
Prelims Exam Topics

FIRST MOLECULAR EVIDENCE FROM HOMO ERECTUS

Context

Scientists recovered the first molecular evidence from Homo erectus fossils using proteins preserved in 400,000-year-old teeth from China.

About the Discovery

- **Method:** Used **acid etching** to extract enamel proteins without significantly damaging the fossils.
 - In acid etching technique a dilute acid was used to release proteins from tooth enamel.
- **Why Proteins?** DNA degrades rapidly after death, whereas enamel proteins can survive much longer.
- **Key Finding:** Identified a unique protein variant in Homo erectus and another shared with **Denisovans**.
 - Denisovans are an extinct human lineage whose DNA survives in some Asian and Oceanian populations.
- **Implication:** Suggests possible genetic links or interbreeding between Homo erectus-related populations and Denisovans.
- **Significance:** First successful recovery of molecular information from Homo erectus fossils.

About Homo erectus

- **Timeline:** Lived about **1.9 million–110,000 years ago**.
- **Importance:** Among the first human species to spread widely outside Africa.
- **Traits:** Upright posture, larger brain and advanced stone-tool use.
- **Famous Fossil:** **Turkana Boy** (Kenya), the most complete Homo erectus specimen known.

UN MILITARY GENDER ADVOCATE OF THE YEAR AWARD

Context

Major Abhilasha Barak serving with the **United Nations Interim Force in Lebanon (UNIFIL)** was conferred the **UN Military Gender Advocate of the Year Award**.

About the Award

- **Purpose:** Recognises peacekeepers promoting gender equality and advancing the **Women, Peace and Security (WPS) Agenda**.

- **WPS Agenda** was established through **UNSC Resolution 1325 (2000)** to enhance women's participation, protection and leadership in peace and security processes.
- **Significance:** Promotes gender-responsive peacekeeping and inclusive conflict resolution.
- **India's Role:** Reflects India's strong contribution to UN peacekeeping, including deployment of the **first all-women UN police unit** and being among the largest troop contributors.

About UNIFIL

- **Established:** 1978 by the **UN Security Council**.
- **Location:** Southern Lebanon along the Lebanon–Israel border.
- **Mandate:** Monitor cessation of hostilities, support the Lebanese Armed Forces and maintain peace and security in the region.
- **Headquarters:** Naqoura, Lebanon.

LISIMA PLATEAU (ANGOLA)

Context

Recent biodiversity surveys on the **Lisima Plateau** in Angola discovered several potential new species, highlighting the region's ecological importance.

About Lisima Plateau

- **Location:** Remote highland plateau in Angola, south-central Africa.
- **Hydrological Importance:** Forms the headwaters of major river systems i.e. **Congo, Zambezi, Okavango and Kwango** rivers.
 - **Okavango River** is one of the few major rivers that does not drain into the sea; it terminates in the Okavango Delta.
 - **Kwango River:** A major tributary of the Congo River
- **Biodiversity Hotspot:** Considered one of Africa's least-explored biodiversity regions, with many species potentially new to science.
- **Recent Discoveries:** Surveys recorded potential new species of spiders, dragonflies, damselflies, butterflies and other insects.
- **Conservation Status:** Large parts of the plateau have received conservation recognition, including designation of **Lisima Lya Mwono** as a **Ramsar Wetland of International Importance**.
- **Threats:** Remoteness has preserved the ecosystem, but habitat degradation, future land-use changes and remnants of past conflicts remain concerns.

PYROPROCESSING

Context

Pyroprocessing has emerged as an important industrial technique and is extensively employed in several sectors worldwide.

What is Pyroprocessing?

- Pyroprocessing refers to the transformation of solid materials through physical or chemical changes induced by very high temperatures.
- It is a dry thermal treatment process that requires significant energy input. The technology is predominantly used in the cement, metallurgical, and nuclear energy industries.

Major Applications of Pyroprocessing

- **Cement Industry:** Used in rotary kilns to calcine limestone and fuse raw materials into clinker for manufacturing cement.
- **Metallurgical Industry:** Used in high-temperature roasting and smelting to extract and refine metals like copper, zinc, and lead from their ores.
- **Nuclear Energy Sector:** Used in high-temperature molten salt baths to safely separate, treat, and recycle spent nuclear fuel.

MEASURES TO DEEPEN G-SEC MARKET AND BOOST FOREIGN INVESTMENT

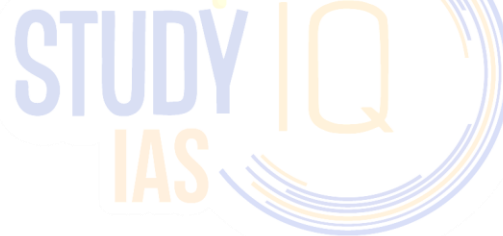
Context

The Union Government has unveiled a comprehensive package of capital market reforms aimed at strengthening the Government Securities (G-Sec) market and enhancing Foreign Portfolio Investment (FPI) inflows into India's equity and debt markets.

