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Polity & Governance

Q1. The Panchayat Advancement Index (PAI) 2.0 marks a shift towards data-driven grassroots governance in India. Examine its significance in strengthening decentralisation and evaluate the challenges in achieving effective local governance. (15 M)

(GS Paper II – Governance | Local Self-Government | Decentralisation)

Topics Covered: Panchayat Advancement Index (PAI) 2.0, SDG Localization (LSDGs), Gram Panchayat Development Plan (GPDP), Decentralisation, Grassroots Governance, Data-driven Policy, Accountability

Introduction	The Panchayat Advancement Index (PAI) 2.0, released by the Ministry of Panchayati Raj, represents India's first comprehensive data-driven framework to evaluate the performance of over 2.5 lakh Gram Panchayats. By aligning local governance with the Localization of Sustainable Development Goals (LSDGs), it seeks to transform Panchayati Raj Institutions from administrative bodies into outcome-oriented institutions.
Body	**1. Significance of PAI 2.0 in Strengthening Decentralisation** • PAI 2.0 enhances decentralisation by introducing measurable indicators and performance-based evaluation at the grassroots level. • It shifts governance from input-based schemes to outcome-based development, ensuring accountability of Panchayats. • By integrating 150 indicators across themes such as poverty, health, infrastructure, and environment, it localizes global SDGs into village-level planning through the Gram Panchayat Development Plan (GPDP). • The index promotes data-driven governance, enabling evidence-based decision-making and targeted interventions. It strengthens transparency through Gram Sabha validation and real-time dashboards, thereby deepening participatory democracy. Additionally, it fosters competitive federalism by encouraging states and Panchayats to improve rankings and adopt best practices. **2. Key Findings Reflecting Governance Trends** • The report recorded a high participation rate of 97.30%, showing increasing institutional engagement. • However, the majority of Panchayats fall under the "Performer"

category, indicating moderate performance, while no Panchayat achieved the highest "Achiever" category overall. States like Tripura have demonstrated strong performance, whereas regional disparities persist with weaker outcomes in states like Bihar. This highlights uneven progress in decentralisation across India.

3. Constitutional Basis of Panchayati Raj

- Panchayati Raj Institutions derive constitutional status from the 73rd Constitutional Amendment Act, 1992, which inserted Part IX (Articles 243–243O) and the Eleventh Schedule.
- The system establishes a three-tier structure and promotes democratic decentralisation, participatory governance, and rural development.
- Provisions such as reservation for women and marginalized groups and the role of State Finance Commissions aim to ensure inclusiveness and financial sustainability.

4. Challenges in Effective Local Governance Regional Imbalance:

Significant variation exists between high-performing and low-performing states due to differences in institutional capacity and socio-economic conditions.

- **Capacity Deficit:** Many Panchayat representatives lack technical expertise, planning skills, and administrative support, affecting effective implementation. **Financial Constraints:** Limited own-source revenue and heavy dependence on state and central grants reduce autonomy and flexibility.
- **Technological Barriers:** Digital divide and low digital literacy in rural areas hinder data reporting and governance innovation.
- **Infrastructure Deficits:** Inadequate infrastructure limits performance in sectors like sanitation, health, and connectivity.
- **Social Justice Gaps:** Progress in inclusion, gender equality, and welfare indicators remains uneven across regions.
- **Political and Administrative Interference:** State-level control often restricts true decentralisation and functional independence of Panchayats.

5. Way Forward

- Capacity building through continuous training and institutional support must be strengthened. Fiscal decentralisation should be enhanced by increasing revenue powers and timely fund transfers. Digital governance tools, real-time monitoring systems, and vernacular interfaces should be expanded to improve accessibility. PAI scores should be linked with

	incentives and targeted funding to encourage performance improvement. Best practices from leading Panchayats should be replicated through peer learning mechanisms.
Conclusion	The Panchayat Advancement Index 2.0 is a transformative step toward institutionalising accountability, transparency, and data-driven governance at the grassroots level. However, the success of decentralisation depends on addressing structural challenges such as financial dependence, capacity gaps, and regional disparities. Strengthening Panchayati Raj Institutions is essential for achieving inclusive development and realizing the vision of true grassroots democracy.

Q2. Examine the legal position of the Forest Rights Act, 2006 in light of recent High Court rulings. Discuss its implications for tribal rights and forest governance in India. (15 M)

(GS Paper II – Governance | Tribal Rights | Judiciary | GS Paper III – Environment)

Topics Covered: Forest Rights Act 2006, Tribal Rights, Judicial Interpretation, Forest Governance, Rights vs Conservation

Introduction	The Forest Rights Act 2006 (FRA) was enacted to correct historical injustices faced by forest-dwelling communities by recognising their legal rights over land and forest resources. Recent contrasting rulings by the Allahabad High Court and Madras High Court have brought into focus the legal supremacy of FRA and challenges in its uniform interpretation.
Body	**1. Legal Position of FRA (Core Principle)** • FRA is a rights-based legislation that overrides conflicting provisions of pre-existing forest laws, based on the doctrine of lex posterior derogat priori (later law prevails over earlier law). • It mandates that no eviction of forest dwellers can take place until the process of recognition and verification of rights is completed. • It places the Gram Sabha at the centre of forest governance, ensuring participatory decision-making. **2. Key Judicial Developments** • **Allahabad High Court:** Reaffirmed the supremacy of FRA by setting aside the rejection of claims of the Tharu tribe by the District Level Committee (DLC). It held that FRA overrides inconsistent administrative orders and earlier laws, thereby strengthening tribal rights and due process. • **Madras High Court:** Took a contrasting approach by upholding eviction notices and prioritising the Tamil Nadu Forest Act, 1882

over FRA claims. It also ignored grazing rights explicitly recognised under FRA, raising concerns about legal inconsistency.

3. Rights Recognised under FRA

- Individual Forest Rights (right to cultivate and live on forest land for livelihood).
- Community Forest Rights including grazing, minor forest produce collection, fishing, and forest management.
- Habitat rights for Particularly Vulnerable Tribal Groups (PVTGs).
- Developmental rights such as access to basic amenities like roads, schools, and healthcare.

4. Implications for Tribal Rights

- The Allahabad HC ruling strengthens legal protection against arbitrary eviction and reinforces the rights-based framework of FRA.
- It promotes recognition of traditional livelihoods such as grazing and forest resource use.
- However, contradictory rulings like that of the Madras HC create uncertainty and weaken the effective realization of tribal rights.

5. Implications for Forest Governance

- FRA shifts forest governance from a state-controlled model to a community-based participatory model.
- It promotes sustainable forest management by integrating local knowledge and practices.
- Conflicting judicial interpretations create ambiguity in governance and implementation, affecting both conservation efforts and livelihood security. The tension between conservation objectives and community rights continues to shape policy debates.

6. Challenges in Implementation

- Bureaucratic delays in recognition of claims and weak administrative capacity.
- Lack of awareness among forest dwellers regarding their rights under FRA.
- Resistance from forest departments due to concerns over loss of control. Inconsistent judicial interpretations across states leading to legal uncertainty.
- Balancing conservation priorities with livelihood needs remains a persistent challenge.

7. Way Forward

	• Ensure uniform judicial interpretation through guidance from the Supreme Court. • Strengthen awareness campaigns and legal literacy among tribal communities. • Improve administrative efficiency and transparency in processing claims. Promote community-based forest governance models for sustainable management. • Integrate conservation goals with livelihood rights through participatory approaches.
Conclusion	The recent rulings highlight the ongoing tension between colonial-era forest laws and modern rights-based legislation. While the Allahabad High Court reinforces the legal primacy of FRA, divergent interpretations undermine its effectiveness. Ensuring consistent enforcement is essential for safeguarding tribal rights and achieving inclusive and sustainable forest governance in India.

Q3. Increasing the number of judges alone cannot solve the problem of judicial pendency in India. Discuss in the context of the recent proposal to expand the strength of the Supreme Court. (15 M)

(GS Paper II – Judiciary | Governance | Constitutional Provisions)

Topics Covered: Supreme Court (Number of Judges) Act 1956, Judicial Reforms, Pendency of Cases, Judicial Infrastructure, Access to Justice

Introduction	The Union Cabinet recently approved a proposal to increase the sanctioned strength of judges in the Supreme Court from 34 to 38 through an amendment to the Supreme Court (Number of Judges) Act 1956. The decision comes amid rising pendency of cases exceeding 92,000 and reflects the need to strengthen judicial capacity. However, judicial pendency is a structural issue that requires broader systemic reforms beyond merely increasing the number of judges.
Body	**1. Constitutional Basis for Increasing Supreme Court Strength** • Article 124(1) of the Constitution establishes the Supreme Court and empowers Parliament to determine the number of judges by law. • The Supreme Court (Number of Judges) Act, 1956 regulates the sanctioned strength of the Court and has been amended multiple times in response to rising litigation. • The recent proposal seeks to increase the number of judges from 34 to 38, including the Chief Justice of India. **2. Why the Number of Judges is Being Increased** • **Rising Pendency:** The Supreme Court currently has more than 92,000 pending cases, reflecting increasing litigation and

pressure on the judiciary.

- **Judicial Vacancies and Retirements:** Existing vacancies and upcoming retirements of judges have increased the workload on sitting judges.
- **Expansion of Litigation:** The Court now deals with constitutional matters, PILs, election disputes, commercial cases, and appeals from across the country.
- **Digital Accessibility:** E-filing and virtual access have increased the inflow of cases, improving accessibility but also increasing pressure on the institution. **3. Significance of Increasing Judicial Strength**
- More judges can improve disposal rates and reduce pendency in the short term.
- It reduces the excessive burden on existing judges, enabling more effective adjudication.
- Constitutional benches can function more efficiently, improving constitutional governance and interpretation.
- Faster hearings strengthen citizens' access to justice and public confidence in the judiciary.

4. Why Increasing Judges Alone is Insufficient Infrastructure Constraints:

- Courtrooms, staff, research support, and digital infrastructure remain inadequate. Additional judges without corresponding infrastructure may reduce efficiency.
- **Procedural Delays:** Frequent adjournments, lengthy oral arguments, and procedural complexities contribute significantly to delays.
- **Vacancy Delays:** Sanctioned posts often remain vacant due to delays in appointments through the Collegium system and executive approvals.
- **Lower Judiciary Crisis:** Most pendency exists in subordinate courts, where shortages of judges, staff, and infrastructure are severe.
- **Case Management Deficits:** Absence of scientific case management systems and limited use of technology affect judicial efficiency.
- **Increasing Litigation Culture:** Rising socio-economic complexity and expanding rights jurisprudence continue to increase the volume of litigation.

5. Wider Judicial Reform Measures Required

- Strengthen judicial infrastructure through modern court complexes, digital systems, and trained support staff.

	• Ensure timely appointment of judges and reduce vacancies at all levels of the judiciary. • Expand use of technology such as AI-assisted case listing, e-filing, and virtual hearings. Introduce effective case management practices and discourage unnecessary adjournments. • Promote alternative dispute resolution mechanisms such as mediation and arbitration to reduce court burden. • Increase focus on strengthening subordinate courts where the bulk of pendency exists.
Conclusion	Increasing the strength of the Supreme Court is an important step toward improving judicial efficiency and reducing case backlog. However, pendency is rooted in deeper structural and procedural challenges within the justice delivery system. Sustainable judicial reform requires a holistic approach combining infrastructure development, technological modernization, timely appointments, and systemic procedural reforms to ensure accessible and effective justice delivery.

Q4. The controversy over the appointment process of the Chief Election Commissioner and Election Commissioners reflects the larger issue of institutional independence in Indian democracy. Discuss.

(UPSC GS Paper II: Constitution, Parliament, Judiciary, Election Commission of India)

Introduction	The Election Commission of India is a constitutional body responsible for conducting elections. Free and fair elections are the foundation of democracy. Therefore, the independence of the Election Commission is essential for maintaining public trust in the electoral process.
Body	**Background** • Article 324(2) provides that the Chief Election Commissioner and Election Commissioners shall be appointed subject to any law made by Parliament. However, for many decades, Parliament did not enact a law on the appointment procedure. • Before the 2023 law, appointments were largely made through an executive-driven process. The Union Law Ministry prepared names, the Prime Minister recommended them, and the President made the appointment. **Supreme Court's Intervention** • In **Anoop Baranwal vs Union of India, 2023**, the Supreme Court held that the Election Commission must be insulated from executive interference. It laid down an interim appointment process consisting of the Prime Minister, Leader of Opposition and Chief Justice of India. • The Court described the Election Commission as a **guardian of democracy** and stressed that elections must be conducted by

	persons who act impartially and honestly. **2023 Act and Its Controversy** Parliament later enacted the **Chief Election Commissioner and Other Election Commissioners Act, 2023**. The law created a Selection Committee consisting of: • Prime Minister • Leader of Opposition • Union Cabinet Minister nominated by the Prime Minister The controversy arose because the Act removed the Chief Justice of India and replaced the CJI with a Cabinet Minister. Petitioners argue that this gives the executive dominance over the appointment process. **Concerns** The major concerns are: • Possibility of executive influence • Weakening of institutional neutrality • Wide discretion to the Selection Committee • Lack of proper parliamentary debate • Impact on public confidence in elections **Supreme Court's Recent Observation** • In 2026, the Supreme Court described Parliament's long delay in making a law as **"tyranny of the elected."** This reflects the concern that elected governments may fail to act in the spirit of constitutional democracy when institutional independence is at stake. **Way Forward** • The appointment process should be transparent, balanced and independent. The Election Commission may also be strengthened through an independent secretariat and financial autonomy by charging its expenditure to the Consolidated Fund of India.
Conclusion	The issue is not merely about appointment procedure. It concerns the independence of one of India's most important democratic institutions. A credible and independent Election Commission is necessary to protect free and fair elections and strengthen constitutional democracy.

Q5. Rural connectivity has the potential to transform physical access into social and economic opportunity. Examine the role of Pradhan Mantri Gram Sadak Yojana in promoting inclusive rural development. How can PMGSY-IV strengthen last-mile connectivity in vulnerable and backward regions?

(GS Paper II – Governance, Welfare Schemes, Rural Development and Social Justice)

Introduction	Rural connectivity is not only about building roads. It converts physical access into **social and economic opportunity**. The **Pradhan Mantri Gram Sadak Yojana (PMGSY)** was launched in 2000 as a Centrally Sponsored Scheme to provide **all-weather road connectivity** to unconnected rural habitations. Its 25-year journey highlights the role of roads in rural transformation.
Body	**PMGSY and Inclusive Rural Development** **1. Access to Basic Services** • PMGSY connects villages with **schools, health centres, markets, employment centres and public services**. This improves access to education and healthcare, especially for women, children, elderly people and remote communities. **2. Rural Economic Integration** • Better rural roads help farmers reach **agricultural markets** more easily. This reduces transport difficulties, improves market access and strengthens the rural economy. **3. Welfare Delivery and Emergency Services** • Road connectivity improves the delivery of government schemes, emergency medical services and administrative outreach in rural areas. **4. Security and Development in LWE Areas** • In **Left Wing Extremism affected areas**, road connectivity supports both security mobility and socio-economic development. It helps bring remote habitations into the mainstream development process. **PMGSY-IV and Last-Mile Connectivity** **1. Connecting Unconnected Habitations** • PMGSY-IV covers the period **2024–25 to 2028–29**. It aims to connect **25,000 unconnected rural habitations** and proposes construction of **62,500 km of rural roads** with an outlay of **₹70,125 crore**. **2. Focus on Vulnerable Regions** • PMGSY-IV gives special attention to **tribal areas, Aspirational Districts and Blocks, desert areas, North-Eastern and Himalayan regions**. **3. Convergence with Tribal Schemes**

	• Its convergence with **PM-JANMAN** and **Dharti Aaba Janjatiya Gram Utkarsh Abhiyan** can improve road access for tribal and backward habitations. **4. Technology and Sustainability** • The use of **OMMAS, e-MARG, GPS tracking, PM Gati Shakti portal and PMGSY Gram Sadak Survey App** can improve planning, monitoring and maintenance. Green technologies such as **waste plastic, fly ash, cold mix technology and bio-engineering** can make rural roads more sustainable.
Conclusion	PMGSY has transformed village roads into pathways of **prosperity, dignity and inclusion**. PMGSY-IV can deepen this impact by combining last-mile connectivity with **technology, sustainability and targeted support for vulnerable regions**.

