State Legislatures, and public servants are legally barred from being appointed as external members of the MPC to preserve institutional autonomy.

3. Statutory Mandate and Target Architecture

- **Flexible Inflation Targeting (FIT):** Under Section 45ZA of the RBI Act, the Central Government, in consultation with the RBI, legally determines the inflation target once every five years.

- **The Primary Directive:** The core statutory directive of the MPC is to maintain price stability while remaining mindful of the objective of growth.
- **The Numeric Framework:** The current long-term inflation target is structurally anchored at **4% for Consumer Price Index (CPI) Headline Inflation**, with a permissible upper tolerance limit of **6%** and a lower tolerance limit of **2%** (expressed mathematically as 4% - 2%).

4. Voting Protocol and Functional Mechanics

- **Meeting Frequency:** The MPC is statutory mandated to meet **at least four times a year**, though it typically meets bi-monthly to review evolving domestic and global economic data.
- **Quorum Requirements:** A minimum of **four members** must be present to form a valid quorum for a scheduled policy evaluation meeting.
- **Decision Matrix:** Each member of the committee possesses one vote. Decisions regarding the policy repo rate require a simple majority of members present and voting.
- **Casting Vote Safeguard:** In the event of an exact equality of votes (a 3–3 tie), the **Governor of the RBI holds a casting vote** in addition to their primary vote, serving as a tie-breaker.
- **Transparency Mandate:** The RBI is legally bound to publish the official minutes of each MPC meeting on the 14th day following its conclusion, publicizing the individual votes cast and the specific economic rationale of each member.

5. Institutional Accountability for Policy Failure

- **Defining Failure:** Under the statutory framework, the RBI is deemed to have failed to meet its inflation target if headline CPI inflation remains outside the 2% -6% tolerance band for **three consecutive quarters**.
- **The Remedial Report:** Upon such an event, the RBI must submit a formal, transparent report to the Central Government detailing:
 - The definitive structural or supply-side reasons behind the failure to maintain price stability.
 - The precise remedial policy actions the central bank proposes to implement.
 - An estimated time matrix within which the inflation trajectory is expected to return to the target midpoint.

6. Key Monetary Policy Concepts Explained

- **Policy Repo Rate:** The benchmark interest rate at which the Reserve Bank of India lends short-term, liquidity-backed funds to commercial banks against the collateral of government securities.
- **Standing Deposit Facility (SDF):** An uncollateralized liquidity absorption mechanism introduced to replace the reverse repo floor, allowing banks to park overnight surplus liquidity with the RBI without requiring government securities as collateral.
- **Marginal Standing Facility (MSF):** A penal, emergency window through which commercial banks can borrow overnight funds from the RBI by dipping into their statutory liquidity ratio portfolio up to a specified limit at a premium rate.
- **Core Inflation vs. Headline Inflation:** Headline inflation measures total inflation within an economy, including highly volatile food and energy products. Core inflation is calculated by stripping out food and fuel components from headline inflation to isolate structural demand-driven price pressures.

Q. Consider the following statements regarding the Monetary Policy Committee (MPC) of India:

- I. The MPC is a statutory body established under the Banking Regulation Act, 1949 to determine India's benchmark interest rates.
- II. External members of the MPC are appointed for a fixed tenure of four years and are ineligible for reappointment to prevent conflict of interest.
- III. In the event of a tie during policy voting, the Union Finance Minister exercises a casting vote to maintain macroeconomic equilibrium.

Which of the statements given above is/are correct?

- (a) II only
- (b) I and II only
- (c) II and III only
- (d) I, II and III

Solution

Correct Answer: (a) II only

- **STATEMENT I IS INCORRECT:** The Monetary Policy Committee is a statutory body explicitly constituted under Section 45ZB of the **Reserve Bank of India (RBI) Act, 1934**, following an amendment introduced by the Finance Act, 2016, and not under the Banking Regulation Act, 1949.
- **STATEMENT II IS CORRECT:** According to the statutory guidelines governing the selection process, the three external members nominated by the Central Government hold office for a **fixed tenure of four years and are strictly ineligible for reappointment**, ensuring objective decision-making and institutional independence.
- **STATEMENT III IS INCORRECT:** In the event of an equality of votes during a policy meeting, the **Governor of the Reserve Bank of India**, acting as the ex-officio chairperson of the committee, exercises a second or casting vote. The Union Finance Minister has no operational role or voting power inside the functional setup of the MPC.

