
Prelims Exam Topics

VEHICLE-TO-VEHICLE (V2V) TECHNOLOGY

Context

The **Ministry of Road Transport and Highways (MoRTH)** has proposed amendments to the **Central Motor Vehicles Rules, 1989**, to introduce **Vehicle-to-Vehicle (V2V) technology** in India.

About Vehicle-to-Vehicle (V2V) Technology

- **Nature:** **Vehicle-to-Vehicle (V2V)** is a **wireless communication technology** that enables nearby vehicles to exchange **real-time information** such as speed, location, direction, braking, and acceleration.
- **Standard:** It is proposed to be implemented under the **AIS-230 (Automotive Industry Standard)** using **Cellular Vehicle-to-Everything (C-V2X)** technology operating in the **5.875–5.925 GHz** frequency band.
- **Objective:** To improve **road safety** by enabling early collision warnings, supporting **Advanced Driver Assistance Systems (ADAS)**, and facilitating the development of **Intelligent Transportation Systems (ITS)**.
- **Working Mechanism:** Vehicles equipped with **On-Board Units (OBUs)** directly exchange low-latency data with nearby vehicles, allowing onboard systems to detect potential collision risks and issue timely driver alerts without relying on cellular networks.
- **Deployment:** Voluntary compliance is proposed from **1 October 2027**, while **AIS-230** will become mandatory for all newly manufactured **L, M, and N category vehicles** from **1 October 2028**.
- **Capabilities:** Provides **360-degree non-line-of-sight communication**, supports functions such as **forward collision warning, emergency electronic brake alerts, blind-spot and lane-change warnings, wrong-way driving alerts, and emergency vehicle notifications**, and incorporates **encrypted cybersecurity protocols** to prevent spoofing and message tampering.

WITHDRAWAL OR CLOSURE OF FIRS

Context

The **Supreme Court** recently clarified that State governments may withdraw or close **First Information Reports (FIRs)** against student protesters only by following the procedures prescribed under the **Bharatiya Nagarik Suraksha Sanhita (BNSS)**.

About First Information Report (FIR)

- **Nature:** A **First Information Report (FIR)** is the first written record of information relating to a **cognizable offence**, registered by the police to initiate a criminal investigation under the **BNSS**.
- **Role:** It authorises the police to investigate a cognizable offence without requiring prior approval from a court.
- **Legal Status:** An FIR is an **initial record of an alleged offence** and does not, by itself, constitute evidence of guilt.
- **Judicial Oversight:** Once registered, an FIR **cannot be cancelled by executive order**; its closure or withdrawal requires action under the **BNSS** and judicial scrutiny.
- **Closure by Police:** If investigation finds insufficient evidence, the police may submit a **Closure Report** under **Section 193 of the BNSS**, after which the Magistrate may accept or reject the report, order further investigation, or take cognisance of the offence.
- **Withdrawal or Quashing:** A **Public Prosecutor** may seek withdrawal from prosecution under **Section 360 of the BNSS** with the **court's consent**, while the **High Court** may quash an FIR or criminal proceedings under **Section 528 of the BNSS** to prevent abuse of process or secure the ends of justice.

CLOUDED LEOPARD CONSERVATION ACTION PLAN (CAP)

Context

The **Ministry of Environment, Forest and Climate Change (MoEFCC)** launched the **Clouded Leopard Conservation Action Plan (CAP)** on **International Clouded Leopard Day**.

About Clouded Leopard Conservation Action Plan (CAP)

- **Nature:** The **Clouded Leopard Conservation Action Plan (CAP)** is a **national conservation strategy** for the long-term protection of the **Clouded Leopard** and its habitats in India.
- **Objective:** To conserve critical habitats, improve scientific population monitoring, strengthen ecological connectivity, reduce human-wildlife conflict, and promote community participation.

- **Coverage:** Focuses on **14 priority landscapes** across **Northeast India**, along with parts of **West Bengal** and **Bihar**.
- **Scientific Monitoring:** Promotes standardized population assessment using **camera traps**, **environmental DNA (eDNA)**, **genetic analysis**, and **occupancy surveys** to establish reliable population estimates.
- **Habitat Conservation:** Emphasises restoration of **forest corridors** connecting fragmented habitats and encourages **transboundary cooperation** with neighbouring range countries such as **Bhutan, Myanmar, and Nepal**.
- **Community Participation:** Involves indigenous communities in **anti-poaching efforts**, habitat conservation, and livelihood initiatives to reduce dependence on forest resources.

About Clouded Leopard

- **Nature:** The **Clouded Leopard** is a **medium-sized wild cat** native to the forests of South and Southeast Asia and represents an ancient evolutionary lineage of felids.
- **Distribution:** It occurs from **Nepal, Bhutan, Bangladesh, and Northeast India** to **southern China** and **Southeast Asia**, inhabiting **tropical rainforests, foothill forests, mangroves, and dry woodlands**.
- **Conservation Status:** IUCN Red List – **Vulnerable**; protected under **Schedule I of the Wildlife (Protection) Act, 1972**.
- **Arboreal Adaptations:** Possesses **highly flexible ankle joints, powerful limbs, large paws, and a long tail**, enabling exceptional tree-climbing abilities, including descending tree trunks headfirst.
- **Physical Characteristics:** Recognised by its **cloud-shaped dark markings** and the **largest canine teeth relative to skull size** among living wild cats.
- **Vocalisation:** Cannot roar like large cats or purr continuously like small cats, producing sounds such as **growls, hisses, and chuffs**.