Major Reforms Announced

- **Liberalisation of Equity Investments by Foreign Individuals:** Amendment to the Foreign Exchange Management (Non-Debt Instruments) Rules, 2019. The Key changes are:
 - Individuals residing outside India (other than NRIs and OCIs) can now directly invest in listed Indian equities through the Portfolio Investment Scheme (PIS).
 - The investment limit for a single foreign individual in a listed company has been raised from 5% to 10%.
 - The aggregate ceiling for all such foreign individuals in a company has been increased from 10% to 24%.
 - Investments will be facilitated through the existing digital onboarding framework used by NRIs and OCIs.

- **Reforms in the Government Securities (G-Sec) Market:** Comprehensive review of the regulatory framework governing FPI investments in sovereign debt. The key changes are:
 - Abolition of short-term investment limits, concentration limits, and security-wise caps for FPIs investing in G-Secs.
 - Overall investment ceilings remain unchanged at 6% of outstanding Central Government Securities and 2% of State Government Securities.
 - Separate ‘General’ and ‘Long-Term’ investment categories have been merged, providing greater flexibility to investors.
- **Tax Exemption for FPI Investments in Government Securities:** Introduction of a tax-free framework for foreign investments in sovereign debt. The key changes are:
 - FPIs will receive a complete exemption from income tax on interest income and capital gains earned from investments in Government Securities.
 - The exemption will apply to earnings accrued on or after 1 April 2026.
 - The benefit is also extended to the Bank for International Settlements (BIS).



Mains Exam Topics

THE QUAD IN A CHANGING GLOBAL ORDER

Context

The recent Quad Foreign Ministers' Meeting reaffirmed the commitment towards a **free, open, inclusive and resilient Indo-Pacific**. The meeting unveiled new initiatives reflecting the Quad's evolution from a consultative dialogue into a platform for practical cooperation and regional resilience.

Relevance of the Quad in the Contemporary Global Order

- **Strategic Counterbalance to Coercion:** The Quad seeks to uphold the status quo and deter unilateral attempts to alter regional balances through force or coercion.
 - **E.g.** Concerns over China's militarisation of the South China Sea, growing pressure on Taiwan etc
- **Promoting a Rules-Based Order:** The grouping supports freedom of navigation and peaceful dispute resolution. (**E.g.** Consistent emphasis on UNCLOS, freedom of navigation in the South China Sea)
- **Economic Security & Supply-Chain Resilience:** The Quad aims to build trusted supply chains and reduce overdependence on concentrated manufacturing hubs. (Quad Critical Minerals Initiative launched as China currently processes around 70% of global rare earths.)
- **Critical & Emerging Technologies Cooperation:** The Quad increasingly views technology as a strategic domain influencing economic and national security. (**E.g.** Cooperation in semiconductors, AI, quantum technologies, Open RAN networks, cybersecurity and trusted digital infrastructure.)
- **Strengthening Digital Connectivity:** The grouping seeks to secure critical communication infrastructure and data flows. (**E.g.** Cooperation on resilient undersea cable networks that carry over 95% of global internet traffic.)
- **Provider of Regional Public Goods:** The Quad contributes to non-traditional security challenges affecting the Indo-Pacific. (**E.g.** vaccine partnerships, disaster-response exercises and climate resilience initiatives.)
- **Supporting a Multipolar Indo-Pacific:** The Quad provides middle powers with a platform to shape regional governance without creating a formal alliance structure.

Key Areas of Quad Cooperation

- **Maritime Security:** Enhancing maritime awareness, surveillance and interoperability across the Indo-Pacific.

E.g. Malabar Naval Exercise; Indo-Pacific Maritime Domain Awareness (IP-MDA); Indo-Pacific Maritime Surveillance Collaboration (IPMSC) launched in 2026.