3.8. NATURAL GAS DISCOVERY IN ANDAMAN OFFSHORE BLOCK

Context

- Recently, the State-owned explorer-producer Oil India Ltd. (OIL) has successfully confirmed the presence of natural gas in the Andaman shallow offshore block.

Key Highlights

- **Location of Discovery:** The natural gas was discovered in the **Andaman shallow offshore block**.
- **Specific Well Name:** The discovery was confirmed in the third exploratory well drilled in this block, named **Vijayapuram-3**.
- Geologically, the AN basin lies at the intersection of the Andaman and Nicobar Basins, part of the Bengal-Arakan sedimentary system



Strategic Importance for India

- **Energy Security:**

- India remains heavily dependent on imported hydrocarbons, with crude oil import dependence reaching about **88%** in FY 2024–25, while nearly **50% of its natural gas requirements** are met through imports.
- Major suppliers of Liquefied Natural Gas (LNG) include **Qatar, the United States, and the United Arab Emirates (UAE)**.
- **Gas Based Economy:** The discovery aligns with India's vision of establishing a Gas Based Economy by 2030 and increasing share of natural gas in its primary energy basket to **15 percent by 2030**.

Initiatives for Natural Gas Exploration

- **Open Acreage Licensing Policy (OALP):**
 - It is a key component of the Hydrocarbon Exploration and Licensing Policy (HELP). Under HELP, exploration is governed by a **revenue-sharing model**, replacing the profit-sharing system of the earlier New Exploration Licensing Policy (NELP).
 - HELP also provides a **single license** for exploration and production of **all hydrocarbons**, including both conventional and unconventional resources.
- **National Deep Water Exploration Mission:** Deepwater Exploration Mission is a flagship energy security initiative of the Ministry of Petroleum and Natural Gas aimed at exploring untapped oil and natural gas reserves beneath India's seabed to enhance domestic hydrocarbon production and reduce import dependence.
- **FDI Policy: 100% FDI allowed in the natural gas sector under automatic route.**

Q. With reference to the Open Acreage Licensing Policy (OALP), consider the following statements:

1. It is a component of the Hydrocarbon Exploration and Licensing Policy (HELP).
2. Companies can identify and propose exploration blocks on their own.
3. It follows a profit-sharing model.

Which of the statements given above are correct?

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

Answer: A

Explanation:

Statement 1: Correct. OALP is a key component of the **Hydrocarbon Exploration and Licensing Policy (HELP)**.

Statement 2: Correct. Under OALP, companies can examine available data and **identify/propose exploration blocks on their own**, without waiting for government-designated blocks.

Statement 3: Incorrect. OALP operates under HELP, which follows a **revenue-sharing model**, not a profit-sharing model. The profit-sharing model was a feature of the earlier **New Exploration Licensing Policy (NELP)**.

4.1. WEBB TELESCOPE CAPTURES WEATHER ON EXOPLANET

Context:

- **Recently**, a landmark study published in the journal *Science*, used **NASA's James Webb Space Telescope (JWST)** to observe **daily cloud cycles and changing weather patterns** on the exoplanet **WASP-43b** for the first time. The discovery provides a more accurate understanding of exoplanet atmospheres and helps scientists improve estimates of their chemical composition.



1. What is WASP-43b?

- A **Hot Jupiter** exoplanet located about **280 light-years** from Earth.
- Similar in size to Jupiter but much closer to its parent star.
- Completes one orbit in approximately **19 hours** (less than one Earth day).
- **Tidally locked**: one side permanently faces the star while the other remains in darkness.

2. Atmospheric Conditions

- Day-side temperatures are high enough to **melt rocks**.
- Night-side temperatures are significantly cooler.
- Presence of **water vapour** and **cloud formations** detected.
- Experiences extreme weather patterns due to temperature differences.

3. Significance of the Research

- Helps scientists understand how **planetary systems formed from protoplanetary disks** of gas and dust.
- Atmospheric composition reveals a planet's **formation history and original location** in the disk.
- Enables comparison between the formation of **Hot Jupiters** and smaller rocky planets like Earth.
- Provides insights into the early evolution of our **Solar System about 4.6 billion years ago**.
- Improves understanding of the processes that shape **diverse planetary architectures** across the universe.