INDIA AT THE COMMONWEALTH GAMES 2026

Context

India finished **4th** in the medal tally at the **2026 Commonwealth Games** held in **Glasgow, Scotland**.

About Commonwealth Games 2026

- **Nature:** The **23rd Commonwealth Games** was an international **multi-sport event** held among athletes from the **Commonwealth of Nations**.

- **Host:** The Games were held in **Glasgow, Scotland**; the official mascot was **Finnie**.
- **Next Host:** The **2030 Commonwealth Games** will be hosted by **Ahmedabad (Amdavad), Gujarat, India**.
- **India's Performance**
 - **Overall Rank:** India secured **4th position** in the overall medal standings.
 - **Medal Tally:** India won **39 medals—13 Gold, 17 Silver, and 9 Bronze**.
 - **Participation:** Indian athletes competed across disciplines such as **boxing, weightlifting, athletics, judo, and para-sports**.

NITROSAMINES

Context

Recent reports have highlighted the presence of **nitrosamines** in **packaged foods, pharmaceuticals, industrial products, and global supply chains**.

About Nitrosamines

- **Nature:** Nitrosamines (**N-nitrosamines**) are a group of **organic compounds** formed by the reaction of **amines with nitrites or nitrates** under suitable conditions.
- **Formation:** They are produced in **acidic conditions, at high temperatures**, or in the presence of **oxidising agents**, and may form during **food processing, storage, or digestion in the stomach**.
- **Occurrence:** They are found in **processed foods, contaminated water, pharmaceuticals, tobacco products, and certain industrial products**.
- **Formation Factors:** Their concentration generally **increases with storage time**, and formation is accelerated by **heat** and the presence of **nitrite-based preservatives**.
- **Exposure Routes:** Humans may be exposed through **ingestion, inhalation, or skin contact**, with **N-nitrosodimethylamine (NDMA)** being one of the most significant nitrosamines detected in drinking water.
- **Health Effects:** Long-term exposure, even at **low concentrations**, has been associated with an **increased risk of cancer** and other adverse health effects.

RHINE RIVER

Context

Water levels in the **Rhine River**, one of Europe's busiest inland waterways, recently fell below the previous record low recorded in **2018**, disrupting freight transport.

About Rhine River

- **Nature:** The **Rhine** is a major **river and inland waterway** of **Western Europe**, the **longest river in Western Europe** and the **12th longest in Europe**.
- **Origin & Course:** It originates in the **Swiss Alps**, flows through **Switzerland, Liechtenstein, Austria, Germany, France, and the Netherlands**, and empties into the **North Sea** at **Rotterdam**.
- **International River:** The Rhine forms part of the **Germany–France border** and is known as **Rhein** in Germany and **Rijn** in the Netherlands.
- **Tributaries & Landmarks:** Major tributaries include the **Aare, Moselle, Tamina, Erft, Plessur, Rotach, Rein da Tuma, and Wiese**; it also features the **Rhine Falls** in Switzerland, Europe's largest waterfall, and the **Upper Middle Rhine Valley**, a region renowned for its castles and vineyards.
- **Economic Importance:** It is **Europe's most important commercial waterway**, linking major industrial centres and ports, and supports a significant share of the continent's **chemical and manufacturing industries**.

ASAN CONSERVATION RESERVE

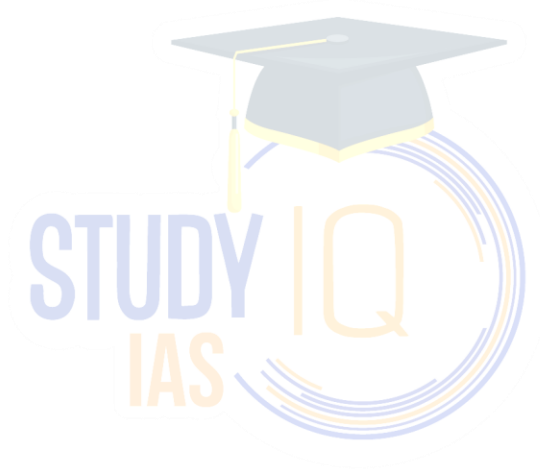
Context

The **Supreme Court** recently ruled that the ban on **mining within a 10 km radius** of the **Asan Conservation Reserve**, a **Ramsar Site** in Uttarakhand, should apply to other wetland conservation reserves across the country for parity.

About Asan Conservation Reserve

- **Nature:** **Asan Conservation Reserve** is a **freshwater wetland conservation reserve** centred around the **Asan Barrage**, formed after damming the **Asan River**.
- **Location:** It is situated in **Dehradun district, Uttarakhand**, at the **confluence of the Asan and Yamuna rivers**.