- **Critical Minerals & Supply Chains:** Building resilient supply chains for strategic industries and energy transition technologies. (E.g. 2026 Quad Critical Minerals Initiative; cooperation on lithium, cobalt, nickel and rare earths critical for EVs, semiconductors and defence systems.)
- **Energy Security:** Strengthening resilience against disruptions in global energy markets. (E.g. Quad Initiative on Indo-Pacific Energy Security launched amid concerns over Strait of Hormuz disruptions)
- **Critical & Emerging Technologies:** Promoting innovation and trusted technology ecosystems. (E.g. Quad Fellowship, semiconductor cooperation, AI partnerships and digital standards collaboration.)
- **Connectivity & Infrastructure:** Providing transparent and sustainable infrastructure alternatives. (E.g. Fiji Port Development Project; Ports of the Future Partnership; regional digital connectivity initiatives.)
- **Humanitarian Assistance & Disaster Relief (HADR):** Strengthening collective response to natural disasters and humanitarian crises. (E.g. Originated from cooperation during the 2004 Indian Ocean Tsunami; recent coordination during disasters in Myanmar and Papua New Guinea.)
- **Cyber Security & Digital Infrastructure:** Protecting critical digital networks and communication systems. (E.g. Collaboration on undersea cable security, cyber resilience and secure telecommunications networks.)

Significance of the Quad for India

- **Countering Strategic Pressure from China:** The Quad strengthens India's ability to respond to growing Chinese influence in the Indo-Pacific.
 - E.g. Provides a strategic counterbalance to China's naval expansion and "String of Pearls" infrastructure network across the Indian Ocean.
- **Preserving Strategic Autonomy:** The informal nature of the Quad allows India to deepen cooperation without entering a formal alliance.
 - E.g. Unlike NATO, the Quad imposes no mutual-defence obligations, aligning with India's traditional strategic autonomy.
- **Strengthening India's Maritime Role:** The Quad enhances India's position as a net security provider in the Indian Ocean Region.
 - E.g. IP-MDA and IPMSC improve India's ability to monitor illegal fishing, maritime militias and grey-zone activities.

- **Expanding Economic Opportunities:** The Quad supports diversification of global manufacturing and investment flows. (E.g. China+1 strategy, and critical minerals partnerships create opportunities for India's manufacturing sector.)
- **Facilitating Technology Access:** Cooperation accelerates India's participation in advanced technology ecosystems. (Partnerships in semiconductors, AI, clean energy and next-generation telecommunications.)
- **Enhancing Regional Influence:** The Quad reinforces India's role in shaping Indo-Pacific governance and regional security architecture.
- (India increasingly serves as a bridge between the Quad, ASEAN and the Global South.)

Challenges Before the Quad

- **Lack of Institutionalisation:** The Quad lacks a permanent secretariat, charter or treaty-based framework.
 - E.g. Leadership changes and domestic political transitions can affect continuity, as seen in delays to recent leader-level summits.
- **Competing Minilateral Frameworks:** The emergence of other security arrangements may dilute the Quad's strategic centrality.
 - E.g. AUKUS, the "Squad" (US-Japan-Australia-Philippines) and other issue-based coalitions increasingly attract attention.
- **Diverse Threat Perceptions:** Members prioritise different geographic theatres and security concerns.
 - E.g. India focuses on the Indian Ocean and LAC; Japan on East China Sea and Taiwan; Australia on Pacific Islands; the U.S. across the broader Indo-Pacific.
- **Economic Integration Deficit:** The Quad lacks a comprehensive economic architecture comparable to regional trade blocs. (E.g. Unlike RCEP, the Indo-Pacific Economic Framework (IPEF) does not provide market-access commitments.)
- **Managing China Relations:** All Quad members maintain significant economic links with China despite strategic concerns. (E.g. Balancing competition with economic interdependence remains a major challenge.)

Challenges for India within the Quad

- **Continental vs Maritime Security Dilemma:** India's primary security challenge remains along the Himalayan frontier.

- **E.g.** The Quad strengthens maritime cooperation but offers limited direct deterrence against LAC-related contingencies.
- **Balancing Relations with Russia:** India's participation must be calibrated to avoid alienating a long-standing strategic partner. (**E.g.** Russia continues to be a major defence supplier and energy partner for India.)
- **Economic Dependence on China:** India's trade and manufacturing ecosystem remains linked to Chinese supply chains. (**E.g.** Rapid diversification remains difficult despite China+1 initiatives.)
- **Managing ASEAN Sensitivities:** Several ASEAN countries remain cautious about major-power competition. (**E.g.** India must reassure ASEAN that the Quad complements rather than undermines ASEAN Centrality.)