Q6. The PM-SHRI scheme reflects both the promise of school transformation and the challenges of cooperative federalism in education. Discuss.

(GS Paper II – Education, Governance and Centre-State Relations)

Introduction	PM-SHRI, or **Pradhan Mantri Schools for Rising India**, is a Centrally Sponsored Scheme launched in 2022 to upgrade more than **14,500 existing schools** into model institutions that showcase the implementation of **NEP 2020**. The scheme aims to improve public school education through modern infrastructure, digital learning, competency-based pedagogy and continuous quality assessment.
Body	**Promise of School Transformation** • PM-SHRI schools are expected to provide a safe, inclusive and stimulating learning environment. They include **smart classrooms, computer labs, integrated science labs, Atal Tinkering Labs, ICT facilities, digital libraries and vocational labs**. • The scheme promotes **experiential, inquiry-driven, holistic, flexible and learner-centred pedagogy**. It also focuses on **competency-based learning**, real-life application of knowledge, STEAM education, sports, arts and early childhood care. • The **School Quality Assessment Framework** can help monitor performance and support continuous improvement. Student registries can also help track enrolment and learning progress. • Thus, PM-SHRI can create exemplar schools that may guide wider school reforms and improve learning outcomes in public education.

	Cooperative Federalism Challenges • The scheme also shows the challenges of Centre-State coordination in education. Education is a sensitive social sector where States have their own language policies, curriculum priorities and political concerns. • West Bengal has raised concerns over **funding and branding**, as States have to bear 40% of the cost while the scheme carries the PM-SHRI name. Tamil Nadu has concerns over the **three-language formula** under NEP 2020. Kerala has raised ideological concerns over NEP implementation. • The requirement of signing an MoU has delayed implementation in these States. Linking PM-SHRI with **Samagra Shiksha funding** has further increased Centre-State tensions. **Way Forward** • The Centre and States should resolve concerns through dialogue. The scheme should allow flexibility for **State Curriculum Frameworks**, regional languages and local educational needs. Fund release should be transparent and predictable. Monitoring should focus on learning outcomes, inclusion and school quality.
Conclusion	PM-SHRI has the potential to become an important instrument for improving the quality of public-school education in India. By combining modern infrastructure, digital learning, competency-based pedagogy, green practices and continuous quality assessment, it can help create model schools for wider reform. However, education is a shared and sensitive governance area. Therefore, the scheme must be implemented through dialogue, State flexibility and respect for regional concerns. Its real success will depend not merely on upgrading buildings, but on improving learning outcomes, inclusion, teacher capacity and student welfare.

Q7. Zoonotic diseases are emerging as a defining public health challenge of the twenty-first century. Discuss in the context of ecological disruption, climate change and the need for a One Health approach.

(GS Paper II –Governance, Public Health Systems, International Health Regulations)

Introduction	**Zoonotic diseases** are infections that spread from animals to humans. Recent outbreaks such as **hantavirus**, along with earlier examples like **COVID-19, Nipah and Ebola**, show that animal-origin diseases are becoming a major public health concern. This is due to increasing disturbance in the relationship between humans, animals and the environment.
Body	**Ecological Disruption and Zoonotic Risk**

	Ecological disruption is a major driver of zoonotic spillovers. • **Deforestation** brings humans closer to wildlife reservoirs such as bats and rodents. • **Agricultural expansion** and **unplanned urbanisation** increase contact between humans, livestock and wild animals. • **Habitat fragmentation** pushes animals into human settlements, farms and markets. • **Industrial livestock farming** creates large populations of genetically similar animals, which can amplify pathogens. Diseases such as **Nipah** and **Ebola** show how habitat loss can increase contact between humans and disease-carrying animals. **Climate Change and Disease Spread** Climate change is reshaping the geography of infectious diseases. • Rising temperatures and changing rainfall patterns affect animal movement and breeding. • Mosquitoes and ticks are expanding into new areas, including higher altitudes and latitudes. • Changes in agriculture and land productivity influence rodent populations. • Fragile health systems may fail to detect new outbreaks early. Thus, climate change acts as a risk multiplier for zoonotic diseases. **Need for One Health Approach** A **One Health approach** recognises that human health, animal health and environmental health are interconnected. It requires: • Integrated surveillance of humans, animals and wildlife • Environmental sampling and early warning systems • Real-time data sharing • Strong veterinary and public health systems • Regulation of high-risk livestock practices • Protection of forests and biodiversity
Conclusion	Zoonotic diseases are not isolated accidents. They are linked to ecological damage, climate change and weak surveillance. The twenty-first century needs a preventive public health model based on **One Health, ecological balance, climate resilience and global cooperation**. Only such an integrated approach can reduce the risk of future pandemics.

Q8. The recent Ebola outbreak and WHO's declaration of Public Health Emergency of International Concern highlight the need for stronger global health security. Discuss the challenges in controlling zoonotic outbreaks and suggest a way forward.

(GS Paper II: Health, Governance and International Institutions)

Introduction	The World Health Organization recently declared the Ebola outbreak in the **Democratic Republic of the Congo and Uganda** as a **Public Health Emergency of International Concern (PHEIC)**. The outbreak is linked to the **Bundibugyo ebolavirus strain**, with reported confirmed cases, suspected cases and deaths in affected regions. A PHEIC is declared when a health event is serious, sudden, unusual, capable of international spread and requires coordinated global action.
Body	**Nature of Ebola and Zoonotic Risk** **Ebola virus disease** is a severe zoonotic disease. It can spread from animals to humans and then from human to human through direct contact with infected bodily fluids, blood, secretions, organs and contaminated materials. Wild animals such as **fruit bats, non-human primates, monkeys and forest antelope** are linked with spillover risks. • The disease has an incubation period of **2 to 21 days**, and symptoms include fever, fatigue, muscle pain, vomiting, diarrhoea, abdominal pain and kidney or liver dysfunction. This makes early detection important but also difficult because symptoms may resemble other diseases. **Challenges in Controlling Zoonotic Outbreaks** • **Limited treatment and vaccine options:** The current outbreak is linked to the **Bundibugyo strain**, for which vaccine and treatment options are more limited compared with some other Ebola variants. • **Difficulty in early diagnosis:** Initial symptoms are similar to many common infections. This can delay testing, isolation and treatment. • **Cross-border movement:** Movement between affected regions of DRC and Uganda increases the risk of international spread. • **Weak health systems:** Health systems in conflict-affected or remote regions may lack testing facilities, trained staff and isolation infrastructure. • **Risk to health workers:** Ebola can spread in health facilities if infection prevention and control practices are weak. • **Social stigma and misinformation:** Fear and misinformation may prevent people from reporting symptoms or seeking medical care. • **Traditional burial practices:** Direct contact with bodies during

	burial ceremonies can increase transmission risk. **Measures Needed for Control** Effective Ebola control needs a combination of medical, administrative and community-level measures. • **Rapid identification and isolation** of suspected and confirmed cases. • **Contact tracing and 21-day monitoring** of exposed persons. • **Safe and dignified burials** to reduce transmission. • **Strict infection control** in hospitals and treatment centres. • **Laboratory testing and surveillance** for early detection. • **Supportive care**, including rehydration and treatment of complications. • **Community engagement** to reduce fear and build trust. • **Targeted use of vaccines and monoclonal antibodies** wherever available and relevant. **Way Forward** • The global response must focus on **One Health**, which links human health, animal health and environmental health. Surveillance should be strengthened in forest areas, border zones and regions with high human-animal interaction. Countries should improve laboratory networks, train frontline health workers and ensure rapid data-sharing. • International cooperation is also essential. WHO, affected countries, research institutions and donor agencies must work together for vaccines, diagnostics, logistics and public health capacity. Instead of unnecessary border closures, better screening, cross-border coordination and community-level monitoring should be adopted.
Conclusion	The Ebola outbreak shows that zoonotic diseases can quickly become international health threats. Strong public health systems, early warning mechanisms, community trust and international cooperation are essential to control such outbreaks. A **One Health-based approach** is necessary for long-term global health security and pandemic preparedness.

Q9. The BCCI case highlights the difference between public function and public authority. Discuss in the context of transparency and accountability in sports governance.

(GS PAPER II - Governance, Transparency and Accountability, RTI Act, Statutory Bodies)

Introduction	The recent **Central Information Commission (CIC)** decision holding

	that the **BCCI is not a public authority under Section 2(h) of the RTI Act, 2005** has reopened the debate on transparency in sports governance. The BCCI is a private society, but it performs functions of national importance such as selecting the Indian cricket team, regulating cricket and managing huge cricket revenues. This creates a tension between **institutional autonomy** and **public accountability**.
Body	**Public Function vs Public Authority** • A **public function** means an activity that affects the public at large or serves a public purpose. The BCCI performs public functions because cricket has national importance in India and its decisions affect players, fans, sponsors and the public. • However, a **public authority** is a specific legal category under the **RTI Act**. Under **Section 2(h)**, a body must be established by the Constitution, by law, by government notification, or must be owned, controlled or substantially financed by the government. • The BCCI does not fulfil these conditions. It is registered under the **Tamil Nadu Societies Registration Act, 1975**, but it was not created by that Act. Therefore, the CIC held that registration under a statute does not make it a statutory body. **Judicial Position** • In **Zee Telefilms v. Union of India, 2005**, the Supreme Court held that the BCCI is not **State under Article 12** because it is not financially, functionally or administratively dominated by the government. • However, in **BCCI v. Cricket Association of Bihar, 2016**, the Court recognised that the BCCI performs public functions and can be subject to **judicial review under Article 226**. Thus, courts can examine its decisions if they are arbitrary or against public interest, but this does not automatically bring it under RTI. **Transparency and Accountability Concerns** The exclusion of BCCI from RTI raises several concerns: • It limits public access to information on **team selection, contracts and governance decisions**. • It may weaken scrutiny over **conflict of interest** and financial dealings. • The BCCI controls cricket administration and large revenues, giving it major public influence. • Cricket has strong national and emotional value in India, so citizens expect higher accountability. • It creates a governance gap where a private body performs public

	functions without full transparency duties. **Need for Balance** • At the same time, excessive government control may harm sports autonomy. Sports bodies need professional independence, quick decision-making and commercial flexibility. Political interference may weaken merit and credibility in sports administration. **Way Forward** • The BCCI should voluntarily disclose **audited accounts, selection norms, conflict-of-interest declarations and major governance decisions**. Parliament may consider a special transparency framework for private bodies performing major public functions. The recommendations of the **Lodha Committee** and the **Law Commission's 275th Report** may be revisited. Independent oversight can be created without day-to-day government interference.
Conclusion	The BCCI case shows that a body may perform **public functions** without becoming a **public authority** under the RTI Act. However, democratic governance requires transparency from powerful institutions affecting public interest. India needs a balanced framework that protects **sports autonomy** while ensuring **fair, clean and accountable sports governance**.

Q10. Indian federalism is facing increasing stress due to demographic, fiscal and institutional challenges. Examine. Suggest measures to strengthen cooperative federalism in India.

(GS Paper II – Polity & Governance, Federalism, Centre-State Relations and Cooperative Federalism)

Introduction	Indian federalism is described as **quasi-federal** because it combines a strong Centre with constitutionally recognised States. **Article 1** describes India as a **"Union of States"**, and in **S.R. Bommai v. Union of India (1994)**, the Supreme Court held federalism to be part of the **Basic Structure** of the Constitution. However, recent issues related to delimitation, fiscal sharing, Governor's role and centralisation have created stress in Centre-State relations.
Body	**Major Stresses on Indian Federalism** **1. Demographic and Delimitation Concerns** • The proposed post-2026 delimitation may readjust parliamentary seats on the basis of population. States that successfully controlled population growth, especially in southern India, fear loss of political representation. This creates

the problem of a **demographic penalty**, where better-performing States may lose voice in Parliament.

2. Fiscal Federalism Under Pressure

- States depend on the Centre for tax devolution. However, the rising use of **cesses and surcharges**, which are not shared with States, reduces the effective divisible pool. Though vertical devolution is officially **41%**, the actual fiscal space available to States becomes lower. This weakens State capacity to spend on welfare, health, education and infrastructure.

3. Conditional Borrowing Limits

- States argue that linking additional borrowing limits with reforms such as power sector changes affects their fiscal autonomy. Such conditions may restrict State-specific development priorities.

4. Centralisation in Concurrent List Subjects

- The Centre can legislate on Concurrent List subjects, but States often complain of inadequate consultation. Major reforms in areas such as criminal law, agriculture, labour and education create federal tensions when States feel excluded from decision-making.

5. Governor-State Friction

- The Governor is expected to act as a constitutional bridge. However, delays in giving assent to Bills passed by State Legislatures have created conflict. In **State of Punjab v. Principal Secretary to the Governor (2023)**, the Supreme Court held that Governors cannot indefinitely delay Bills.

6. Weak Inter-State Council

- **Article 263** provides for the Inter-State Council, but its limited use weakens dialogue. This increases litigation and reduces cooperative decision-making.

Measures to Strengthen Cooperative Federalism

- **Revitalise the Inter-State Council** as a regular Centre-State consultation forum.
- **Limit excessive cesses and surcharges** to protect States' fiscal share.
- **Adopt a balanced delimitation formula** that considers population, demographic performance and human development.
- **Define Governor's discretionary powers** clearly and implement Sarkaria and Punchhi Commission recommendations.
- **Consult States before legislating** on Concurrent List subjects.

	• **Strengthen Rajya Sabha** as a true Council of States. • Use the **GST Council model** for other shared governance areas such as health, climate, migration and internal security.
Conclusion	Indian federalism cannot function only through constitutional provisions; it also requires trust, consultation and democratic self-restraint. A strong Union is necessary for national unity, but strong States are equally important for democracy and development. Cooperative federalism must therefore be strengthened through fair fiscal sharing, institutional dialogue and respect for regional diversity.

Q11. The rise of offshore online gambling platforms shows the limitations of a blanket ban on online money games. Discuss the need for a balanced regulatory framework in India.

(GS Paper II: Governance, Government policies, regulation of digital platforms)

Introduction	The **Promotion and Regulation of Online Gaming Act, 2025** was enacted to protect citizens, especially youth and vulnerable users, from the financial, psychological and social harms of online money games. The **PROG Rules, 2026** further created the **Online Gaming Authority of India** to regulate the sector. However, early evidence suggests that a blanket ban may be pushing users towards illegal offshore platforms.
Body	**Limitations of a Blanket Ban** • **Shift to offshore platforms:** Users may move from regulated domestic platforms to illegal foreign platforms that are outside Indian jurisdiction. • **Weak consumer protection:** Offshore platforms do not provide reliable grievance redressal, fair-play standards or refund mechanisms. • **Cybercrime risks:** Fraudsters use Telegram, WhatsApp links, fake investment tasks and online betting traps to exploit users. • **Financial security threats:** Illegal platforms may use mule accounts and hidden payment channels for **money laundering**. • **Enforcement difficulty:** VPNs, proxy servers and mirror websites make blocking difficult. When one domain is blocked, another may quickly become active. **Need for Balanced Regulation** • A balanced approach does not mean allowing harmful money games without control. It means creating a clear legal framework that separates harmful online money games from legitimate **e-sports** and **online social games**. • **User safety:** Age verification, parental controls, spending limits, time restrictions and counselling support can reduce harm.