4. About James Webb Space Telescope (JWST)

- Launched by NASA in 2021.
- Joint project of NASA, European Space Agency and Canadian Space Agency.
- Studies the universe primarily in the **infrared spectrum**.
- Successor to the Hubble Space Telescope.

5. Future Instruments

- **Extremely Large Telescope (ELT):** Currently being constructed by Europe in **northern Chile**. Once operational, its main objective will be to discover and analyze "exoplanet nurseries" around distant stars, dramatically increasing the chances of finding extra-solar, Earth-like rocky planets.

Q. With reference to the exoplanet WASP-43b and the James Webb Space Telescope (JWST), consider the following statements:

1. WASP-43b is classified as a Hot Jupiter and is located about 280 light-years from Earth.
2. The planet is tidally locked, with one side permanently facing its parent star.
3. JWST primarily observes the universe in the ultraviolet spectrum.
4. The study of WASP-43b's atmosphere can provide insights into planetary formation and the early evolution of the Solar System.

Which of the statements given above are correct?

- A. 1, 2 and 4 only
- B. 1 and 3 only
- C. 2 and 4 only
- D. 1, 2, 3 and 4

Answer: A. 1, 2 and 4 only

Explanation:

- **Statement 1 is Correct:** WASP-43b is a **Hot Jupiter** located about **280 light-years** away.
- **Statement 2 is Correct:** It is **tidally locked**, with one side always facing its star.
- **Statement 3 is Incorrect:** JWST studies the universe primarily in the **infrared spectrum**, not ultraviolet.
- **Statement 4 is Correct:** Atmospheric composition helps scientists understand **planetary formation, migration, and Solar System evolution**.

4.2. SUMMER AIR POLLUTION IN INDIAN CITIES & MITIGATION MECHANISMS

Context:

- While air pollution in India is heavily associated with winter, data from 2026 highlights an alarming rise in **summer air pollution** across major Indian metros (Delhi, Mumbai, Bengaluru, Chennai, Hyderabad, and Kolkata).
- The Commission for Air Quality Management (CAQM) revoked winter curbs under the **Graded Response Action Plan (GRAP)** but had to re-impose Stage 1 of GRAP as temperatures soared to combat summer air pollution driven by heatwaves.



1. Key Differences: Winter vs. Summer Air Pollution

Feature	Winter Air Pollution	Summer Air Pollution
Primary Pollutants	Fine particulate matter pm 2.5 dominates.	Coarser particulate matter pm 10 and Ground-level Ozone dominate.
Meteorological Factors	Low temperatures, low wind speeds, and inversion layers trap pollutants close to the ground (especially in the Indo-Gangetic plain's basin-like topography).	High temperatures, intense sunlight, heatwaves, and strong convective winds (dust storms).
Additional Sources	Biomass burning for heating, agricultural residue burning (stubby burning).	Dust storms (Andhi/Loo) , road dust resuspension, and secondary chemical reactions accelerated by intense solar radiation.

2. Pollutant Dynamics

A. Ground-Level Ozone (O₃) — A Secondary Pollutant

- **Mechanism of Formation:** Ozone is **not emitted directly** into the atmosphere from tailpipes or chimneys.
- It is a **secondary pollutant** formed through photochemical reactions between primary precursor gases under the influence of strong sunlight and high temperatures:
- **Precursor Sources:** Vehicle exhaust, industrial emissions, paints, solvents, and fuel combustion.
- It forms when **nitrogen oxides (NO_x) and volatile organic compounds (VOCs)** react in the presence of **strong sunlight**.
- **Health Impact:** Severe respiratory illnesses.
- **National Ambient Air Quality Standard (NAAQS):** The hourly ozone safety standard is **180 $\mu\text{g}/\text{m}^3$** .

B. Summer PM 10 Spikes & Meteorological Drivers

- **Low-Pressure Dynamics:** Hot conditions over the Indian subcontinent create a local low-pressure area. Its interaction with surrounding high-pressure areas produces hot, windy conditions.
- **Loo:** Strong, hot, and dry summer winds blowing from West Asia and the Thar Desert across North India, carrying massive amounts of dust.
- **Andhi:** Localized, short-duration dust storms associated with thunderstorms that lift loose soil high into the atmosphere.
- **The Summer Standard:** The 24-hour NAAQS threshold for PM 10 is **100 $\mu\text{g}/\text{m}^3$** . During peak summer days, cities frequently breach this threshold due to dust storms and active construction.

