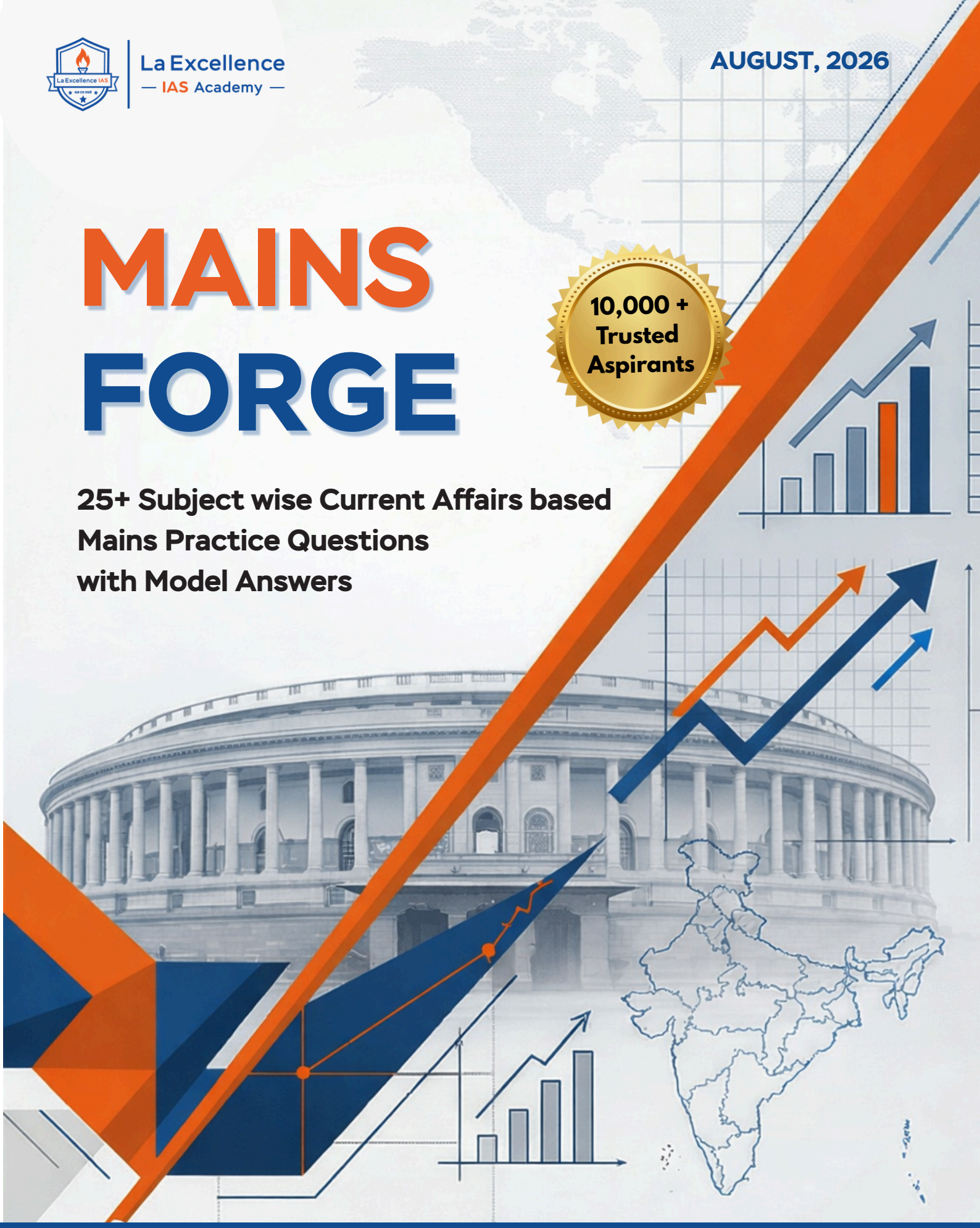
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A. Polity & Governance

1. **"The crisis of Indian higher education is not merely a shortage of resources, but a deficit of institutional integrity, autonomy and implementation capacity." Critically examine. (15 Marks, 250 Words)**

Introduction:

India's higher-education system has expanded rapidly, but expansion has not consistently produced quality, equity or employability. While inadequate funding and infrastructure remain significant, the deeper crisis lies in weak institutional governance, constrained autonomy and the gap between policy design and implementation.

Institutional Deficits:

- **Governance failures:** non-transparent appointments, prolonged leadership vacancies, examination irregularities and weak accountability undermine credibility.
- **Academic integrity:** Plagiarism, predatory journals, fabricated research and compromised accreditation weaken knowledge production.
- **Regulatory fragmentation:** Overlapping authorities encourage compliance-oriented administration rather than genuine quality improvement.
- **Commercialisation:** Inadequately regulated institutions may prioritise enrolment and revenue over learning outcomes and faculty quality.

Deficit of Autonomy:

- **Political and bureaucratic interference** affects appointments, curricula, research priorities and campus administration.
- Universities possess limited financial and administrative freedom, while accountability mechanisms remain weak.
- Faculty often lack the academic freedom required for critical inquiry and interdisciplinary innovation.
- However, autonomy without transparency may permit arbitrary appointments, fee escalation and institutional capture; hence it must accompany public accountability.