	• **Regulatory certainty:** Genuine gaming companies can operate under clear rules, while illegal operators can be targeted. • **Financial monitoring:** Coordination with banks, payment gateways and cybercrime agencies can help detect suspicious transactions. • **Tax revenue:** A regulated ecosystem may generate revenue that can be used for awareness campaigns and enforcement. • **Innovation support:** India can promote e-sports, animation, gaming technology and digital creativity without encouraging gambling addiction. **Role of PROG Rules, 2026** • The Rules provide important mechanisms such as the **Online Gaming Authority of India**, classification of games, registration of e-sports, user safety features and a two-tier grievance redressal system. These provisions can become effective only if backed by strong enforcement and Centre-State coordination. **Way Forward** • India should strengthen digital monitoring of offshore platforms, improve international cooperation, and ensure real-time coordination among MeitY, RBI, banks, State police and cybercrime units. A controlled regulatory sandbox may also be tested to study user behaviour and platform risks. Public awareness campaigns are necessary to warn users against fake betting apps, Telegram scams and mule account fraud.
Conclusion	A blanket ban may reduce visible domestic activity but can push the problem into an illegal offshore space. India needs a balanced framework that protects users, prevents financial crime and supports lawful digital innovation. Effective regulation, not mere prohibition, is the key to safe and accountable online gaming governance.

International Relations

Q12. Discuss the concept of ecocide and examine the limitations of existing international law in addressing large-scale environmental destruction during armed conflicts. (15 M)

(GS Paper II – International Relations | International Institutions | GS Paper III – Environment | Security)

Topics Covered: Ecocide, International Criminal Court, Rome Statute, Environmental Security, International Humanitarian Law, Climate Justice

Introduction	Ecocide refers to large-scale, long-term, or irreversible destruction of ecosystems caused by human activities such as war, industrial disasters, deforestation, or pollution. Growing instances of environmental devastation during armed conflicts have intensified demands for recognising ecocide as an international crime under the Rome Statute of the International Criminal Court.
Body	**1. Concept and Evolution of Ecocide** • The term "ecocide" was coined in 1970 by biologist Arthur W. Galston during criticism of environmental destruction caused by the Vietnam War. • It emerged in response to the ecological devastation caused by chemical defoliants such as Agent Orange, which destroyed forests, biodiversity, and agricultural systems. • Over time, the concept expanded beyond wartime destruction to include industrial pollution, oil spills, mining, and large-scale ecosystem degradation during peacetime. • Ecocide reflects an ecocentric approach, recognising ecosystems and nature as deserving independent legal protection rather than viewing them merely as resources for human use **2. Environmental Damage During Armed Conflicts** • Modern warfare increasingly causes ecological destruction through oil spills, toxic contamination, destruction of forests, and damage to agricultural systems • Burning fuel depots and industrial facilities generate severe air pollution and toxic emissions affecting public health • Soil degradation, radioactive contamination, and biodiversity loss create long-term ecological consequences. • Environmental destruction during conflicts also threatens food security, water availability, and livelihoods of vulnerable populations.

3. Current Position under International Law

- Existing international law provides only limited protection against environmental destruction during war.
- Article 8 of the Rome Statute treats environmental destruction as a war crime only under strict conditions where damage is intentional, widespread, long-term, severe, and clearly excessive compared to military advantage.
- The Environmental Modification Convention (ENMOD) prohibits hostile environmental modification techniques such as deliberate manipulation of climate or ecosystems for military purposes.
- However, most legal frameworks remain anthropocentric, focusing more on human suffering than ecological harm itself.

4. Limitations of Existing International Law

- **High Legal Threshold:** Proving that damage is simultaneously widespread, long-term, and severe is extremely difficult.
- **Wartime Limitation:** Existing provisions mainly apply during armed conflict and do not adequately address peacetime ecological destruction.
- **Weak Enforcement:** Many international environmental agreements lack criminal liability and enforcement mechanisms.
- **Jurisdictional Constraints:** Countries not party to the ICC cannot easily be prosecuted under the Rome Statute.
- **Attribution Problems:** Determining responsibility for environmental destruction during conflicts is often politically and legally complex
- **Definitional Ambiguity:** There is no universally accepted legal definition of ecocide, leading to inconsistencies in interpretation.

5. Emerging Global Developments

- Countries such as Vietnam, France, Belgium, Chile, Russia, and Ukraine have introduced domestic legal provisions relating to ecocide or severe environmental destruction.
- In 2025, the Council of Europe adopted a convention criminalising severe environmental destruction, indicating growing international concern.
- International organisations such as the International Union for Conservation of Nature continue advocating stronger environmental governance and accountability mechanisms.

6. Significance of Recognising Ecocide

- Recognition of ecocide would create legal accountability for states, corporations, and individuals causing irreversible ecological destruction.
- It would strengthen deterrence against environmentally

	destructive military and industrial practices. • It promotes climate justice by protecting vulnerable communities dependent on ecosystems for survival. • It integrates environmental protection with international humanitarian law and global governance frameworks. **7. Way Forward** • Develop a universally accepted legal definition of ecocide under international law • Expand the scope of environmental criminal liability beyond wartime situations. • Strengthen international cooperation in environmental monitoring, evidence collection, and prosecution mechanisms. • Reform existing treaties such as the Rome Statute to include ecological destruction as a standalone international crime. • Integrate environmental protection into humanitarian, security, and climate governance frameworks.
Conclusion	The growing demand for recognition of ecocide reflects the evolving understanding that environmental destruction threatens not only ecosystems but also global peace, public health, and human survival. While current international law remains inadequate, emerging global initiatives indicate a gradual shift toward ecological accountability. Recognising ecocide as an international crime would mark a major step toward integrating environmental justice with international governance and humanitarian principles.

Q13. The recent U.S.–China agricultural trade deal and Taiwan arms sale reflect the dual nature of U.S.–China relations. Discuss.

(GS Paper II: International Relations, Effect of Policies of Developed Countries, India and Global Powers)

Introduction	U.S.–China relations are marked by both **economic interdependence** and **strategic rivalry**. Recently, China agreed to increase imports of U.S. agricultural products at an annualised rate of about **$17 billion** for 2026, 2027 and 2028. At the same time, the United States approved a major arms package of around **$11.1 billion** for Taiwan. These developments show that both powers cooperate where economic interests overlap but compete strongly in security matters.
Body	**Economic Cooperation Through Agricultural Trade** • **Relief to U.S. farmers:** The deal can help American farmers regain access to the Chinese market, especially for products such as **soybeans, beef and poultry**. • **Market access focus:** The agreement aims to address barriers

	related to beef plant registration, poultry imports and disease-free certification. • **Food security concerns:** China has diversified agricultural imports from countries such as **Brazil and Argentina**, showing that food supply is linked with national security. • **Trade diplomacy:** The agreement reflects an attempt to stabilise economic relations after years of tariff conflict. **Strategic Rivalry Over Taiwan** • **Taiwan as a flashpoint:** China claims Taiwan under the **One-China Principle**, while the U.S. continues to support Taiwan's defence capability. • **Arms sale:** The U.S. approved weapons such as **HIMARS, howitzers, anti-tank missiles and drones** for Taiwan. • **Deterrence strategy:** Taiwan seeks to strengthen its defence capacity against possible Chinese military action. • **Regional instability:** China strongly opposed the arms sale, making the Taiwan Strait a major concern for Indo-Pacific stability. **Dual Nature of U.S.–China Relations** • The farm trade deal shows that both countries need stable economic engagement. • The Taiwan issue shows that political and military distrust remains deep. • Trade dialogue can reduce economic tension, but it cannot automatically solve strategic disputes. • Their relationship is therefore neither fully cooperative nor fully hostile. It is a mix of selective cooperation and intense competition. **India's Perspective** • India must monitor global agricultural prices, especially soybeans, animal feed and fertilisers. • Taiwan Strait tensions can affect Indo-Pacific security and global semiconductor supply chains. • India should strengthen domestic food security, export standards and supply-chain resilience. • India must maintain **strategic autonomy** while engaging with both economic and security developments.
Conclusion	The U.S.–China agricultural trade deal and Taiwan arms sale clearly show that economic cooperation and geopolitical competition can exist

	at the same time. For India, the lesson is clear: in the present global order, trade, food security, technology, defence and diplomacy are closely connected. A balanced and resilient strategy is essential to protect national interests.

Q14. Discuss the significance of the India-Netherlands Strategic Partnership Roadmap 2026–2030 for India's strategic and developmental interests.
(GS Paper II: International Relations)

Introduction	The **India-Netherlands Strategic Partnership Roadmap 2026–2030** is a five-year framework to strengthen cooperation in **trade, water, agriculture, health, technology, energy, defence, security, migration and culture**. It reflects India's effort to build deeper partnerships with advanced European economies. The return of the **Chola-era Anaimangalam Copper Plates**, also known as the **Leiden Plates**, also adds civilisational and cultural importance to the relationship.
Body	**Significance for India** • **Technology and semiconductor cooperation:** The roadmap focuses on **semiconductors, artificial intelligence, cybersecurity, photonics and quantum technology**. Cooperation with Dutch institutions and companies can support India's aim to build resilient semiconductor supply chains. It can also help India in skill development, research collaboration and high-end manufacturing. • **Water management and climate resilience:** The Netherlands is globally known for **flood control, coastal protection and urban water management**. Its expertise can help India address urban flooding, river basin planning, coastal vulnerability and water quality challenges. Cooperation in the **Ganga Basin** and urban river management can support India's climate adaptation efforts. • **Clean energy and maritime cooperation:** The roadmap promotes **renewable energy, green hydrogen, battery storage, circular economy and waste-to-energy**. The proposed **Green and Digital Sea Corridor** can support sustainable shipping, port modernisation, digital maritime systems and India's ambition to export green hydrogen to Europe. • **Agriculture and health security:** Dutch expertise in **climate-resilient agriculture, agri-tech, biotechnology and food safety standards** can help India improve productivity and reduce post-harvest losses. Health cooperation in **One Health,**

	antimicrobial resistance, infectious diseases and digital health is important for future pandemic preparedness. • **Defence and Indo-Pacific cooperation:** The partnership includes maritime security, naval exercises, defence industry cooperation, cybersecurity and counterterrorism. This can strengthen India's strategic role in the **Indo-Pacific** and improve cooperation with Europe on non-traditional security threats. • **Migration and cultural diplomacy:** The Migration and Mobility MoU can benefit Indian students, researchers and skilled professionals. The return of the **Anaimangalam Copper Plates** strengthens heritage restitution and highlights India's historic maritime links with Southeast Asia. **Challenges** • The partnership may face challenges such as **high-tech export controls**, European environmental standards like **CBAM**, strict sanitary and phytosanitary rules, anti-immigration politics, implementation delays and differences over technology transfer.
Conclusion	The roadmap is important for India's technological growth, water security, green transition, maritime strategy and cultural diplomacy. Its success will depend on timely implementation, regulatory coordination, institutional trust and respect for India's strategic autonomy.

Q15. The Quad has evolved from a maritime security dialogue into a broader platform for Indo-Pacific cooperation. Discuss its significance and challenges for India.

(UPSC GS Paper II: International relations, regional groupings, India and Indo-Pacific)

Introduction	The **Quad**, comprising **India, the United States, Japan and Australia**, has become an important platform for cooperation in the Indo-Pacific. It began after the **2004 Indian Ocean tsunami** as a disaster relief coordination mechanism and was given political shape in **2007** by Japanese Prime Minister **Shinzo Abe**. It was revived in **2017** due to growing strategic concerns in the Indo-Pacific. The 11th Quad Foreign Ministers' Meeting in New Delhi shows its expanding agenda beyond maritime security to critical minerals, supply chains, energy security and port infrastructure.
Body	**Significance for India** • **Maritime security:** Quad supports freedom of navigation, maritime surveillance and security in the Indian Ocean and wider Indo-Pacific. • **Strategic balancing:** It helps India respond to China's growing military and maritime presence without joining a formal military

	alliance. • **Critical minerals security:** The Quad Critical Minerals Framework can help India secure minerals needed for batteries, semiconductors, clean energy and defence manufacturing. • **Supply chain resilience:** Quad cooperation can reduce dependence on concentrated global supply chains and support India's manufacturing ambitions. • **Technology cooperation:** The grouping supports collaboration in cybersecurity, semiconductors, emerging technologies and clean energy. • **Pacific and Indian Ocean outreach:** Initiatives like the Ports of the Future Partnership can help engage smaller island nations and support infrastructure development. **Challenges** • **No formal structure:** Quad lacks a permanent secretariat and binding decision-making system. • **Different interests:** India, the US, Japan and Australia have different threat perceptions and economic priorities. • **China factor:** China views Quad as an anti-China grouping, which may increase regional tensions. • **Economic dependence:** Quad members continue to have strong trade links with China, creating policy contradictions. • **Implementation gap:** Announcements on critical minerals, infrastructure and surveillance must be converted into concrete projects. **Way Forward** • India should use Quad for practical cooperation in maritime domain awareness, critical minerals, disaster relief and technology. Quad should engage ASEAN, Pacific Island countries and Indian Ocean states to make the platform inclusive. India must balance Quad cooperation with its strategic autonomy and independent foreign policy.
Conclusion	Quad is not a military alliance, but it is an important strategic platform for India. It strengthens India's Indo-Pacific role, supports economic security and helps build resilient partnerships. Its success will depend on practical outcomes, inclusive engagement and respect for strategic autonomy.

Economy

Q16. The issue of substandard fertilisers highlights systemic weaknesses in agricultural input regulation in India. Examine its implications for farmers and food security, and suggest measures to strengthen quality control mechanisms. (15 M)

(GS Paper III – Agriculture | Food Security | Input Regulation)

Topics Covered: Fertiliser Quality, Fertiliser Control Order, 1985, Soil Health, Agricultural Productivity, Food Security, Regulatory Mechanisms

Introduction	The recent detection of non-standard fertilisers in Vidisha during the Rabi season has raised serious concerns about the effectiveness of regulatory mechanisms governing agricultural inputs in India. Fertilisers being a critical determinant of crop productivity, any compromise in their quality directly affects farmer livelihoods and national food security
Body	**1. Nature of the Issue: Substandard Fertilisers** • Fertilisers such as DAP, APS, and TSP were found to have nutrient deficiencies below prescribed standards. • These inputs failed to meet specifications under the Fertiliser Control Order (FCO), 1985. • The issue was identified during the sowing stage, where nutrient availability is crucial for crop establishment. • Authorities halted sales and initiated further testing, indicating regulatory lapses **2. Implications for Farmers and Food Security** • **Reduced Crop Productivity:** Deficient nutrients lead to poor germination, weak root development, and lower yields. • **Economic Losses:** Farmers incur financial losses due to ineffective inputs and may need additional fertiliser application. • **Soil Health Degradation:** Imbalanced nutrient supply affects long-term soil fertility. • **Increased Input Costs:** Farmers compensate by overusing fertilisers, increasing production costs. • **Food Security Risk:** Declining yields can affect overall agricultural output and food supply stability. • **Loss of Trust:** Repeated quality failures reduce confidence in institutions and input supply systems **3. Systemic Issues in Fertiliser Regulation** • **Weak Enforcement:** Limited inspections and monitoring capacity at field level.

	• **Testing Infrastructure Gaps:** Overburdened laboratories delay timely detection. • **Supply Chain Issues:** Storage and transport conditions degrade fertiliser quality. • **Adulteration and Counterfeiting:** Presence of fake fertilisers in informal markets. • **Regulatory Loopholes:** Inefficient coordination between central and state authorities. **4. Importance of Fertiliser Quality in Agriculture** • Fertilisers are essential for ensuring balanced nutrient supply and optimal crop growth. • High-quality inputs improve productivity, soil fertility, and sustainability. • They are central to India's food security and Green Revolution model. • Poor-quality fertilisers disrupt nutrient balance and reduce efficiency of agricultural practices **5. Way Forward** • Strengthen enforcement through regular inspections and strict penalties for violations. • Expand and modernize fertiliser testing laboratories for timely analysis. • Implement digital tracking systems for supply chain transparency. • Increase farmer awareness on fertiliser quality and grievance mechanisms. • Promote balanced nutrient management including bio- and nano-fertilisers. • Enhance coordination between central and state agencies for effective regulation.
Conclusion	The Vidisha case underscores critical gaps in India's fertiliser regulation framework. Ensuring the quality of agricultural inputs is essential not only for protecting farmer incomes but also for sustaining food security. Strengthening regulatory enforcement, improving institutional capacity, and promoting scientific nutrient management are key to building a resilient agricultural system.