3. Key Institutional Frameworks & Technology Initiatives

- **CAQM (Commission for Air Quality Management):** A statutory body responsible for air quality management in the National Capital Region (NCR) and adjoining areas.
- **GRAP (Graded Response Action Plan):** A set of layered emergency measures implemented depending on the severity of air pollution. Traditionally a winter mechanism, parts of it are now deployed during summer heatwaves.
- **AQEWS (Air Quality Early Warning System):**
 - Originally created in 2018 to predict severe dust storms and winter smog episodes in Delhi; it now **runs year-round**.
 - It has expanded its footprint to other major cities like **Jaipur and Mumbai**.
 - Provides multi-pollutant forecasts several days in advance and a 3-day Air Quality Index (AQI) forecast for **140 Indian cities**.
- **AQDSS (Air Quality Decision Support System):** Developed by the Brihanmumbai Municipal Corporation (BMC) in collaboration with the *Council on Energy, Environment and Water (CEEW)* to monitor construction sites and track heavy-vehicle movement to lower localized particulate matter.

Q. Consider the following statements:

1. Ground-level ozone is directly emitted from industrial chimneys.
2. Heatwaves and strong sunlight can accelerate ozone formation.
3. PM₁₀ levels can increase due to dust storms and construction activities.

Which of the statements given above is/are correct?

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

Answer: a) 2 and 3 only

Explanation:

Statement 1 is incorrect: Ground-level ozone (O₃) is **not directly emitted** from industrial chimneys or vehicles. It is a **secondary pollutant** formed through photochemical reactions.

Statement 2 is correct: **Heatwaves, high temperatures, and strong sunlight** accelerate the reaction between NO_x and VOCs, increasing ozone formation.

Statement 3 is correct: **Dust storms (Andhi), Loo winds, road dust resuspension, and construction activities** can significantly raise PM₁₀ concentrations.

4.3. FIRST EVER SIGHTING OF YELLOW-THROATED MARTEN IN KAZIRANGA NATIONAL PARK

Context:

Recently, during routine camera-trapping conducted by the Kaziranga Tiger Cell, a yellow-throated marten (*Martes flavigula*) was photographed for the first time in the semi-evergreen forest patches of the Kaziranga National Park and Tiger Reserve, Assam.



About the Yellow-Throated Marten

- **Taxonomy & Family:** It belongs to the **Mustelidae** family (popularly known as the weasel family), which also includes **otters, badgers, and wolverines**.
- **Physical Characteristics:** It is a medium-sized **carnivore**, unique for its striking bright golden-orange fur across its throat and upper chest, contrasting with a darker head, lower back, and long bushy tail. It is known for a highly aggressive and fearless temperament.
- **Ecological Status:** It is a **mesopredator** (a mid-ranking predator in the food web, sitting below apex predators like tigers).
- **Behavior:** It is a primarily **diurnal** (active during the day) and highly proficient **arboreal** (tree-climbing) animal.
- **Ecological Role:** While it is an omnivorous hunter feeding on rodents, birds, insects, and small ungulates, it also consumes a large volume of fruits, berries, and nectar, making it an essential **seed disperser** for natural forest regeneration.
- **Geographical Distribution:** Native to the Himalayas, Northeast India, East Asia, and Southeast Asia. The Kaziranga sighting confirms its local presence within known regional distribution limits.

Legal & Conservation Status

- **IUCN Red List:** Least Concern (LC) due to its wide distribution and relatively stable global populations.
- **Wildlife Protection Act (WPA), 1972:** Protected under **Schedule II**.

Comparison: Marten Species in India

Species	Primary Habitat Range	Key Distinction
Yellow-throated Marten	Himalayas & Northeast India	Bright golden throat; highly adaptable to semi-evergreen and temperate forests.
Nilgiri Marten	Western Ghats (Endemic)	Endemic to Southern India; dark brown coat with a distinct lemon-yellow throat patch; Vulnerable on IUCN Red List.
Stone Marten / Beech Marten	Higher altitudes of Himalayas	White throat patch; prefers rocky landscapes and open alpine fields.