- **Recognition:** It was declared a **Conservation Reserve** under **Section 36A of the Wildlife (Protection) Act, 1972**, and became **Uttarakhand's first Ramsar Site** in **2020**.
- **Ecological Importance:** Located along the **Central Asian Flyway**, it provides a vital habitat for **migratory and resident waterbirds** and is recognised as an **Important Bird Area (IBA)** by **BNHS** and **BirdLife International**.
- **Aquatic Habitat:** It serves as an important **feeding, migration, and spawning ground** for the **endangered Golden Mahseer** and is well known for hosting large winter flocks of the **Ruddy Shelduck**.



Mains Exam Topics

NATO'S EVOLVING STRATEGIC ROLE

Context

As the United States shifts its strategic focus to the Indo-Pacific, NATO is redefining its role through greater European defence responsibility and increased engagement with the Indo-Pacific, carrying important implications for India's regional strategy and security architecture.

How does NATO's Indo-Pacific outreach affect India's vision of a free, open and inclusive Indo-Pacific?

Positive Impacts

- **Elevates the Indo-Pacific as a Global Strategic Theatre:** NATO's growing attention has brought greater international focus to Indo-Pacific security, strengthening diplomatic support for a stable regional order.
 - **Example:** NATO's **2022 Strategic Concept** recognised the Indo-Pacific's strategic importance.
- **Deepens India's Engagement with European Powers:** NATO's outreach has encouraged European countries to strengthen their Indo-Pacific presence, creating new opportunities for India's bilateral and minilateral cooperation.
 - **Example:** India has expanded maritime and defence cooperation with **France, the UK and Germany**.
- **Encourages Cooperation in Emerging Security Domains:** NATO's experience in cyber security, critical infrastructure resilience and emerging technologies provides useful institutional practices for India.
 - **Example:** NATO has prioritised **cyber defence and resilience** in recent strategic initiatives.
- **Promotes Greater International Support for Maritime Security:** Growing European interest in secure sea lanes complements India's efforts to maintain stability in the Indian Ocean through cooperative security.
 - **Example:** European countries participate in **anti-piracy operations in the Gulf of Aden**, supporting secure maritime trade.

- **Broadens Strategic Dialogue on Indo-Pacific Challenges:** NATO's outreach has expanded discussions on maritime security, supply chains and technology among like-minded countries, indirectly benefiting India's strategic engagement.
 - **Example:** NATO's dialogue with the **Indo-Pacific Four (IP4)** has increased attention to regional security issues.

Negative Impacts

- **Challenges India's Inclusive Indo-Pacific Vision:** NATO's alliance-based approach contrasts with India's preference for an **inclusive, ASEAN-led** regional architecture rather than bloc politics.
 - **Example:** India's **IPOI** and support for **AOIP** emphasise openness and inclusivity.
- **Intensifies Great Power Rivalry:** Greater NATO engagement may sharpen US-China competition, increasing geopolitical tensions in the region.
 - **Example:** China has criticised NATO's Indo-Pacific engagement as promoting an "Asian NATO."
- **Reinforces India's Exclusion from NATO's Regional Framework:** NATO's institutional engagement centres on the **Indo-Pacific Four (IP4)**, while India prefers independent minilateral platforms under strategic autonomy.
 - **Example:** India prioritises the **Quad** and **India-France-UAE trilateral** over formal NATO-led mechanisms.
- **Accelerates Russia-China Strategic Convergence:** NATO's expanding strategic focus may push Russia closer to China, reducing India's strategic flexibility in Eurasia and affecting defence cooperation.
 - **Example:** The **Russia-China "no limits" partnership (2022)** has deepened amid tensions with the West.
- **Limits NATO's Long-Term Indo-Pacific Role:** NATO's primary responsibility remains Euro-Atlantic security, making its Indo-Pacific commitment secondary during crises in Europe.
 - **Example:** The **Ukraine war** has remained NATO's principal strategic priority despite its Indo-Pacific outreach.

What lessons can India's security architecture draw from NATO's institutional evolution without adopting alliance politics?

- Anchor Defence Reforms in a National Security Strategy: Joint commands require a common strategic direction to align priorities across the armed forces and ministries. A formal National Security Strategy (NSS) can provide this institutional guidance.
 - Example: NATO's Strategic Concept provides a common strategic framework for member states.
- Strengthen Intelligence Coordination through Institutional Incentives: Intelligence fusion should be backed by clear accountability and mandatory information-sharing to overcome agency silos.
 - Example: NATO's Intelligence Fusion Centre (IFC) supports coordinated threat assessment.
- Reform Defence Procurement to Accelerate Innovation: Innovation must be complemented by faster procurement, simplified trials and timely induction of indigenous technologies.
 - Example: NATO's DIANA complements innovation with pathways for capability development.
- Build Integrated Civil-Military Decision-Making: National security requires coordinated action across defence, diplomacy, internal security and economic ministries during crises.
 - Example: NATO's Comprehensive Approach integrates civilian and military institutions.
- Institutionalise Jointness through Permanent Structures: Integrated planning, logistics and operations should become routine rather than crisis-driven, improving military effectiveness.
 - Example: NATO's Integrated Military Command institutionalises joint operations.