Q17. The Mission for Cotton Productivity can play a crucial role in improving farmer income and strengthening India's textile value chain. Discuss.

(GS Paper III: Agriculture, Cropping Patterns, Inclusive Growth, Industrial Growth)

Introduction	Cotton is one of India's most important commercial crops and the backbone of the textile industry. India has the largest area under cotton cultivation, but its productivity remains low compared to global leaders. To address this issue, the Government launched the **Mission for Cotton Productivity** as a five-year initiative under the **Union Budget 2025–26**.
Body	**Importance of the Mission** **1. Improving Cotton Productivity** • India accounts for nearly **40% of the world's cotton area**, but ranks low in productivity. The mission aims to improve yield through **high-yielding, pest-resistant and climate-smart cotton varieties**. **2. Supporting Farmer Income** • Higher productivity and better fibre quality can increase farmers' returns. It will also reduce crop losses caused by pests such as **pink bollworm**. **3. Strengthening Textile Value Chain** • The mission follows the **5F Vision**: **Farm → Fibre → Factory → Fashion → Foreign** • This will ensure better linkage between cotton farmers, textile industries and export markets. **4. Reducing Import Dependence** • India's cotton imports have increased in recent years. Better domestic production can reduce import dependence and support self-reliance. **5. Promoting Export Competitiveness** • Focus on **Extra Long Staple cotton**, quality testing and branding through **Kasturi Cotton India** can improve India's position in global textile markets. **Challenges** • Low productivity compared to USA, China and Brazil • Pink bollworm infestation and resistance to Bt cotton • No new GM cotton approval since 2006 • Low adoption of Extra Long Staple cotton • Climate stress, water shortage and poor market linkages **Way Forward** • Promote advanced breeding and biotechnology with proper biosafety checks • Scale up **Integrated Pest Management** • Encourage **micro-irrigation** and climate-smart farming • Provide premium MSP and contract farming support for ELS

	cotton • Use AI-based pest alerts, remote sensing and digital traceability • Link cotton clusters with **PM MITRA textile parks**
Conclusion	The **Mission for Cotton Productivity** can transform India's cotton sector by improving productivity, farmer income, textile quality and export competitiveness. If implemented with scientific planning and farmer participation, it can strengthen India's goal of becoming a global textile manufacturing hub by 2030.

Q18. Prime Minister's recent austerity call reflects concerns over India's external sector vulnerability. Discuss in the context of gold imports, crude oil dependence, foreign travel outflows and essential imports.

(GS Paper III: Indian Economy, External Sector and Energy Security)

Introduction	India's external sector is facing pressure due to falling forex reserves, high crude oil prices, rising gold imports, FII outflows and high foreign travel spending. In this context, the Prime Minister urged citizens to reduce non-essential foreign exchange outflows and support self-reliance.
Body	**Major Sources of Pressure** • Gold imports have risen sharply, reaching nearly **$72 billion** in 2025–26. Since India imports most of its gold, household gold purchases increase dollar demand and can widen the current account deficit. • Crude oil is another major vulnerability because India imports about **89%** of its oil needs. High and volatile oil prices due to the West Asia conflict can increase import bills, weaken the rupee and raise inflation. • Foreign travel under the **Liberalised Remittance Scheme** has also become a major source of forex outflow. Rising foreign vacations and overseas weddings add to external pressure. • Essential imports such as edible oils and fertilisers also create vulnerability. Edible oils are daily necessities, while fertilisers are linked to agriculture and food prices. Disruptions in West Asia can affect fertiliser imports and LNG supplies used in domestic production. **Significance of the Austerity Call** • The appeal promotes responsible consumption, forex conservation and self-reliance. Measures such as using public transport, EVs, work-from-home, postponing gold purchases, reducing edible oil use and promoting natural farming can reduce import pressure.

	Way Forward • India should popularise the Gold Monetisation Scheme, encourage public transport and EVs, reduce non-essential foreign travel, strengthen domestic production, promote balanced fertiliser use and boost inbound tourism. Citizen behaviour must be supported by structural reforms.
Conclusion	India's external sector vulnerability is linked not only to global shocks but also to domestic consumption patterns. A combination of citizen austerity, domestic capacity-building and self-reliance can help protect forex reserves and strengthen macroeconomic stability.

Q19. Jaggery production in India connects agriculture, nutrition, rural livelihoods and export promotion. Discuss

(GS Paper III – Economy, Agriculture, Food Processing, Rural Economy, Inclusive Growth, Exports and Value Addition).

Introduction	Jaggery, commonly known as **gur**, is a traditional unrefined sweetener mainly produced from **sugarcane juice**. In India, it is not only a food product but also an important **agro-based rural industry**. It connects sugarcane farming with nutrition, village-level employment and export opportunities.
Body	**1. Link with Agriculture** Jaggery production is directly linked with **sugarcane cultivation**. It provides farmers an alternative market apart from sugar mills. It helps in: • reducing dependence on large sugar factories; • promoting local processing of sugarcane; • improving value addition at the farm level; • supporting sugarcane-growing regions such as **Uttar Pradesh, Maharashtra, Karnataka, Tamil Nadu and Andhra Pradesh**. Thus, jaggery production strengthens the connection between **agriculture and rural industry**. **2. Link with Nutrition** Jaggery is considered more nutritious than refined sugar because it retains small amounts of **iron, calcium, magnesium and other minerals**. It is traditionally used: • as an energy-giving food; • in winter diets; • in sweets, traditional recipes and Ayurvedic practices; • as a natural sweetener in rural households.

	However, jaggery is still a form of sugar. Therefore, it should be consumed in **moderation**, especially by people with diabetes or lifestyle diseases. **3. Link with Rural Livelihoods** Jaggery making is a **labour-intensive cottage industry**. It creates employment in different stages such as: • harvesting and transport of sugarcane; • crushing and boiling of cane juice; • moulding, drying and packaging; • marketing and local trade. It also provides opportunities for **small farmers, rural workers, women's self-help groups, farmer producer organisations and small entrepreneurs**. Value-added products such as **jaggery powder, liquid jaggery and organic jaggery** can increase rural income. **4. Link with Export Promotion** Global demand for **natural, organic and chemical-free sweeteners** is increasing. India has a strong opportunity to promote jaggery as a traditional and healthy sweetener in international markets. For this, India needs: • hygienic production units; • proper grading and standardisation; • attractive packaging; • organic certification; • food safety compliance; • branding through GI tags and regional identity. This can strengthen India's **processed food exports** and improve farmers' income.
Conclusion	Jaggery production connects **farm production, nutrition, rural employment and exports** in one value chain. With modern technology, quality control, better marketing and export-oriented branding, jaggery can become a strong tool for **farmer welfare, rural industrialisation and inclusive economic growth**.

Q20. Paddy dwarfing disease in Punjab highlights the growing vulnerability of Indian agriculture to pest and disease outbreaks. Discuss the causes, impacts and preventive measures needed to manage such crop diseases.

(GS Paper III – Economy, Agriculture)

Introduction	Indian agriculture is increasingly facing risks from pests, viral diseases and changing farming patterns. The recurrence of **paddy dwarfing disease** in Punjab, linked to the **Southern Rice Black-Streaked Dwarf**

	Virus, shows the need for strong crop surveillance and preventive agriculture.
Body	**Causes of Paddy Dwarfing Disease** • The disease is transmitted by the **white-backed plant hopper**. • The insect carries the virus from infected plants to healthy plants. • It survives on **alternate grassy hosts** and weeds during non-crop periods. • Continuous paddy cultivation over large areas increases the chance of spread. • Early sowing exposes nurseries to insect attack for a longer time. • Poor field hygiene around bunds and water channels supports insect survival. **Impact on Farmers and Agriculture** • The disease reduces plant height and weakens root growth. • Grain formation becomes poor or completely absent in severe cases. • Farmers in affected areas reported very low yield compared to normal paddy yield. • It causes heavy income loss, especially for small and marginal farmers. • Since symptoms appear late, farmers may not get enough time to re-transplant the crop. • It can affect rice production in major paddy-growing regions like Punjab. **Preventive Measures** • Farmers should monitor nurseries and young paddy fields regularly. • White-backed plant hopper should be identified through simple field inspection. • **Yellow-light traps** can be used to monitor insect activity. • Weeds and grassy hosts near fields and water channels should be removed. • Farmers should follow the officially recommended transplantation schedule. • PAU-recommended insecticides should be used only after detecting infestation. • Agricultural extension services must conduct village-level awareness camps. **Way Forward** • Develop early warning systems for crop diseases.

	• Promote scientific pest surveillance at village level. • Strengthen farmer training through Krishi Vigyan Kendras and agricultural universities. • Encourage crop diversification to reduce risks of continuous monocropping. • Improve coordination between scientists, extension officers and farmers.
Conclusion	Paddy dwarfing disease is not only a plant health issue but also a farmer livelihood issue. Since viral diseases have limited curative options, India must focus on **prevention, early detection and scientific crop management**. This will help protect food security and support sustainable agriculture.

Q21. The replacement of MGNREGA with VB-G RAM G reflects a major restructuring of India's rural employment guarantee framework. Discuss its significance and concerns.

(GS Paper III – ECONOMY Rural Economy, Employment, Inclusive Growth and Public Finance)

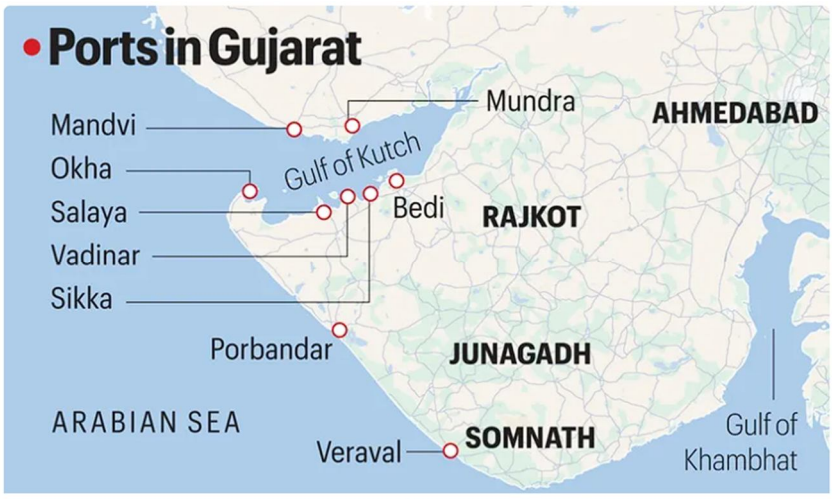
Introduction	The **Viksit Bharat–Guarantee for Rozgar and Ajeevika Mission (Gramin) Act, 2025** will replace the two-decade-old **MGNREGA**. The new framework introduces **125 days of guaranteed work**, revised fund-sharing, **DBT-based wage payments** and Centre-determined fund allocation to States.
Body	**Significance** • **Higher income support:** The increase in guaranteed workdays from **100 to 125 days** can provide better livelihood security to rural households, especially during periods of rural distress. • **Continuity for workers:** Existing **MGNREGS job cards** will remain valid after renewal and **e-KYC verification**, which can reduce disruption during the transition. • **Transparency in payments:** Wage and unemployment allowance payments through **Direct Benefit Transfer** can reduce leakages and improve accountability. • **Agricultural labour availability:** The **60-day pause** during peak sowing and harvesting seasons aims to ensure that farm labour remains available during critical agricultural operations. • **Performance-based governance:** Linking allocation with timely wage payments, social audits and completion of works may improve implementation efficiency. **Concerns** • **Fiscal burden on States:** Under MGNREGS, the Centre paid

	the full wage bill. Under VB-G RAM G, States will bear **40% of the funding burden**, which may strain poorer States. • **Weakening demand-driven nature:** Centre-determined **normative allocation** may reduce the rights-based and demand-driven character of rural employment guarantee. • **Risk for high-demand States:** If demand exceeds normative allocation, States must bear additional expenditure. This may affect drought-prone or poorer regions more severely. • **Digital exclusion:** e-KYC verification may exclude vulnerable workers if digital infrastructure and documentation are weak.
Conclusion	VB-G RAM G can improve rural employment support through higher workdays, DBT and better monitoring. However, its success depends on adequate funding, timely wage payments, strong social audits, State flexibility and protection of vulnerable workers from exclusion.

Q22. Small ports and traditional maritime vessels continue to play an important role in India's coastal economy. Discuss with reference to Salaya port and Gujarat's dhow trade.

(GS Paper III – Indian Economy, Infrastructure, Ports and Maritime Trade)

Introduction	India's maritime economy is not limited to major ports such as Mumbai, Kandla or Chennai. Small ports and traditional maritime vessels also support **coastal commerce, export trade, employment and regional connectivity**. The case of **Salaya port in the Gulf of Kutch** and Gujarat's **dhow trade** shows the continued importance of traditional maritime systems in India's economy.
Body	**Importance of Salaya Port** • **Strategic location:** Salaya is located in the **Gulf of Kutch**, an important maritime zone of Gujarat. • **Home port for MSVs:** It is a major home port for **Mechanised Sailing Vessels (MSVs)**, also called traditional dhows. • **Natural protection:** Salaya has **creeks and mangroves**, which protect vessels from rough sea conditions by reducing wave impact. • **Monsoon shelter:** During the rough sea season from **mid-June to September**, MSVs return to Salaya for beaching, repair and maintenance. • **Repair facilities:** Salaya is known for affordable **painting, cleaning, dry-dock repair and seaworthiness inspection** of traditional vessels.



Map.

Role of Gujarat's Dhow Trade

- Gujarat has a large number of Indian-flagged MSVs.
- These vessels trade with countries in the **Gulf, Middle East, Indian Ocean and East Africa**.
- They carry goods such as:
  - Rice
  - Sugar
  - Soyabean
  - Dates
  - Onions
  - Foodstuffs
  - Livestock
- The trade is largely **export-oriented**, helping small merchants and coastal communities.
- MSVs provide livelihood to vessel owners, sailors, repair workers, traders and port-based workers.

Recent Regulatory Significance

- Many MSVs faced difficulty because ports such as **Salaya and Okha** were not notified Immigration Check Posts.
- A temporary rule allowed crew sign-on and sign-off at **Porbandar Immigration Check Post** for vessels headed to Salaya and Okha.
- This helped vessels return safely before the monsoon and avoid risky routes near conflict-affected Gulf waters.

Challenges

- Many traditional ports lack notified immigration and digital processing facilities.
- Small vessels are vulnerable to rough seas, war zones and

	crowded ports. • Docking abroad during the monsoon is costly for small owners. • Port infrastructure for traditional vessels remains limited. **Way Forward** • Notify more traditional ports for immigration and customs services. • Improve repair, berthing and safety facilities at small ports. • Provide digital immigration support for MSVs. • Strengthen maritime safety advisories for vessels operating in conflict-prone areas. • Recognise dhow trade as part of India's coastal and export economy.
Conclusion	Salaya port shows that small ports and traditional vessels remain vital to India's maritime economy. They support exports, livelihoods and regional trade. India's maritime policy should not focus only on major ports but also strengthen small ports, traditional vessels and coastal communities for inclusive maritime development.

Q23. The Insolvency and Bankruptcy Code, 2016 has transformed India's insolvency framework from a fragmented recovery system to a creditor-driven resolution mechanism. Discuss the achievements of the IBC and examine how the Insolvency and Bankruptcy Code (Amendment) Act, 2026 seeks to address its operational challenges.