Key Geography & Facts about Kaziranga National Park

- **Status:** Declared a National Park in 1974, a **UNESCO World Heritage Site** in 1985, and a Tiger Reserve in 2006.
- **Location:** Spread across the **Golaghat and Nagaon districts** of Assam.
- **Rivers:** The River Difalu, a tributary of the Brahmaputra, flows through the National Park while another tributary, Moradifalu, flows along its southern boundary.
- **Key Species:** It hosts the world's largest population of the **Great Indian One-Horned Rhinoceros**. It is also famous for the "Big Five" of Kaziranga: Rhinoceros, Tiger, Asian Elephant, Asiatic Wild Water Buffalo, and Swamp Deer.

Q. With reference to the Yellow-Throated Marten (*Martes flavigula*), consider the following statements:

1. It belongs to the Mustelidae family.
2. It is an apex predator in forest ecosystems.
3. It is known for its bright golden-orange throat and upper chest.

Which of the statements given above is/are correct?

- A) 1 and 3 only
- B) 2 and 3 only
- C) 1 only
- D) 1, 2 and 3

Answer: A) 1 and 3 only

Explanation:

Statement 1 is Correct: The Yellow-Throated Marten belongs to the **Mustelidae (weasel) family**, which also includes otters, badgers, and wolverines.

Statement 2 is Incorrect: It is a **mesopredator (mid-ranking predator)**, not an apex predator like a tiger or leopard.

Statement 3 is Correct: It is easily identified by its **bright golden-orange throat and upper chest** contrasting with a darker body.

4.4. MANGROVES

Context

- Recently, expert highlighted that natural mangrove buffers protect coastal communities more effectively and economically than engineered structures. Despite mangroves protecting more people per hectare in India than in almost any other country, public spending heavily favors grey infrastructure (such as concrete seawalls) over ecological missions. Experts are urging a policy shift toward Ecosystem-based Adaptation (EbA) to embed these natural shields into core coastal planning.



Core Ecological Concepts of Mangroves

Mangroves are highly specialized, salt-tolerant (halophytic) intertidal plant communities that occupy the **ecotone** between terrestrial and marine environments.

1. Specialized Adaptations

- **Pneumatophores (Respiratory Roots):** Vertical root extensions covered with **lenticels** (pores) that grow upward to breach water surfaces, allowing atmospheric oxygen intake in anaerobic, waterlogged mudflats.
- **Stilt and Prop Roots:** Adventitious root networks branching from the lower trunk to firmly anchor the flora in unstable, shifting substrates against powerful wave impacts and tidal surges.
- **Vivipary Reproduction:** An evolutionary adaptation where seeds germinate while still attached to the parent tree, developing into mature **propagules** before dropping, which prevents seeds from rotting or suffocating in tidal muds.
- **Salt Regulation Mechanisms:** Species either filter out bulk salt at the root level via ultrafiltration (*Rhizophora*) or channel and excrete absorbed salt through specialized secretory glands located on their leaves (*Avicennia*).

2. Geographic Distribution in India

Coastline	Major Sites	Key Ecological Features
East Coast (Largest Share)	Sundarbans (WB), Bhitarkanika (Odisha), Pichavaram (TN), Coringa (AP).	Supported by massive river deltas providing rich sediment and heavy freshwater influx. The Sundarbans acts as a primary buffer against Bay of Bengal cyclones.
West Coast (Highly Fragmented)	Gulf of Kutch (Gujarat), Thane Creek (MH), Mandovi-Zuari (Goa).	Characterized by steep rocky coasts and lower silt loads. Gujarat holds the second-largest mangrove area in the country.
Islands	Andaman & Nicobar Islands.	Pristine, deep fringing mangrove formations that transition directly into coral reef systems.

Strategic Value & Conservation Frameworks

1. Ecosystem-based Adaptation (EbA) vs. Grey Infrastructure

- **The Adaptation Asset:** Research identifies India as a global "hotspot" for coastal EbA, with mangroves protecting more individuals per hectare than almost any other country. They act as superior natural buffers compared to hard structures like seawalls, which are expensive to maintain and often transfer erosion risks to adjacent coastal stretches.
- **Blue Carbon & Co-benefits:** Mangroves sequester up to four times more carbon than terrestrial tropical rainforests. Ground-level projects in the Sundarbans have restored over 4,600 hectares, creating tangible socio-economic co-benefits by protecting local livelihoods through crab farming and honey collection.