Way Forward

- **Institutionalise the Quad:** Establish a permanent secretariat and structured implementation mechanisms. (Would reduce dependence on political cycles and improve continuity of initiatives.)
- **Operationalise Economic Initiatives:** Move from declarations to project execution. (**E.g.** Accelerate implementation of the Ports of the Future Partnership, critical minerals projects and connectivity initiatives.)
- **Deepen Maritime Cooperation:** Expand information sharing, surveillance networks and operational interoperability. (**E.g.** Strengthen Malabar exercises and integrate maritime-domain awareness through IFC-IOR and IPMSC.)
- **Bridge Maritime and Continental Security:** Recognise the interconnected nature of Indo-Pacific security challenges. (**E.g.** Provide greater diplomatic, technological and intelligence support on continental security concerns.)
- **Develop a Quad Plus Framework:** Engage like-minded partners on issue-specific cooperation. (**E.g.** South Korea, Vietnam, France, Indonesia and Pacific Island nations can participate in selected initiatives.)
- **Support ASEAN-Centric Regionalism:** Strengthen cooperation with ASEAN-led institutions. (**E.g.** Funding climate resilience, disaster management and connectivity projects can reinforce regional trust.)

ORDINANCE AND JUDICIAL APPOINTMENTS

Context

A constitutional debate has emerged following the issuance of a Presidential Ordinance under Article 123 increasing the sanctioned strength of the Supreme Court from 34 to 38 judges.

What is an Ordinance?

- An Ordinance is a temporary law issued by the Executive when immediate legislative action is required and Parliament is not in a position to enact a law.
- Although promulgated by the President, it has the same legal force as an Act of Parliament for a limited period.
- The Supreme Court has consistently held that the ordinance-making power is an exceptional and emergency power intended to address urgent situations..

Evolution of the Ordinance Power in India

- The concept of ordinance-making was introduced through the Indian Councils Act, 1861 after the Revolt of 1857 to strengthen the authority of the Viceroy.
- Subsequently, the Government of India Act, 1935 empowered the Governor-General to promulgate ordinances.
- This framework was incorporated into the Constitution through Article 123, which vests ordinance-making authority in the President.

Key Features of an Ordinance

- An ordinance carries the same legal status and effect as a law enacted by Parliament.
- It may operate retrospectively, taking effect from a date prior to its promulgation.
- It can amend, repeal, or modify existing laws enacted by Parliament.
- Taxation laws may also be introduced or altered through an ordinance.
- An ordinance cannot be used to amend the Constitution.
- Like parliamentary legislation, it remains subject to constitutional limitations, particularly the provisions relating to Fundamental Rights under Part III.

Constitutional Provisions

- **Article 124(1):** Empowers Parliament to determine the number of judges in the Supreme Court through legislation.
- **Article 123:** Authorizes the President to promulgate Ordinances when Parliament is not in session. Such Ordinances have the force of law but cease to operate six weeks after Parliament reconvenes unless replaced by an Act.

Recent developments

- After the promulgation of the Ordinance, judges were sworn into the Supreme Court.
- Two appointments filled vacancies that already existed within the sanctioned strength of 34 judges.

- The remaining three appointments were made against the additional posts temporarily created through the Ordinance.

Associated Constitutional and Institutional Concerns

- **Departure from Judicial Caution on Ordinance-Making:** The use of an Ordinance to alter the Supreme Court's composition raises questions about adherence to the Court's own jurisprudence discouraging executive law-making as a substitute for legislative action.
 - Eg: In the case of D.C. Wadhwa v. State of Bihar, the Court criticized repeated reliance on Ordinances as a constitutional impropriety.
- **Perceived Impact on Separation of Powers:** Judges occupying posts created by a temporary executive measure may face concerns regarding institutional independence, particularly when matters involving the Union Government come before the Court.
- **Uncertainty if the Ordinance Lapses:** Should Parliament fail to enact a replacement statute, the status of judges appointed to Ordinance-created positions would enter uncharted constitutional territory.
 - Eg: The de facto doctrine recognized in Gokaraju Rangaraju v. The state of Andhra Pradesh may protect past judicial decisions.
- **Implications for Judicial Independence:** Allowing the executive to temporarily determine the Court's sanctioned strength could be viewed as inconsistent with the judiciary's longstanding efforts to preserve institutional autonomy
 - Eg: In the Supreme Court Advocates-on-Record Association v. Union of India, the Court invalidated the National Judicial Appointments Commission framework to safeguard judicial primacy in appointments.

Way Forward

- **Early Legislative Approval:** Parliament should promptly enact legislation replacing the Ordinance to remove uncertainty surrounding the newly created posts.
- **Parliamentary Route for Future Expansion:** Changes in the strength of the Supreme Court should ordinarily be undertaken through regular legislation rather than temporary executive measures.
- **Institutional Guidelines by the Collegium:** The Collegium may consider refraining from recommending appointments against Ordinance-created posts until such positions receive statutory backing.

- **Safeguarding Institutional Credibility:** To avoid perceptions of conflict of interest, judges occupying temporary posts could exercise caution in participating in sensitive constitutional matters involving the Union Executive until the legal status of their positions is settled.