(GS Paper III – Indian Economy: Banking, Financial Sector Reforms, Mobilisation of Resources)

Introduction	The **Insolvency and Bankruptcy Code, 2016 (IBC)** is one of India's major structural reforms in the financial sector. Before the IBC, insolvency resolution was governed by multiple laws such as the **Companies Act**, **SICA**, **SARFAESI Act** and debt recovery mechanisms. This created delays, overlapping jurisdiction and loss of asset value. The IBC introduced a **unified, creditor-driven and time-bound insolvency framework** for resolving financial distress.
Body	**Major Achievements of the IBC** • **Unified legal framework:** The IBC consolidated multiple insolvency laws into a single system, making the process more coordinated and predictable. • **Creditor-driven process:** It shifted control from the debtor to the **Committee of Creditors (CoC)**, allowing financial creditors to decide the future of stressed companies. • **Time-bound resolution:** The **Corporate Insolvency Resolution Process (CIRP)** was designed to be completed

within **180 days**, extendable up to **330 days** in specified cases.

- **Improved recoveries:** Till **March 2026**, around **8,987 CIRPs** were admitted and **1,419 corporate debtors** were resolved through approved resolution plans. Creditors realised nearly **₹4.32 lakh crore** through approved resolution plans.
- **Better value realisation:** Recoveries under the IBC exceeded liquidation value and helped preserve enterprise value in many cases.
- **Strengthening credit discipline:** The IBC improved repayment behaviour among borrowers. It created fear of loss of control over the company, encouraging timely repayment and settlement.
- **Positive impact on resolved firms:** Studies by IIM Ahmedabad and IIM Bangalore showed improvements in sales, employment, capital expenditure, governance and cost of debt after resolution.

Operational Challenges

Despite its success, the IBC faced several challenges:

- **Delays in admission and adjudication** weakened the time-bound nature of the Code.
- **Prolonged litigation** reduced the value of distressed assets.
- **Average resolution timelines** in several cases exceeded the statutory limit.
- **Withdrawal of cases at advanced stages** sometimes wasted institutional effort.
- **Liquidation proceedings** often lacked clear timelines and creditor oversight.
- **Legal ambiguities** regarding security interests, avoidance transactions and guarantees created disputes.

Reforms under the IBC Amendment Act, 2026

The **IBC Amendment Act, 2026** seeks to make insolvency resolution more efficient, predictable and resolution-oriented.

- It mandates that the **Adjudicating Authority** decide applications within **14 days**, with reasons recorded for delay.
- It defines important terms such as **service provider**, **avoidance transaction** and **fraudulent or wrongful trading**.
- It restricts withdrawal of cases at critical stages to prevent misuse.
- It strengthens **moratorium protection**, including cases involving guarantees.
- It expands the role of creditors during **liquidation**, allowing better supervision and replacement of liquidators where

	necessary. • It permits continuation of proceedings related to **avoidance transactions** and **fraudulent trading** even after resolution or liquidation. • It allows, subject to conditions, inclusion of **guarantor assets** in the resolution process. • It improves fairness for **dissenting creditors**. • It provides for **phased approval of resolution plans** and continuity of licences and regulatory permissions. • It introduces a new **creditor-led insolvency process** for specified corporate debtors.
Conclusion	The IBC has improved India's insolvency ecosystem by promoting creditor discipline, faster resolution and better recovery outcomes. However, delays and litigation continue to affect its efficiency. The **IBC Amendment Act, 2026** is a timely reform that strengthens institutional accountability, creditor oversight and procedural clarity. If implemented effectively, it can further improve India's credit culture, ease of doing business and financial stability.

Environment & Ecology

Q24. India's energy strategy reflects a balance between renewable expansion and continued reliance on coal. Examine the role of solar energy and coal in ensuring energy security, especially under climate variability such as El Niño. (15 M)

(GS Paper III – Energy | Environment | Climate Change)

Topics Covered: El Niño, Energy Security, Solar Energy, Coal Dependence, Grid Stability, Renewable Curtailment, Climate Variability

Introduction	India is witnessing a sharp rise in electricity demand, exacerbated by climate variability such as El Niño, which weakens monsoons and increases cooling and irrigation needs. To ensure uninterrupted power supply, India is adopting a dual strategy of expanding solar capacity while maintaining coal-based base-load power.
Body	**1. India's Energy Demand and Climate Context** • Peak electricity demand has reached record levels, driven by rising temperatures, urbanisation, and industrial growth. • El Niño conditions weaken the monsoon, increasing dependence on irrigation and electricity consumption. • This creates pressure on the energy system to ensure both

reliability and sustainability.

2. Role of Coal in Ensuring Energy Security

- Coal provides stable and continuous base-load power essential for round-the-clock electricity supply.
- It supports grid stability and can be adjusted to meet peak demand fluctuations.
- India's large domestic coal reserves enhance energy security and reduce import dependence.
- Coal remains cost-effective and supports core industries such as steel and cement.
- During weak monsoons, reduced hydropower output increases reliance on coal-based generation.

3. Role of Solar Energy in Energy Transition

- Solar energy contributes significantly to India's clean energy transition and emission reduction goals.
- It efficiently meets daytime electricity demand, particularly during peak cooling hours.
- Rapid capacity expansion (record additions in recent years) reflects strong policy push.
- Solar reduces fossil fuel dependence and supports climate commitments.
- It plays a crucial role in diversifying India's energy mix

4. Challenges in Renewable Energy Integration

- **Intermittency:** Solar energy is available only during daylight hours.
- **Storage Constraints:** Lack of large-scale battery systems limits usage at night.
- **Grid Instability:** Fluctuations in renewable output affect frequency and supply balance.
- **Transmission Gaps:** Renewable energy sites are often far from demand centers.
- **Seasonal Variability:** Output varies across seasons and weather conditions

5. Concept of Renewable Curtailment

- Renewable curtailment refers to the reduction of renewable power generation despite availability.
- It occurs due to excess supply, lack of transmission infrastructure, and grid limitations.
- This leads to wastage of clean energy and highlights inefficiencies in the system

	6. Significance of Dual Energy Strategy • Ensures uninterrupted electricity supply during extreme weather conditions. • Balances environmental sustainability with economic growth and industrial needs. • Reflects a pragmatic transition strategy rather than abrupt fossil fuel phase-out. • Strengthens resilience against climate variability and global energy shocks. **7. Way Forward** • Develop large-scale battery energy storage systems for better renewable utilization. • Strengthen transmission networks through Green Energy Corridor projects. • Promote hybrid systems combining solar, wind, and storage. • Improve grid flexibility using smart technologies and forecasting tools. • Gradually reduce coal dependence while ensuring energy security. • Encourage demand-side management to align consumption with renewable availability.
Conclusion	India's energy transition is characterized by a careful balance between sustainability and reliability. While solar energy is expanding rapidly, coal continues to play a critical role in ensuring grid stability and meeting peak demand, especially under climate uncertainties like El Niño. A successful transition will depend on overcoming storage and infrastructure challenges to make renewable energy a dependable primary source without compromising energy security.

Q25. The Carbon Border Adjustment Mechanism (CBAM) has significant implications for India's trade and climate policy. Discuss how the proposed India Border Adjustment Mechanism (IBAM) can help address these challenges. (15 M)

(GS Paper III – Environment | Economy | Climate Change | International Trade)

Topics Covered: Carbon Border Adjustment Mechanism, India Border Adjustment Mechanism, Carbon Pricing, Carbon Leakage, Climate Justice

Introduction	The European Union's Carbon Border Adjustment Mechanism (CBAM), operational from 2026, imposes a carbon cost on imports of emission-intensive goods such as steel, cement, aluminium, and fertilisers. This increases compliance costs for Indian exporters and leads to loss of price competitiveness in global markets. Moreover, since the revenue collected under CBAM accrues to the EU, it results in an

	external drain of financial resources linked to India's emissions. In this context, India is considering the India Border Adjustment Mechanism (IBAM) to internalise carbon pricing, retain revenues domestically, and align trade policy with climate objectives.
Body	**1. Understanding CBAM and Its Implications for India** • CBAM is designed to impose a carbon price on imports equivalent to the price paid by EU producers under its Emissions Trading System, thereby ensuring a level playing field. • It targets carbon-intensive sectors such as steel, aluminium, cement, fertilisers, electricity, and hydrogen, which are critical for India's export basket. • Indian industries, which often operate with higher carbon intensity due to developmental constraints, face increased costs and reduced profit margins in EU markets. • The mechanism effectively extends EU climate regulations beyond its borders, making global trade sensitive to carbon emissions. • Since CBAM revenues are retained by the EU, India loses potential financial resources that could otherwise support its own green transition. **2. India's Existing Framework: Carbon Credit Trading Scheme (CCTS)** • India has introduced a Carbon Credit Trading Scheme to create a domestic carbon market based on emission reductions and tradable credits. • The scheme incentivises industries to adopt cleaner technologies and reduce emissions in a cost-effective manner. • It establishes a domestic carbon pricing framework, which can be used to argue that Indian exports have already borne a carbon cost. • Under CBAM provisions, such domestic carbon pricing can potentially be recognised, reducing the overall tax burden on exporters. **3. Role of IBAM in Addressing CBAM Challenges** • IBAM proposes to impose a carbon-based adjustment domestically on goods exported to countries implementing CBAM-like measures. • This ensures that carbon-related revenues are collected within India rather than being transferred to foreign jurisdictions. • The funds generated through IBAM can be channelled into green infrastructure, renewable energy expansion, and industrial decarbonisation. • It transforms an external cost into an internal developmental resource, thereby strengthening domestic economic resilience.

- IBAM also enhances India's negotiating power in international trade and climate discussions by demonstrating a credible carbon pricing mechanism.

4. Carbon Leakage and Climate Justice Dimension

- Carbon leakage refers to the relocation of industries from countries with strict climate policies to those with weaker regulations, leading to no net reduction in global emissions.
- While CBAM aims to address this issue, it places a disproportionate burden on developing countries like India, which have lower historical emissions.
- This raises concerns of climate injustice, as developed countries effectively shift the cost of decarbonisation onto exporters while retaining financial benefits.
- IBAM can act as a corrective mechanism by ensuring that developing countries retain carbon-related revenues and use them for sustainable development.

5. Legal and Trade Considerations

- IBAM must be carefully designed to comply with World Trade Organization (WTO) rules to avoid being challenged as a protectionist measure.
- Under provisions such as Annex 14-A of trade agreements, India can engage in technical dialogue to seek recognition of its domestic carbon pricing systems.
- If IBAM is aligned with global norms, it can be treated as a legitimate carbon cost paid in the country of origin, thereby reducing CBAM liabilities. • Transparency, non-discrimination, and consistency with international trade law are essential for its acceptance.

6. Challenges in Implementing IBAM

- Accurate measurement of embedded carbon emissions across industries requires advanced data systems, monitoring mechanisms, and technical expertise.
- There is a risk that additional carbon pricing may increase production costs for Indian exporters in the short term, affecting competitiveness.
- Institutional coordination between multiple ministries such as environment, commerce, and finance is complex and requires strong governance mechanisms.
- Ensuring transparency and accountability in the utilisation of IBAM revenues is critical for maintaining policy credibility.
- There is also the possibility of trade disputes if IBAM is perceived as inconsistent with international trade rules. **7. Way Forward**
- India should strengthen its domestic carbon market under the

	CCTS with robust monitoring, reporting, and verification systems. • IBAM must be designed as a transparent and WTO-compliant instrument aligned with international best practices. • Investment in cleaner technologies and energy-efficient processes is essential to reduce carbon intensity in export sectors. • Revenues generated from IBAM should be ring-fenced and utilised for verifiable green projects, renewable energy expansion, and climate adaptation. • India must actively engage in global negotiations to ensure fair recognition of its developmental needs and climate efforts.
Conclusion	The emergence of CBAM signifies a new era where climate policy and international trade are deeply interconnected. While it poses challenges to India's export competitiveness and economic interests, it also creates an opportunity to develop IBAM as a strategic policy tool. A well-designed IBAM can help India retain carbon revenues, accelerate its green transition, and ensure that climate action remains equitable and aligned with the principles of sustainable development.

Q26. India's leadership in the International Big Cat Alliance (IBCA) reflects the growing linkage between biodiversity conservation, ecological security, and global environmental diplomacy. Discuss. (15 M)

(GS Paper III – Environment | Biodiversity Conservation | International Environmental Cooperation)

Topics Covered: International Big Cat Alliance (IBCA), Project Tiger, Wildlife Diplomacy, Biodiversity Governance, Habitat Connectivity, Conservation Financing

Introduction	The International Big Cat Alliance (IBCA), launched by India in 2023, represents an important global initiative for the conservation of seven major big cat species and their ecosystems. The first IBCA Summit and the proposed "Delhi Declaration" highlight India's expanding role in global biodiversity governance, wildlife diplomacy, and ecosystem-based conservation efforts.
Body	**1. International Big Cat Alliance (IBCA) and Objectives** • The International Big Cat Alliance (IBCA) is an India-led global platform dedicated to the conservation of tiger, lion, leopard, snow leopard, cheetah, jaguar, and puma populations along with their habitats and prey base. • The alliance was launched during the commemoration of 50 years of Project Tiger, reflecting India's transition from national wildlife conservation leadership to global ecological diplomacy. • The IBCA seeks to strengthen international cooperation among range countries, conservation organizations, scientists, and policymakers for coordinated conservation strategies.

- The summit aims to address challenges such as habitat loss, poaching, illegal wildlife trafficking, climate-related ecological threats, and declining biodiversity.

2. Importance of Big Cat Conservation for Ecosystems and Humanity

- Big cats are apex predators occupying the highest level in the food chain and are essential for maintaining ecological balance.
- They regulate herbivore populations and prevent ecological degradation caused by overgrazing and habitat destruction.
- Conservation of big cats indirectly protects forests, wetlands, grasslands, rivers, and biodiversity-rich ecosystems.
- Big cats function as umbrella species, meaning that protecting their habitats benefits numerous other plant and animal species sharing the same ecosystem.
- Forest ecosystems supporting big cats contribute significantly to carbon sequestration, climate regulation, and water conservation.
- Wildlife tourism associated with species such as tigers and lions generates employment opportunities, eco-tourism revenue, and sustainable livelihoods for local communities.

3. Delhi Declaration and Key Areas of Focus

- The proposed "Delhi Declaration" is expected to become a major international framework for big cat conservation cooperation.
- It emphasizes a landscape-based conservation approach recognizing that big cats require large interconnected ecosystems rather than isolated protected areas.
- Habitat connectivity and transboundary conservation are major priorities because many wildlife habitats extend across national boundaries.
- The declaration aims to strengthen international cooperation against poaching, illegal wildlife trade, and trafficking networks.
- It also promotes conservation financing, scientific research, ecological restoration, satellite tracking, AI-based wildlife monitoring, and data sharing mechanisms.
- Community participation and sustainable livelihood programs for local populations are expected to become important pillars of conservation policy.

4. India's Leadership in Global Wildlife Conservation

- India has emerged as a global leader in wildlife conservation, particularly through the success of Project Tiger launched in 1973.
- Project Tiger follows an ecosystem-based conservation model involving habitat restoration, anti-poaching measures, scientific monitoring, prey management, and community participation.
- India currently hosts more than 70% of the world's wild tiger population, making it central to global tiger conservation efforts.