2. Policy Bottlenecks and Governance

- **Terminology Confusion:** The policy space suffers from overlapping labels like Nature-based Solutions (NbS), Ecosystem-based Disaster Risk Reduction (Eco-DRR), and Coastal Adaptation (EhCA). This lacks a clear classification system, meaning interventions are often hidden within generic developmental programs rather than tracked as distinct climate adaptations.
- **The MISHTI Scheme:** The Mangrove Initiative for Shoreline Habitats & Tangible Incomes (MISHTI) aims to restore 540 square kilometers across nine States. However, it is primarily framed as a standalone restoration scheme rather than a core component embedded within integrated coastal planning and adaptation policies.
- **Legal Protections:** Mangroves are legally shielded under the **Coastal Regulation Zone (CRZ-I)** classification of the Environment (Protection) Act, 1986, which heavily restricts industrial and commercial construction in these eco-sensitive areas.

Q. With reference to coastal protection and adaptation strategies in India, consider the following statements:

1. Over the past decade, public expenditure by coastal states has leaned heavily toward engineered grey measures like seawalls and groynes rather than natural ecological buffers.
2. The MISHTI initiative is an integrated framework designed explicitly to align blue carbon accounting directly with industrial carbon credit registries.
3. Hard infrastructure solutions like coastal seawalls can cause structural trade-offs by shifting erosion risks and damage to adjacent coastal areas.

Which of the statements given above are correct?

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

Solution

Correct Answer: (c) 1 and 3 only

- **STATEMENT 1 IS CORRECT:** Public spending across India's coastal landscape reveals a strong preference for engineered measures over green interventions, with states allocating over ₹2,641 crore to hard protection measures during the last decade.
- **STATEMENT 2 IS INCORRECT:** The MISHTI scheme focuses primarily on the physical restoration of mangrove habitats across states to safeguard coastal communities. It is currently framed as a restoration program and is not yet fully integrated into mainstream coastal adaptation policies or industrial carbon accounting systems.
- **STATEMENT 3 IS CORRECT:** Engineered grey structures are not only expensive to maintain but can also alter local wave dynamics, which can displace underlying risks and accelerate coastal erosion in neighboring areas.

5.1. DRDO SUCCESSFULLY FLIGHT-TESTS INDIGENOUS RudraM-II MISSILE

Context

- The Defence Research and Development Organisation (DRDO), along with the Indian Air Force (IAF), successfully flight-tested the indigenously developed **RudraM-II air-to-surface missile** from a Su-30 MKI fighter jet off the coast of Odisha.



About RudraM-II Missile

- **Type of Missile:** It is an indigenous, Next-Generation **Anti-Radiation Missile (ARM)**.
- **Role/Tactics:** Developed to enhance the IAF's **Suppression of Enemy Air Defence (SEAD)** and Destruction of Enemy Air Defence (DEAD) capabilities. It targets and neutralizes adversary radar, communication assets, and radio frequency (RF) sources.
- **Propulsion:** Powered by a solid-propelled rocket motor.
- **Speed:** Hypersonic/high-supersonic capabilities, reaching terminal speeds up to **Mach 5.5**.
- **Range & Payload:** Operates at a strike range of approximately **300 km** (a major step up from RudraM-I's 150 km range) and carries a **200 kg warhead**.
- **Launch Platform:** Tested primarily via the frontline **Su-30 MKI** fighter jet, with future plans to integrate it across other IAF platforms like the HAL Tejas and Mirage 2000.
- **Nodal Development Agency: Research Centre Imarat (RCI), Hyderabad** (a premier DRDO laboratory), along with DRDL (Hyderabad), HEMRL & ARDE (Pune).
 - Along with the Development-cum-Production Partners (DcPPs), agencies such as Hindustan Aeronautics Limited (HAL), the Regional Centre for Military Airworthiness, the Missile System Quality Assurance Agency, and several industry partners contributed to the project, according to the Ministry of Defence (MoD).

Q. With reference to the RudraM-II missile, consider the following statements:

1. It is an indigenous Next-Generation Anti-Radiation Missile (ARM).
2. It is designed to target enemy radar and radio frequency sources.
3. It is a surface-to-air missile developed for ballistic missile defence.