	• Institutions such as the National Tiger Conservation Authority (NTCA) have strengthened scientific wildlife governance and conservation infrastructure. • India is also involved in snow leopard conservation, Asiatic lion protection, elephant conservation, and cheetah reintroduction initiatives. • Through the IBCA, India is extending its domestic conservation expertise into international biodiversity diplomacy. **5. Challenges in Big Cat Conservation** • Habitat loss due to deforestation, mining, infrastructure development, and urban expansion remains the biggest threat to big cat populations. • Human-wildlife conflict is increasing because of growing encroachment into forest habitats. • Poaching and illegal wildlife trafficking continue to threaten species such as tigers, leopards, and snow leopards despite stronger enforcement mechanisms. • Climate change is affecting prey availability, ecosystem stability, water resources, and habitat sustainability. • Fragmentation caused by highways, railways, and industrial projects disrupts wildlife corridors and reduces genetic diversi • ty. • Developing countries often face shortages of conservation financing, modern surveillance systems, scientific monitoring capacity, and trained manpower. **6. Way Forward** • Countries must strengthen transboundary conservation through coordinated wildlife monitoring, anti-poaching operations, and intelligence sharing. • Habitat connectivity should be improved by protecting wildlife corridors and reducing fragmentation caused by infrastructure projects. • Greater investment is required in conservation financing, scientific research, AI-based monitoring systems, and satellite tracking technologies. Local communities should be integrated into conservation strategies through eco-tourism, compensation mechanisms, and sustainable livelihood programs. • Stronger international legal cooperation is needed to dismantle illegal wildlife trafficking networks.
Conclusion	The International Big Cat Alliance represents an important evolution in global biodiversity governance by linking wildlife conservation with ecological security, climate resilience, and international cooperation. India's leadership through the IBCA demonstrates how conservation diplomacy can strengthen global environmental governance while

	promoting sustainable development and ecosystem protection. Long-term success, however, depends on stronger international cooperation, scientific innovation, community participation, and sustained conservation financing.

Q27. The Solid Waste Management Rules, 2026 reflect the tension between national environmental standards and decentralised governance. Discuss.
(GS Paper III – Environment Environmental Pollution, Waste Management, Urbanisation and Sustainable Development.)

Introduction	India's waste crisis has become a serious ecological and public health challenge. The **Solid Waste Management Rules, 2026**, which came into effect from April 1, 2026, seek to improve source segregation, scientific waste processing, landfill reduction, legacy waste remediation, circular economy and digital monitoring.
Body	**Need for National Environmental Standards** • A national framework is necessary because waste pollution affects public health, air quality, water bodies and climate. Landfills, open burning, plastic waste and leachate pollution require uniform minimum standards. The Rules can help in regulating bulk waste generators, improving scientific processing and promoting circular economy practices. • Article 253 also enables Parliament to make laws for implementing international obligations. However, such power should ideally create minimum environmental standards rather than a rigid operational model for all States and local bodies. **Concerns with Centralised Design** • Waste management is a highly local function. It depends on geography, population density, local economy, land availability, citizen behaviour and informal waste-worker networks. A model suitable for a megacity may not suit a coastal panchayat, tribal hamlet or pilgrimage town. • Many Gram Panchayats lack staff, sanitation experts, waste vehicles, digital capacity and adequate funds. Hence, complex compliance requirements may result in paper reporting rather than cleaner villages. • Digital monitoring is useful, but excessive dashboard compliance may shift focus from service delivery to data entry. **Way Forward** • The Centre should set minimum environmental standards, while States should design context-specific models. Local bodies need funds, staff, vehicles, training and technical support. Rural areas

	should focus on composting, periodic collection and cluster-level dry-waste management. Large cities need specialised waste-management authorities with citizen oversight.
Conclusion	The 2026 Rules have important environmental goals, but their success depends on decentralised implementation. India needs a model based on **national standards, State flexibility, empowered local bodies, predictable finance and citizen accountability**.

Q28. India's renewable energy transition will remain incomplete without large-scale energy storage. Discuss.

(GS Paper III – Energy, Infrastructure, Climate Change and Science & Technology)

Introduction	India has made rapid progress in renewable energy, with renewable sources accounting for nearly **53% of installed power capacity**. Solar power alone contributes more than **150 GW**. However, solar and wind power are **intermittent sources** because solar generation stops after sunset and wind power changes with weather. Therefore, large-scale **energy storage** is essential to make renewable energy reliable, stable and useful for round-the-clock power supply.
Body	**Why Energy Storage is Necessary** • **Bridges demand-supply mismatch:** Renewable power is often generated when demand is low, while demand may rise in the evening when solar generation falls. • **Improves grid stability:** Sudden changes in solar and wind generation can disturb grid balance. Storage helps smooth these fluctuations. • **Reduces renewable energy wastage:** Surplus power generated during high-output hours can be stored instead of being curtailed. • **Supports round-the-clock clean power:** Storage can help industries and households access renewable power even when generation is low. • **Reduces fossil fuel dependence:** Storage can reduce the need for coal or gas-based backup power. **Major Storage Technologies** • **Pumped Hydro Storage:** It uses surplus electricity to pump water to a higher reservoir and releases it later to generate electricity. It is useful for **long-duration storage**. • **Battery Energy Storage Systems:** These store electricity chemically and release it when required. **Lithium-ion and LFP batteries** are important for short-duration storage. • Other options include **compressed-air storage, thermal**

	storage, flywheel storage and gravity-based storage. **India's Storage Gap** • India's current storage capacity is still limited. Installed **BESS capacity is around 0.27 GW**, while **pumped hydro storage is around 7.2 GW**. The Central Electricity Authority projects that India will need around **174 GW / 888 GWh** of storage by **2035–36**, including both BESS and pumped hydro. **Key Challenges** • Heavy import dependence on **lithium-ion cells**. • High capital cost of storage projects. • Environmental and land-related concerns in pumped hydro projects. • Need for domestic battery manufacturing and recycling systems. • Grid planning challenges due to variable renewable generation. **Way Forward** • India must scale up both **battery storage and pumped hydro storage**. Domestic battery manufacturing, critical mineral security, alternative technologies such as **sodium-ion and flow batteries**, battery recycling and smart grid management should be promoted. Storage-linked renewable energy projects should also be encouraged.
Conclusion	India's renewable energy transition cannot depend only on adding solar and wind capacity. A reliable clean energy system needs strong storage infrastructure. Large-scale energy storage will help India achieve **grid stability, energy security, climate goals and round-the-clock renewable power**.

Science &Technology & Internal Security

Q29. The increasing use of dual-use satellites has transformed the nature of modern space warfare. Examine the challenges posed by this shift and suggest measures to address them. (15 M)

(GS Paper III – Internal Security | Space Technology | Cyber Security | International Relations)

Topics Covered: Dual-use satellites, Cyber Warfare, Space Militarisation, Attribution

Problem, Legal Vacuum, Grey-zone Conflict

Introduction	The nature of space warfare has undergone a fundamental transformation with the rise of dual-use satellites, which serve both civilian and military purposes. Unlike traditional kinetic warfare, modern conflicts increasingly involve cyber and electronic interference such as signal jamming, spoofing, and cyberattacks. This has blurred the distinction between civilian and military assets, creating new strategic, legal, and security challenges.
Body	**1. Concept of Dual-Use Satellites and Changing Nature of Warfare** • Dual-use satellites are designed for civilian functions such as communication, navigation, and weather forecasting but are also used for military applications like intelligence, surveillance, and reconnaissance. • The same satellite infrastructure supports both civilian services (telecom, banking, aviation) and defence operations, making them highly strategic assets. • Space warfare has shifted from kinetic destruction (anti-satellite weapons) to non-kinetic methods aimed at disruption, degradation, and manipulation of satellite systems. • These operations are often covert and fall within "grey-zone conflicts," avoiding direct military escalation while causing significant disruption. **2. Tools and Techniques in Modern Space Cyber Warfare** • Jamming involves deliberate interference with satellite signals, disrupting communication and navigation systems. • Spoofing manipulates satellite signals to provide false information, such as incorrect GPS coordinates, affecting both civilian and military operations. • Cyberattacks target ground stations and control systems, allowing adversaries to disrupt or take control of satellite functions. • Malware and software attacks can compromise satellite systems over time without visible physical damage. • These techniques are remote, difficult to detect, and leave minimal physical evidence, increasing their strategic attractiveness. **3. Key Challenges Posed by Dual-Use Satellites** • **Blurring of Civilian-Military Distinction:** Attacks on dual-use satellites affect civilian infrastructure, violating the principle of distinction under international humanitarian law. • **Legal Vacuum:** Existing frameworks such as the Outer Space Treaty do not address cyber operations or electronic interference, creating regulatory gaps. • **Attribution Problem:** Cyberattacks can be routed through multiple networks, making it difficult to identify the responsible

	actor and weakening deterrence. • **Escalation Risks:** Disruption of critical infrastructure like communication and navigation can trigger unintended escalation between states. • **Dependence on Space Infrastructure:** Modern economies rely heavily on satellites, making them vulnerable to systemic disruptions. **4. Case Study and Emerging Trends** • The KA-SAT cyberattack demonstrated how satellite communication networks can be disrupted without physical destruction • It affected both civilian and military systems across multiple countries, highlighting vulnerabilities in dual-use satellite networks. • Increasing reliance on commercial satellite constellations further complicates accountability and security **5. India's Response and Global Implications** • India has introduced space cybersecurity guidelines through CERT-In, focusing on a secure-by-design approach. • These guidelines aim to strengthen satellite communication security, ground station protection, and incident response mechanisms. • However, challenges remain in real-time threat detection, advanced cyber defence, and attribution capabilities. • Globally, the rise of non-kinetic space warfare is shifting security dynamics towards persistent low-intensity conflicts. **6. Way Forward** • Develop comprehensive international legal frameworks to regulate cyber operations in outer space. • Update existing treaties such as the Outer Space Treaty to address dual-use and cyber warfare challenges • Strengthen global cooperation in space cybersecurity through information sharing and joint response systems. • Invest in resilient and redundant satellite infrastructure to minimise disruption risks. • Promote secure-by-design principles across all space missions and enhance indigenous capabilities.
Conclusion	The emergence of dual-use satellites has blurred the boundaries between civilian and military domains, fundamentally altering the nature of space warfare. Addressing these challenges requires a combination of legal reforms, technological resilience, and international cooperation. Ensuring the security of space infrastructure is essential for maintaining global stability in an increasingly space-dependent world.

Q30. India is transitioning from import-dependent treatment to indigenous innovation in Pulmonary Hypertension care. Examine the significance of this shift and analyse the challenges in achieving affordable and accessible healthcare. (15 M)

(GS Paper II – Health | GS Paper III – Biotechnology | Economy | Science & Technology)

Topics Covered: Pulmonary Hypertension, Atmanirbhar Bharat in Healthcare, Biopharma Innovation, Digital Health, Affordable Healthcare

Introduction	India is witnessing a paradigm shift in the management of Pulmonary Hypertension (PH), moving from dependence on expensive imported therapies to domestic manufacturing, innovation, and digital health integration. This transition reflects the broader vision of Atmanirbhar Bharat in healthcare, aimed at improving affordability, accessibility, and quality of treatment.
Body	**1. Significance of the Shift towards Indigenous PH Care** • The move towards domestic pharmaceutical production has significantly reduced dependence on costly imported drugs, making life-saving therapies more affordable and accessible to a larger population. • India's manufacturing of key drug classes such as Endothelin Receptor Antagonists (ERAs) and PDE5 inhibitors has strengthened the availability of targeted therapies within the country. • Government initiatives like Biopharma SHAKTI have enhanced research capacity, promoted innovation in biologics, and supported the development of advanced therapies. • The integration of digital health under initiatives such as the Ayushman Bharat Digital Mission (ABDM 2.0) enables seamless sharing of patient data, improves disease monitoring, and ensures continuity of care across regions. • This transformation strengthens India's position as a global pharmaceutical hub while contributing to universal health coverage and improved public health outcomes. **2. Evolution of PH Care in India** • Earlier, treatment was largely dependent on imported drugs, leading to high costs and limited accessibility, especially for economically weaker sections. • Diagnostic infrastructure was inadequate, particularly in rural areas, resulting in delayed detection and poor prognosis. • The current approach emphasises early diagnosis, precision medicine, continuous monitoring, and integrated care models combining modern and traditional practices. **3. Role of Digital and Integrative Healthcare**

	• Digital health platforms facilitate telemedicine, enabling access to specialised care in remote and underserved regions • ABHA-based digital health records ensure better coordination between healthcare providers and improve treatment adherence. • Integrative approaches such as yoga, lifestyle modification, and stress management complement pharmacological treatment and enhance patient outcomes. **4. Challenges in Achieving Effective PH Care** • **Infrastructure Gaps:** Rural healthcare systems lack advanced diagnostic facilities and specialised treatment centres, leading to delayed diagnosis. • **Awareness Deficit:** Limited awareness among both healthcare providers and patients results in misdiagnosis and late intervention. • **Financial Constraints:** Despite cost reductions, long-term treatment remains expensive for economically weaker sections. • **Urban Concentration:** Advanced care facilities are concentrated in urban areas, creating regional disparities in healthcare access. • **Technological Barriers:** Digital divide and limited digital literacy hinder the effective implementation of digital health initiatives. **5. Way Forward** • Strengthen primary healthcare systems to enable early detection and referral mechanisms for PH patients. • Expand awareness programs for early diagnosis and disease management among medical professionals and communities. • Increase investment in research and development for advanced therapies and indigenous drug innovation. • Enhance digital health infrastructure and ensure inclusive access through vernacular and user-friendly platforms. • Promote integrative healthcare models combining modern medicine with traditional wellness practices. • Ensure affordability through subsidies, insurance coverage, and policy support for essential drugs.
Conclusion	The shift towards indigenous innovation in Pulmonary Hypertension care represents a significant step toward achieving self-reliance, affordability, and inclusivity in India's healthcare system. However, addressing structural challenges such as infrastructure gaps, awareness deficits, and regional disparities is essential to ensure that these advancements translate into equitable health outcomes for all.

Q31. "Modern warfare is increasingly shifting from conventional battlefields to multi-domain and grey-zone conflicts." Examine in the context of Operation Sindoor. (15 M)

(GS Paper III – Internal Security | Defence Technology | Cyber Warfare | Nuclear Deterrence)

Topics Covered: Grey Zone Warfare, Multi-Domain Warfare, Cyber Security, Nuclear Deterrence, Defence Modernization, Strategic Resilience

Introduction	Operation Sindoor represents an important example of India's evolving military strategy under a nuclearized environment. The operation demonstrated how modern conflicts are increasingly becoming technology-driven, politically calibrated, and fought across multiple domains such as cyberspace, information networks, electronic systems, and strategic communication rather than through traditional large-scale battlefield warfare alone.
Body	**1. Operation Sindoor and Its Strategic Objectives** • Operation Sindoor reflected a strategy of calibrated escalation where India responded firmly to provocation while avoiding uncontrolled conventional war. • The operation demonstrated "aggression with restraint," combining precision strikes, strategic signaling, and limited military objectives. • India maintained escalation control despite operating in a sensitive nuclear environment, highlighting strategic maturity and political restraint. • The operation reinforced India's attempt to impose costs on cross-border terrorism without crossing thresholds that could trigger full-scale conflict. **2. Shift Towards Multi-Domain Warfare** • The operation highlighted that modern warfare increasingly depends on integrated operations across land, cyber, electronic, intelligence, and information domains. • India effectively combined intelligence fusion, surveillance systems, cyber capabilities, electronic warfare systems, and precision technologies for operational effectiveness. • Electronic warfare systems disrupted enemy communication networks and operational coordination. • Cyber capabilities emerged as major tools of conflict because they can target communication systems, financial networks, energy grids, and infrastructure without direct kinetic attacks. • Future conflicts are likely to involve drones, artificial intelligence, autonomous systems, satellite surveillance, and network-centric warfare. **3. Grey Zone Warfare and Emerging Security Dynamics**

- Grey zone warfare refers to hostile activities below the threshold of conventional war, including cyberattacks, proxy terrorism, disinformation campaigns, economic coercion, and covert operations.
- Operation Sindoor demonstrated how modern states increasingly operate within this grey zone where attribution and proportional retaliation become difficult.
- The operation reaffirmed that nuclear deterrence does not eliminate conflict but pushes it into indirect and sub-conventional forms.
- Modern warfare increasingly blurs distinctions between civilian and military targets because digital infrastructure, communication systems, and energy networks are now strategic assets.
- Terror financing and destabilization efforts are also evolving through cryptocurrencies, digital payments, and transnational covert networks.

4. Nuclear Deterrence and India's Strategic Doctrine

- India's Nuclear Doctrine is based on the principles of Credible Minimum Deterrence and No First Use (NFU).
- The doctrine emphasizes civilian control through the Nuclear Command Authority and assures massive retaliation against nuclear aggression.
- Operation Sindoor demonstrated that limited military conflict remains possible between nuclear-armed states if escalation thresholds are carefully managed.
- India's response reflected confidence in its deterrence capability and escalation management strategy.

5. Significance of Operation Sindoor for India

- Strengthened India's deterrence credibility by demonstrating the ability to conduct calibrated military responses under nuclear conditions.
- Highlighted the growing importance of indigenous defence technologies, cyber capabilities, and precision-guided systems.
- Demonstrated the importance of jointness among armed forces and coordination between military, intelligence, diplomatic, and political institutions.
- Showed that maintaining civilian stability, economic continuity, and public morale has become a strategic objective during modern conflicts.
- Reflected India's adaptation to the realities of hybrid warfare and evolving global security dynamics.

6. Challenges in the Emerging Nature of Warfare

- Cyber vulnerabilities in critical infrastructure, communication

	systems, and financial networks remain major security concerns. • Attribution problems in cyber warfare complicate deterrence and retaliation. • Rapid technological advancements require continuous modernization of military doctrine and capabilities. • Increasing overlap between civilian and military infrastructure increases the risk of societal disruption during conflicts. • Managing escalation in a nuclearized environment remains strategically sensitive and complex. **7. Way Forward** • Accelerate defence modernization with focus on artificial intelligence, cyber warfare, drones, space security, and electronic warfare systems. • Institutionalize integrated theatre commands and deeper inter-service coordination. • Strengthen indigenous defence manufacturing under Aatmanirbhar Bharat to reduce external technological dependence. • Expand cybersecurity architecture protecting critical infrastructure and communication systems. • Enhance strategic communication systems to counter misinformation and psychological warfare. • Improve civil defence preparedness and national resilience mechanisms.
Conclusion	Operation Sindoor marks an important transition in India's strategic thinking by demonstrating that future conflicts will increasingly be fought across cyber systems, information networks, economic infrastructure, and technological domains alongside traditional military operations. The operation highlighted the importance of calibrated force, technological superiority, escalation management, and national resilience in an era of evolving hybrid and grey-zone warfare.

Q32. Energy storage is becoming essential for India's renewable energy transition. Discuss the need, challenges and way forward.

(GS Paper III: Science & Technology, Renewable Energy, Infrastructure and Energy Security)

Introduction	India is rapidly expanding renewable energy, especially solar and wind. However, these sources are intermittent. Solar power is unavailable after sunset, while wind generation varies with weather. Therefore, energy storage has become essential for grid stability and reliable clean power.
Body	**Need for Energy Storage** • Energy storage helps store surplus renewable electricity and release it during peak demand. It reduces the mismatch between

	generation and consumption. It also supports round-the-clock renewable power for industries and improves grid reliability. • India's renewable capacity is rising fast, and CEA projects a major increase in storage capacity by 2035–36. This shows that storage will be central to India's clean energy future. **Challenges** • India's present storage capacity remains limited. Battery storage faces high cost and import dependence, especially for lithium-ion cells. Pumped hydro projects require land, environmental clearances and long construction time. There are also challenges related to transmission planning, grid flexibility and supply chain security. **Way Forward** • India should promote both **BESS** and **pumped hydro storage**. Domestic battery manufacturing must be strengthened to reduce import dependence. Hybrid renewable projects with storage should be encouraged. Pumped storage projects should be fast-tracked with environmental safeguards. Smart grids, better forecasting and demand-side management are also necessary.
Conclusion	Energy storage is the backbone of a renewable-heavy power system. Without it, India's clean energy growth may face reliability challenges. A strong storage ecosystem will help India achieve energy security, climate goals and stable electricity supply.

Q33. Hyper-local weather forecasting can strengthen climate-resilient agriculture and disaster management in India. Discuss with reference to IMD's block-level monsoon forecast system and Bharat Forecast System.

(UPSC GS Paper III: Science and Technology, Agriculture, Disaster Management, Climate Change)

Introduction	India's agriculture is highly dependent on the southwest monsoon. However, rainfall is often uneven across regions, districts and even blocks. Therefore, broad weather forecasts are not always sufficient for farmers and local administrators. IMD's new block-level monsoon forecast system and Bharat Forecast System aim to address this gap through hyper-local forecasting.
Body	**Role in Agriculture** • Block-level monsoon forecasts can help farmers decide the correct time for sowing. This is important because premature sowing without adequate rainfall may lead to seed loss and crop failure. • Localised rainfall forecasts can also guide irrigation, fertiliser

	application, pest control and harvesting. This is useful in rainfed regions, where farmers depend mainly on monsoon rainfall. • The Bharat Forecast System, with its 6-km resolution, can provide more precise short- and medium-range weather information. This can support climate-resilient agriculture and reduce uncertainty for farmers. **Role in Disaster Management** • Hyper-local forecasts can improve preparedness for heavy rainfall, floods, heatwaves and other extreme weather events. • Local administrations can issue timely warnings, prepare shelters, regulate transport and protect vulnerable communities. • Impact-based forecasting can also help authorities understand the likely effects of weather events on crops, roads, electricity, water bodies and public safety. **Challenges** • The success of such systems depends on dense observational data, automatic weather stations, Doppler weather radars and strong computing capacity. • Forecasts must also be communicated in simple language through mobile phones, local media, Panchayats and agriculture extension networks. **Way Forward** • India should expand weather observation infrastructure, integrate forecasts with Krishi Vigyan Kendras and promote local-language advisories. • Digital access in rural areas should also be improved so that farmers can use weather information effectively.
Conclusion	Hyper-local forecasting can transform weather information into practical decision-support for farmers and administrators. If implemented effectively, IMD's new systems can strengthen climate-resilient agriculture, reduce disaster losses and improve rural livelihoods.

Q34. India's pharmaceutical sector is shifting from generic manufacturing to innovation-led growth. Discuss the opportunities and challenges in this transition. Suggest measures to make India a global pharmaceutical leader by 2030.

(GS Paper III: Science and Technology, Industrial Growth and Health Security)

Introduction	**India's Pharmaceutical Transition: Opportunities, Challenges and Way Forward** India's pharmaceutical sector is moving from a **low-cost generic**

	manufacturing model to a **science-led innovation model**. The sector is valued at nearly **$65 billion** and supplies around **20% of the world's generic medicines**. India now aims to build a **$130 billion pharmaceutical market by 2030**. This transition is important for **health security**, **industrial growth**, **export competitiveness** and **technological self-reliance**.
Body	**Opportunities in the Transition** • **Shift towards high-value innovation:** India can move beyond low-margin generic medicines towards **biosimilars, biologics, novel molecules, mRNA platforms, cell therapies and gene therapies**. These areas can create higher economic value and improve India's global position. • **Growth of biosimilars and complex therapies:** India already has more than **100 approved biosimilars**. This gives India an opportunity to provide affordable alternatives for costly treatments in areas such as **cancer, autoimmune diseases and diabetes**. • **Regulatory modernisation:** Reforms by the **Central Drugs Standard Control Organisation (CDSCO)**, such as risk-based approvals, dossier-based licensing and digital systems like the **SUGAM portal**, can reduce delays and improve global trust in Indian medicines. • **Supply-chain resilience through PLI:** The **Production Linked Incentive Scheme** for pharmaceuticals can reduce India's dependence on imported **Active Pharmaceutical Ingredients (APIs)** and **Key Starting Materials (KSMs)**. This is essential for pharmaceutical sovereignty. • **AI-driven drug discovery:** India's strong digital talent base can support **AI-native drug discovery**, clinical data analysis and faster molecular design. This can reduce the time and cost of developing new drugs. • **Export potential:** India exports medicines to nearly **191 countries**. With better quality systems and global regulatory harmonisation, India can increase its share in regulated markets such as the **US and Europe**. **Challenges in the Transition** • **API and KSM dependence:** India still depends on imports for many critical APIs, especially in fermentation-based products and antibiotics. This creates supply-chain vulnerability during global disruptions. • **Low R&D investment:** Indian pharma companies spend

	much less on research compared to global innovators. This limits the development of **New Chemical Entities (NCEs)** and advanced therapies. • **Quality and compliance concerns:** Import alerts, warning letters and contamination incidents affect India's image as the **"Pharmacy of the World"**. Strong quality assurance is necessary for high-value markets. • **Price control pressures:** The **National Pharmaceutical Pricing Authority (NPPA)** ensures affordability, but rigid price controls during rising raw material costs can affect MSMEs and discourage modernisation. • **Environmental compliance costs:** Rules such as **Zero Liquid Discharge (ZLD)** are important for sustainability, but they increase costs for bulk drug manufacturers, especially in older industrial clusters. • **Skill gap:** India lacks sufficient skilled professionals in **bioprocessing, genomics, clinical bioinformatics, mRNA technology and regulatory science**. **Measures Needed by 2030** • Create **regulatory sandboxes** for advanced therapies such as **CAR-T, CRISPR and mRNA platforms**. • Adopt **continuous quality monitoring** through IoT-based manufacturing systems and stronger inspection mechanisms. • Increase public and private investment in **R&D**, especially for **NCEs, biosimilars and platform technologies**. • Build a **Quad-Helix ecosystem** involving government, industry, academia and venture capital. • Promote **green chemistry, flow chemistry, solvent recovery and common effluent treatment plants** in pharma parks. • Develop specialised **Pharma-Bio-Data talent** through industry-linked courses and fellowships. • Pursue **Mutual Recognition Agreements** with trusted global regulators to improve export access.
Conclusion	India's pharmaceutical future depends on combining **affordability with innovation**. If India strengthens **R&D, regulation, quality systems, API self-reliance and skilled human resources**, it can become a trusted global pharmaceutical leader by **2030**. This will support **national health security**, inclusive access to medicines

	and India's larger goal of self-reliant development.

Q35. Make in India in the defence sector is essential for India's strategic autonomy, but several structural bottlenecks continue to limit its success. Discuss the challenges and suggest a way forward.

(GS Paper III: Science & Technology Defence, Internal Security)

Introduction	Defence indigenisation is a key requirement for India's **strategic autonomy** and national security. Recent global conflicts and **Operation Sindoor** show that future warfare will depend on drones, sensors, artificial intelligence, missiles and rapid technological innovation. India has promoted **Make in India**, FDI reforms and DRDO technology transfer, but import dependence still continues in critical areas.
Body	**1. Continued import dependence:** • India remains dependent on foreign suppliers for advanced systems such as jet engines, sophisticated drones, sensors and high-end defence electronics. This creates vulnerability during wars and supply-chain disruptions. **2. Delayed procurement process:** • India's defence acquisition system is highly centralised and layered. Ambiguous **Quantitative Requirements**, overlapping approvals and slow decision-making delay projects. Parliamentary review has also pointed out delays in several defence projects. **3. Limited high-end technology:** • India has improved assembly and production capacity, but still lacks deep design and manufacturing capability in advanced technologies. This limits real self-reliance. **4. Dominance of DPSUs:** • Defence Public Sector Undertakings continue to dominate defence manufacturing. Private companies face barriers such as delayed payments, complex documentation and limited participation in decision-making. **5. Weak talent retention:** • Government defence institutions face difficulty in attracting top scientific and engineering talent due to lower compensation and limited research flexibility. **Lessons from Global Conflicts** • Recent conflicts in **Ukraine and West Asia** show that low-cost drones, counter-drone systems, precision weapons, cyber tools and AI-enabled systems are becoming decisive. Therefore, India must not focus only on traditional platforms like tanks and

	fighter aircraft. It must invest in scalable and affordable technologies. **Way Forward** • India should simplify defence procurement and make QRs clear and realistic. A genuine level playing field should be created between **DPSUs and private firms**. • DRDO, armed forces, start-ups, academia and private industry must work together. • India must invest in **directed energy weapons, hypersonic weapons, UAVs, quantum technologies, underwater domain awareness and AI-based systems**. • Foreign partnerships should ensure real technology transfer, not merely assembly. Better pay and facilities should be provided to top scientists and engineers.
Conclusion	Make in India in defence is not only an industrial policy but a national security necessity. A hybrid ecosystem involving public sector strength, private sector innovation and research excellence can help India become self-reliant, technologically advanced and strategically secure.

Q36. The SMILE mission highlights the growing importance of space weather monitoring in the modern world. Discuss.
(GS Paper III – Science and Technology, Space Technology, SMILE Mission)

Introduction	The **SMILE Mission**, jointly developed by the **European Space Agency** and the **Chinese Academy of Sciences**, aims to study the interaction between **solar wind** and Earth's **magnetosphere**. It is important because modern societies depend heavily on satellites, GPS, communication networks, electricity grids and space-based services.
Body	**Importance of Space Weather Monitoring** • **Protection of satellites:** Solar storms can damage satellite electronics and disturb satellite operations. Space weather monitoring helps operators take preventive steps. • **Communication and navigation security:** GPS, satellite phones, aviation communication and defence communication can be affected by solar activity. • **Protection of power grids:** Strong solar storms can induce currents in power transmission systems and disturb electricity supply. • **Astronaut safety:** Solar radiation is dangerous for astronauts. Better forecasting helps protect human spaceflight missions. • **Disaster preparedness:** Early warnings of solar storms can help

	governments and industries protect critical infrastructure. **Role of SMILE Mission** • SMILE will provide X-ray and ultraviolet observations of Earth's magnetosphere. • It will help scientists understand how Earth's magnetic shield reacts to solar wind. • It can improve the accuracy of space weather forecasting. • It will support long-term research on Sun-Earth interaction. **Relevance for India** • India depends on satellites for **communication, navigation, weather forecasting, agriculture, disaster management and defence**. Therefore, better understanding of space weather is important for national security and economic stability. **Way Forward** • India should strengthen space weather research through ISRO and academic institutions. International cooperation, real-time data sharing and better early warning systems are necessary to protect critical infrastructure.
Conclusion	The SMILE mission shows that space weather is not only a scientific issue but also a matter of economic security, technological safety and disaster preparedness. As human dependence on space systems increases, studying Earth's magnetic shield becomes essential for sustainable and secure development.

Q37. Neuro-Symbolic AI can make educational technology more explainable, affordable and inclusive for India. Discuss.

(GS Paper III – Science and Technology, Artificial Intelligence, Digital Infrastructure and Inclusive Growth)

Introduction	**Neuro-Symbolic Artificial Intelligence (NSAI)** is a hybrid AI system that combines **neural networks** with **symbolic reasoning**. Neural networks help in pattern recognition, while symbolic reasoning uses rules, logic and verified knowledge. In the context of **NEP 2020**, which promotes conceptual learning, multilingual education and critical thinking, NSAI can become a suitable model for Indian education.
Body	**How NSAI Can Make EdTech More Explainable** • **Reduces black-box learning:** Traditional AI tools often give direct answers without explaining the process. NSAI can show the logical steps behind an answer. • **Supports conceptual clarity:** It can help students understand

why an answer is correct, not merely **what** the answer is.

- **Uses verified knowledge graphs:** Curriculum-based knowledge graphs, such as those based on **NCERT or State Board content**, can help verify answers and reduce AI hallucinations.
- **Enables knowledge tracing:** If a student makes a mistake in algebra or science, NSAI can identify the exact concept misunderstood, such as signs, formula use or logical sequence.

How NSAI Can Make EdTech Affordable

- **Lower computing requirement:** Unlike large AI models that need powerful cloud systems, NSAI can be made lightweight.
- **Offline and edge deployment:** It can work on low-cost smartphones or tablets with limited internet access, which is important for rural India.
- **Cost-effective at scale:** For a country with millions of students and schools, compact AI tools are more practical than expensive data-heavy models.
- **Useful for government platforms:** NSAI can be integrated with platforms such as **DIKSHA** to provide personalised learning at low cost.

How NSAI Can Make Education Inclusive

- **Supports Indian languages:** NSAI can be built to reason in regional languages instead of simply translating from English. This supports mother-tongue education.
- **Helps rural and disadvantaged students:** Students with limited access to private tuition can receive step-by-step digital support.
- **Personalised learning:** It can give hints, simplify questions and provide examples before revealing the final answer.
- **Promotes confidence:** Puzzle-based and interactive learning can reduce fear of mistakes and encourage students to think independently.