Which of the statements given above is/are correct?

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

Answer: a

Explanation:

Statement 1 is Correct. RudraM-II is an indigenous **Next-Generation Anti-Radiation Missile (ARM)** developed by DRDO.

Statement 2 is Correct. It is designed to destroy **enemy radar systems, communication assets, and other radio-frequency (RF) emission sources.**

Statement 3 is Incorrect. RudraM-II is an **air-to-surface missile**, not a **surface-to-air missile**. It is intended for **Suppression and Destruction of Enemy Air Defence (SEAD/DEAD)** missions, not ballistic missile defence.

5.2. S-400 TRIUMF AIR DEFENCE SYSTEM

Context

- India has received the fourth squadron of the Russian-made S-400 air defence system, which is expected to be deployed soon. After delays caused by the Russia-Ukraine conflict, deliveries are back on schedule, and the fifth and final squadron is expected to arrive in 2027.



Key Highlights of the Deal

- The Agreement:** India and Russia signed a **\$5.43 billion** government-to-government agreement in **2018** for the acquisition of **five S-400 regimental systems** (squadrons).
- Current Status:** With this latest delivery, four squadrons have been received, leaving only one remaining.
- Modern Integration:** The S-400 systems will be integrated with **AI-enabled decision-support capabilities**. This technology will assist human operators by identifying, prioritizing, and recommending target selections based on the nature of incoming threats. However, the **final engagement decision remains with the human operator**.

Technical Capabilities of the S-400

- Type:** It is a mobile, surface-to-air missile (SAM) system designed by Russia's Almaz Central Design Bureau.
- Multi-Layered Air Shield:** It can engage all types of aerial targets, including aircraft, unmanned aerial vehicles (UAVs), and ballistic/cruise missiles.
- Range & Tracking:** It can track up to 100 airborne targets simultaneously and engage up to 36 of them at a distance of up to **400 km** at altitudes up to 30 km.
- Radar Network:** It integrates multifunction radar, autonomous detection and targeting systems, anti-aircraft missile systems, and a command and control centre.

India's Indigenous Air Defence Layer

While the S-400 forms the long-range outer layer of India's air defense, India uses a multi-tiered network:

- **Project Kusha:** India's indigenous Long-Range Surface-to-Air Missile (L-SAM) system being developed by DRDO, aiming for a 350 km range (similar to S-400 capabilities).
- **MRSAM & Akash:** The Medium-Range Surface-to-Air Missile (jointly developed with Israel) and the **indigenous Akash missile** system handle medium and short-range threats.

Q. Consider the following statements regarding the S-400 Triumph air defence system:

1. It is a long-range surface-to-air missile system acquired by India through a bilateral agreement with Russia.
2. The system integrates Artificial Intelligence (AI) to automatically fire at and neutralize incoming aerial threats without human intervention.
3. The US law 'CAATSA' primarily targets countries engaging in significant defense transactions with Russia, North Korea, and Iran.

Which of the statements given above are correct?

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

Answer: C

Explanation:

Statement 1 is correct – The S-400 is a long-range air defence missile system that India bought from Russia.

Statement 2 is incorrect – The S-400 is highly advanced, but it does not automatically fire missiles on its own. Human operators make the final decision.

Statement 3 is correct – **CAATSA** is a US law that can impose sanctions on countries making major defence deals with **Russia, Iran, or North Korea**.

5.3. SUN PROTECTION FACTOR (SPF) & UV RADIATION

Context

- With rising summer temperatures and heightened awareness around skin health, understanding the science behind Sun Protection Factor (SPF), ultraviolet radiation types (UVA vs. UVB), and the efficacy of dermatological blocks is crucial for health and scientific literacy.



Key Concepts & Technical Details

1. Ultraviolet (UV) Radiation Types & Impact

- **UVB Radiation:** This is the primary component of sunlight responsible for **sunburns and skin redness (erythema)**. SPF values strictly measure protection against UVB radiation **only**.
- **UVA Radiation:** This type penetrates the skin more deeply than UVB. It is strongly linked to **pigmentation, photoageing, wrinkles, and loss of skin elasticity**.

2. What is SPF (Sun Protection Factor)?

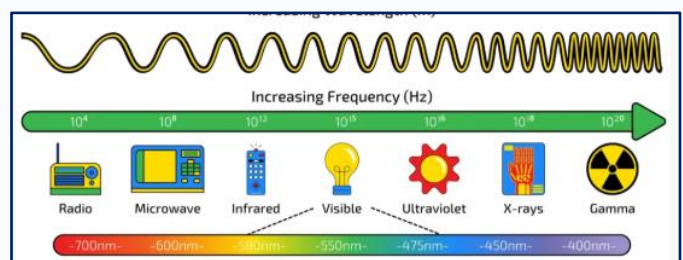
- **Definition:** It is a measure of how much ultraviolet exposure is needed to cause minimal redness (erythema) on sunscreen-applied skin compared to unprotected skin.
- **Mathematical Concept:** If a sunscreen is rated **SPF 30**, it theoretically means the amount of UV exposure required to cause minimal erythema is **30 times higher** than on unprotected skin.
- **Non-Linear Protection:** One of the most common misconceptions is that SPF protection increases linearly. Protection gains actually become progressively smaller at higher SPF values:
 - **SPF 30** blocks about **95% to 97%** of UVB radiation.
 - **SPF 50** blocks roughly **97% to 98%** of UVB radiation.
 - **SPF 80** blocks close to **99%** of UVB radiation.
 - *Takeaway:* The difference between SPF 30 and SPF 50 is small (roughly 1 to 2 percentage points), meaning a higher number does not automatically mean vastly superior protection.

4. Types of Sunscreen

- **Mineral (Physical) Sunscreens:** Contain inorganic ingredients such as **zinc oxide** and/or **titanium dioxide**. They mainly **absorb UV rays** and also provide protection by **reflecting and scattering** some UV radiation.
- **Chemical (Organic) Sunscreens:** Contain **organic UV-filtering molecules** that protect the skin primarily by **absorbing UV rays**. Some particulate organic filters can also reflect and scatter a small amount of UV light.
- **Hybrid Sunscreens:** Combine both **mineral (inorganic)** and **chemical (organic)** UV filters to provide broad-spectrum sun protection.

5. About UV Radiation

- Ultraviolet (UV) radiation is a form of electromagnetic radiation emitted **mainly by the Sun**.
- It has wavelengths shorter than visible light but longer than X-rays.
- UV radiation is invisible to the human eye.
- Wavelength range: 100–400 nanometers (nm).



Classification of UV Radiation:

1. UV-A (315–400 nm)

- Longest wavelength and lowest energy among UV rays.
- Makes up about 95% of UV radiation reaching Earth.
- **Penetrates deep into the skin**, contributing to skin aging and long-term damage.

2. UV-B (280–315 nm)

- Medium wavelength and higher energy UV radiation.
- Partially absorbed by the ozone layer.

- Causes sunburn, DNA damage, and increases skin cancer risk.
- Also **helps in vitamin D synthesis** in humans.

3. UV-C (100–280 nm)

- Shortest wavelength and highest energy UV radiation.
- Extremely harmful to living organisms.
- Almost completely absorbed by atmospheric oxygen and ozone, so it rarely reaches Earth's surface.
- Commonly used for **water purification, air sterilization, and medical disinfection.**
- Sources of UV Radiation
 - Natural Sources
 - The Sun (primary source)
 - Stars and other celestial bodies
 - Artificial Sources
 - UV lamps
 - Welding torches
 - Mercury vapor lamps
 - Tanning beds
 - Germicidal lamps

Q. Which of the following statements correctly distinguishes mineral sunscreens from chemical sunscreens?

- (a) Mineral sunscreens contain only organic molecules.
- (b) Chemical sunscreens work exclusively through reflection of UV rays.
- (c) Mineral sunscreens commonly use zinc oxide and titanium dioxide as active ingredients.
- (d) Hybrid sunscreens contain only inorganic UV filters.

Answer: C

Explanation:

- (a) Incorrect:** Mineral sunscreens contain **inorganic compounds**, not organic molecules.
- (b) Incorrect:** Chemical sunscreens primarily protect by **absorbing UV radiation**, not exclusively by reflection.
- (c) Correct:** Mineral (physical) sunscreens use **zinc oxide** and/or **titanium dioxide** as active ingredients.
- (d) Incorrect:** Hybrid sunscreens contain a combination of **both organic and inorganic UV filters.**

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