Challenges

- Building accurate **curriculum knowledge graphs** is complex and time-consuming.
- India's linguistic diversity requires localised datasets and grammar-based systems.
- Digital divide, poor internet and lack of devices remain serious barriers.
- Teachers need training to use AI-based learning diagnostics.
- Student data privacy must be protected under the **Digital**

	Personal Data Protection Act, 2023. • AI cannot replace the emotional understanding, empathy and professional judgment of teachers. **Way Forward** • Build a national **Bharat Ontology** with curriculum-aligned knowledge graphs. • Integrate NSAI with **DIKSHA, Bhashini and IndiaAI Mission**. • Develop offline-friendly and smartphone-compatible AI tools. • Upgrade teacher training through programmes such as **NISHTHA**. • Conduct regular audits to prevent caste, gender, language or regional bias.
Conclusion	Neuro-Symbolic AI can help India move from rote learning to concept-based education. Its real value lies in making AI **explainable, affordable, multilingual and teacher-supportive**. If implemented with proper infrastructure, data protection and teacher training, NSAI can become a strong tool for inclusive and quality education in India.

Society

Q38. The "Women and Men in India 2025" report highlights both progress and persistent gaps in gender equality. Examine the key achievements and challenges, and suggest measures to achieve substantive gender parity in India. (15 M)

(GS Paper I – Society | GS Paper III – Economy | Human Development)

Topics Covered: Gender Equality, Women Empowerment, Labour Force Participation, Education, Health Inequality, Digital Divide, Human Development

Introduction	The "Women and Men in India 2025" report released by the Ministry of Statistics and Programme Implementation provides a comprehensive statistical assessment of gender-based socio-economic indicators. While the report reflects significant progress in education, health, and economic participation, it also highlights deep-rooted structural inequalities that continue to limit substantive gender parity in India.
Body	**1. Key Achievements in Gender Equality** • India has witnessed notable improvements in gender indicators across multiple sectors. The Sex Ratio at Birth has improved, indicating better survival and reduced discrimination against female children.

- Educational parity has been achieved at the school level, and women now surpass men in Gross Enrolment Ratio in higher education, reflecting a positive shift in access to opportunities.
- Female Labour Force Participation Rate, particularly in rural areas, has increased significantly, indicating improved economic engagement. The rise in women occupying managerial positions suggests gradual progress in breaking the glass ceiling.
- Health indicators such as maternal and infant mortality have improved, and the rising age of marriage reflects greater autonomy and educational attainment among women.

2. Persistent Inequalities and Structural Barriers

- Despite progress, several challenges remain deeply embedded in socio-economic structures. A significant literacy gap continues to exist between men and women, especially among older populations. Women bear a disproportionate burden of unpaid care and domestic work, which restricts their ability to participate fully in the workforce.
- Health inequalities persist, particularly in preventive healthcare, with extremely low participation in cancer screening. The digital divide limits women's access to digital services, financial inclusion, and online opportunities, while also exposing them to cyber risks. Underreporting of crimes against women reflects gaps in institutional support, awareness, and access to justice.

3. Structural Nature of Gender Inequality

- The persistence of inequality indicates that gender disparity is not merely a resource issue but a structural and societal challenge. Patriarchal norms, unequal division of labour, and socio-cultural constraints continue to shape outcomes despite improvements in education and employment indicators. This results in a gap between formal equality (access) and substantive equality (actual empowerment).

4. Significance of the Report

- The report serves as an evidence-based tool for policymaking by providing comprehensive gender-disaggregated data. It helps track progress toward Sustainable Development Goal 5 (Gender Equality) and highlights sector-specific gaps requiring targeted intervention. It also enables governments to design inclusive policies and monitor long-term socio-economic transformation.

5. Way Forward

- Achieving substantive gender parity requires addressing structural barriers. Expanding adult literacy programmes and skill development initiatives can improve women's

	employability. Reducing unpaid care burden through childcare infrastructure, social support systems, and workplace reforms is essential. • Strengthening healthcare access, especially preventive screening services, can improve health outcomes. Bridging the digital divide through digital literacy programmes and safe online ecosystems is crucial for inclusive growth. Gender-sensitive budgeting and policy design must be institutionalised, while legal and institutional mechanisms to address crimes against women must be strengthened.
Conclusion	The Women and Men in India 2025 report reflects a transition from gender disparity to gradual parity, but true empowerment remains incomplete. Bridging the gap between statistical progress and real-life equality requires sustained policy intervention, social transformation, and institutional commitment to ensure that women participate equally in all spheres of life.

Q39. Demographic changes caused by illegal immigration and abnormal settlement patterns have implications for internal security, social harmony and governance. Discuss.

(UPSC GS Paper I – Indian Society: Population and Associated Issues and demographic changes)

Introduction	Demographic change is a natural social process, but **abnormal population shifts** caused by **illegal immigration**, cross-border movement or organised settlement may create serious governance and security challenges. Recently, the **Ministry of Home Affairs** constituted a **High-Level Committee on Demographic Change** to study changes arising from illegal immigration and other abnormal reasons. The issue is also linked with **Article 355**, which places a duty on the Union to protect States against **external aggression and internal disturbance**.
Body	**Internal Security Implications** • **Illegal immigration through porous borders** can create pressure on border management, policing and identity verification systems. • In **Sarbananda Sonowal v. Union of India (2005)**, the Supreme Court observed that large-scale illegal migration into Assam could amount to **external aggression and internal disturbance**. • Border States such as **Assam, West Bengal, Tripura and Meghalaya** are more vulnerable because of geographical proximity, riverine borders and historical migration routes.

- Illegal migration routes may also be misused by **trafficking networks, arms smugglers, fake document rackets and extremist elements**.
- Sensitive areas such as the **Siliguri Corridor** require careful demographic and security monitoring because of their strategic location.

Impact on Social Harmony

- Sudden demographic changes may create fear among local communities regarding **land, jobs, language, culture and political representation**.
- In tribal and indigenous regions, abnormal settlement patterns can threaten **traditional land rights and cultural identity**.
- Areas under the **Fifth and Sixth Schedules** require special protection because tribal communities are closely linked with land, forest and customary institutions.
- If not handled carefully, demographic anxiety can lead to **ethnic tensions, local conflicts and social polarisation**.
- The issue must therefore be studied scientifically, without targeting any genuine citizen or lawful migrant.

Governance and Electoral Concerns

- Illegal procurement of documents such as **Aadhaar, ration cards or voter IDs** may affect welfare delivery and electoral rolls.
- It can create pressure on public services such as **schools, health centres, housing, drinking water and local employment**.
- The last Census was conducted in **2011**, and the next Census is scheduled for **2027**. Hence, updated and granular data is necessary for proper policy-making.
- Abnormal settlement patterns may also affect local body representation, resource allocation and administrative planning.

Legal and Institutional Framework

- The **Foreigners Act, 1946** empowers the government to identify, detain and deport foreigners.
- The **Citizenship Act, 1955** provides the legal framework for acquisition and termination of citizenship.
- The High-Level Committee can help create a **fair, legal and time-bound mechanism** for identification, detention and deportation of illegal immigrants.

Way Forward

- Conduct **scientific demographic audits** using Census, SRS, border data and local administrative records.

	• Strengthen border management through technology such as **smart fencing, sensors, drones and CIBMS**. • Ensure strong **Centre-State coordination** on migration, policing and identity verification. • Protect genuine citizens through **due process, appeal mechanisms and non-discriminatory procedures**. • Strengthen tribal land protection laws and monitor illegal land transfers. • Improve legal migration channels and formalise safe internal labour mobility.
Conclusion	Demographic management must balance **national security** with **constitutional morality**. A data-driven, lawful and humane approach can protect sovereignty, tribal rights, electoral integrity and social harmony while respecting the dignity of genuine citizens and migrants.

History

Q40. Somnath Temple reflects India's civilisational resilience through faith, memory and reconstruction. Discuss its significance in the context of cultural heritage and heritage-led development.

(GS Paper I – Indian Culture, Heritage, History and Architecture;)

Introduction	Somnath Temple, located at **Prabhas Patan on the Saurashtra coast of Gujarat**, is one of India's most sacred pilgrimage centres and is regarded as the **first among the twelve Jyotirlingas of Lord Shiva**. The Somnath Swabhiman Parv marks **1,000 years since the first recorded attack in 1026** and **75 years of its reopening in 1951**.
Body	**Civilisational Resilience** • Somnath represents India's ability to preserve its cultural identity despite repeated destruction. The temple was attacked and damaged several times between the eleventh and eighteenth centuries. Yet, every time it was destroyed, devotees and rulers rebuilt it. • This shows that Indian heritage survived not only through monuments but also through **collective faith, public memory and cultural will**. **Historical Reconstruction** • Several rulers contributed to Somnath's restoration, including **King Kumarapala**, the King of Junagadh and **Ahilyabai**

	Holkar. After Independence, **Sardar Vallabhbhai Patel** resolved to rebuild the temple in 1947. • Its consecration by **President Dr. Rajendra Prasad on 11 May 1951** marked more than a temple restoration. It symbolised India's cultural resurgence and national self-confidence after centuries of foreign rule. **Living Heritage** • Somnath is not only a sacred monument but also a living cultural centre. It continues to attract lakhs of devotees and supports cultural programmes, pilgrimage activities and traditional worship practices. • Its architecture, including the **Kailash Mahameru Prasad style**, reflects India's temple-building tradition. **Heritage-Led Development** • Somnath also reflects the idea of **"Vikas Bhi, Virasat Bhi."** The Somnath Trust undertakes education, skill training, healthcare, food donation, women employment, environmental conservation and sustainability initiatives. • This shows that heritage sites can support both cultural preservation and inclusive development.
Conclusion	Somnath is a symbol of **faith, resilience and civilisational continuity**. Its journey from destruction to renewal shows that true heritage survives through preservation, reconstruction and public participation. It remains a powerful example of India's cultural strength and heritage-led development.

Geography

Q41. Climate phenomena such as Western Disturbances, El Niño and heatwaves are increasingly influencing India's weather patterns. Discuss their impact on agriculture, public health and disaster management.

(GS Paper I: Geography - Physical Geography – Climate phenomena - Western Disturbances, El Niño and heatwaves)

Introduction	India's weather is influenced by several climate phenomena such as **Western Disturbances**, **ENSO**, **El Niño**, **La Niña**, and **heatwaves**. These phenomena affect rainfall, temperature, monsoon behaviour and extreme weather events. Their impact is especially important for a country like India, where agriculture, water resources and livelihoods are closely linked with climate.

Body	**Impact on Agriculture** • **El Niño** may weaken the southwest monsoon and create dry spells in major agricultural regions. • Poor rainfall can reduce soil moisture and affect crops such as **paddy, pulses, cotton and oilseeds**. • **Western Disturbances** bring winter rainfall to North India, which is useful for rabi crops like wheat. • However, strong or unseasonal Western Disturbances may cause hailstorms and crop damage. • Heatwaves can reduce crop productivity by increasing evaporation and heat stress on plants. **Impact on Public Health** • Heatwaves increase the risk of **dehydration, heat exhaustion and heatstroke**. • High humidity raises **wet bulb temperature**, making it difficult for the human body to cool itself through sweating. • Outdoor workers, elderly people, children and people with diseases are more vulnerable. • Urban areas may face greater heat stress due to the **urban heat island effect**. • Higher temperatures also increase demand for drinking water and electricity. **Impact on Disaster Management** • Extreme weather events require strong **early warning systems** and local preparedness. • Heatwaves need district-level **Heat Action Plans**. • Unseasonal rainfall due to Western Disturbances can cause local flooding, crop loss and disruption of transport. • Weak monsoon conditions during El Niño years may increase drought risk. • Disaster management agencies must coordinate with IMD, health departments and local bodies. **Way Forward** • Strengthen IMD-based local weather forecasting and early warnings. • Prepare and update Heat Action Plans for vulnerable districts. • Promote climate-resilient crops and efficient irrigation. • Provide shade, drinking water and rest breaks for outdoor workers. • Increase urban green cover and cool-roof practices. • Improve coordination between disaster management authorities, agriculture departments and local governments.
Conclusion	Climate phenomena such as **Western Disturbances**, **El Niño** and

	heatwaves are no longer only scientific terms; they directly affect India's agriculture, health, economy and disaster preparedness. A climate-resilient approach based on forecasting, awareness, adaptation and local planning is essential for reducing risks and protecting vulnerable communities.

Health

Q42. The recent Ebola outbreak and WHO's declaration of Public Health Emergency of International Concern highlight the need for stronger global health security. Discuss the challenges in controlling zoonotic outbreaks and suggest a way forward.

(GS Paper II: Health, Governance and International Institutions)

Introduction	The World Health Organization recently declared the Ebola outbreak in the **Democratic Republic of the Congo and Uganda** as a **Public Health Emergency of International Concern (PHEIC)**. The outbreak is linked to the **Bundibugyo ebolavirus strain**, with reported confirmed cases, suspected cases and deaths in affected regions. A PHEIC is declared when a health event is serious, sudden, unusual, capable of international spread and requires coordinated global action.
Body	**Nature of Ebola and Zoonotic Risk** **Ebola virus disease** is a severe zoonotic disease. It can spread from animals to humans and then from human to human through direct contact with infected bodily fluids, blood, secretions, organs and contaminated materials. Wild animals such as **fruit bats, non-human primates, monkeys and forest antelope** are linked with spillover risks. • The disease has an incubation period of **2 to 21 days**, and symptoms include fever, fatigue, muscle pain, vomiting, diarrhoea, abdominal pain and kidney or liver dysfunction. This makes early detection important but also difficult because symptoms may resemble other diseases. **Challenges in Controlling Zoonotic Outbreaks** • **Limited treatment and vaccine options:** The current outbreak is linked to the **Bundibugyo strain**, for which vaccine and treatment options are more limited compared with some other Ebola variants. • **Difficulty in early diagnosis:** Initial symptoms are similar to many common infections. This can delay testing, isolation and

treatment.

- **Cross-border movement:** Movement between affected regions of DRC and Uganda increases the risk of international spread.
- **Weak health systems:** Health systems in conflict-affected or remote regions may lack testing facilities, trained staff and isolation infrastructure.
- **Risk to health workers:** Ebola can spread in health facilities if infection prevention and control practices are weak.
- **Social stigma and misinformation:** Fear and misinformation may prevent people from reporting symptoms or seeking medical care.
- **Traditional burial practices:** Direct contact with bodies during burial ceremonies can increase transmission risk.

Measures Needed for Control

Effective Ebola control needs a combination of medical, administrative and community-level measures.

- **Rapid identification and isolation** of suspected and confirmed cases.
- **Contact tracing and 21-day monitoring** of exposed persons.
- **Safe and dignified burials** to reduce transmission.
- **Strict infection control** in hospitals and treatment centres.
- **Laboratory testing and surveillance** for early detection.
- **Supportive care**, including rehydration and treatment of complications.
- **Community engagement** to reduce fear and build trust.
- **Targeted use of vaccines and monoclonal antibodies** wherever available and relevant.

Way Forward

- The global response must focus on **One Health**, which links human health, animal health and environmental health. Surveillance should be strengthened in forest areas, border zones and regions with high human-animal interaction. Countries should improve laboratory networks, train frontline health workers and ensure rapid data-sharing.
- International cooperation is also essential. WHO, affected countries, research institutions and donor agencies must work together for vaccines, diagnostics, logistics and public health capacity. Instead of unnecessary border closures, better screening, cross-border coordination and community-level monitoring should be adopted.

Conclusion	The Ebola outbreak shows that zoonotic diseases can quickly become international health threats. Strong public health systems, early warning mechanisms, community trust and international cooperation are essential to control such outbreaks. A **One Health-based approach** is necessary for long-term global health security and pandemic preparedness.