Implementation - Capacity Gaps:

- Policies such as the **National Education Policy, 2020** envisage multidisciplinary education, flexible curricula and research orientation, but institutions differ greatly in their ability to implement them.
- Faculty vacancies, weak teacher training and excessive contractual employment reduce instructional quality.
- Accreditation and learning-outcome monitoring remain uneven, particularly among affiliated colleges.
- Poor coordination between Union, State and institutional authorities delays reforms.
- Digital initiatives cannot overcome linguistic, socio-economic and accessibility divides without local capacity.

Why Resources Still Matter?

- Public expenditure remains inadequate relative to massification and ambitious reform goals.
- Laboratories, libraries, hostels and research funding are unevenly distributed.
- Resource shortages disproportionately affect State universities, rural colleges and disadvantaged students. Thus, governance reforms cannot substitute for adequate investment.

Way Forward:

- Ensure transparent, merit-based appointments and time-bound filling of vacancies.
- Provide graded academic, administrative and financial autonomy linked to independent audits.
- Strengthen accreditation, research-integrity offices and grievance redressal.
- Build institutional capacity through faculty development and professional university administration.
- Increase predictable public funding with equity-based allocations.
- Replace excessive regulation with outcome-based oversight and meaningful stakeholder participation.

Conclusion:

India requires both greater investment and institutional renewal. Resources will produce outcomes only when autonomous, ethical and capable institutions convert them into quality teaching, credible research and equitable access.

2. "Delimitation is not merely a technical exercise but a redistribution of political power within the Union." Discuss the tension between electoral equality and federal fairness in this context. (250 words, 15 marks)

Introduction:

Delimitation redraws constituency boundaries and reallocates legislative seats according to population. Under **Articles 82 and 170**, it seeks to realise "one person, one vote, one value." However, when population growth differs across States, delimitation also shifts parliamentary influence and therefore redistributes power within India's federal system.

Case for Electoral Equality:

- Unequal constituency populations mean that votes in more populous constituencies carry less representational weight.
- Population-based readjustment corrects demographic imbalances and strengthens political equality under **Article 14**.
- Rapidly urbanising and migrant-receiving regions require additional representation.
- Periodic delimitation prevents outdated boundaries from producing malapportionment.
- It also facilitates constitutionally mandated representation for Scheduled Castes and Scheduled Tribes according to population.

Concerns Regarding Federal Fairness:

- States that successfully controlled population growth may lose their relative share of Lok Sabha seats, effectively penalising good governance.
- States with higher fertility may gain greater influence over Union legislation, government formation and national resource allocation.
- Reduced representation could deepen the north - south political divide and weaken trust in cooperative federalism.
- Population alone ignores States' contributions to taxation, human development and implementation of national policies.
- Smaller States fear that majoritarian population weight may overwhelm their voice in a diverse Union.
- Increasing seats without addressing women's representation and intra-State disparities may reproduce existing inequalities.
- The **42nd Constitutional Amendment** froze interstate seat allocation, while the **84th Amendment** extended the freeze until figures of the first census after 2026 become available.
- This protected States pursuing population stabilisation but prolonged vote-value disparities.

Way Forward:

- Increase the total strength of the Lok Sabha so that growing States gain seats without substantially reducing others' representation.
- Adopt a transparent formula combining population with demographic performance and federal balance.
- Strengthen the Rajya Sabha's role in protecting State interests.
- Ensure an independent Delimitation Commission, public consultation and judicially reviewable procedural fairness.
- Coordinate delimitation with women's reservation and equitable SC/ST representation.
- Build an interstate political consensus before implementation.

Conclusion:

Electoral equality requires demographic correction, while federal fairness demands that responsible States are not politically disadvantaged. A consensual, expansion-based and constitutionally balanced delimitation is therefore essential to preserve both democratic legitimacy and national unity.

3. Why does the information asymmetry between patients and health-care providers make ordinary market mechanisms inadequate for regulating private health care? Explain. (10 marks, 150 words)

Introduction:

Information asymmetry in health care arises because doctors and hospitals possess far greater medical knowledge than patients. This makes health care different from ordinary markets, where consumers can usually compare quality and prices before purchasing.

Why ordinary market mechanisms are inadequate?

- **Informed choice is limited:** Patients often cannot assess whether a diagnosis, test or procedure is medically necessary.
- **Provider-induced demand:** Doctors may influence the quantity or type of treatment because patients depend on their expertise, potentially leading to unnecessary tests or procedures.
- **Quality is difficult to judge:** Health-care quality is often observable only after treatment, making it difficult for patients to distinguish good providers from poor ones.
- **Emergency situations weaken consumer choice:** In emergencies, patients cannot effectively compare prices, negotiate or shift between providers.
- **Price does not ensure value:** A higher-priced treatment may not necessarily provide better outcomes, while patients may lack the expertise to evaluate cost-effectiveness.
- **Insurance creates additional distortions:** Third-party payment can reduce price sensitivity among patients and encourage over-utilisation, while providers may have incentives to maximise reimbursable services.

Way Forward:

- **Transparent information:** Mandate disclosure of treatment costs, standard tariffs, itemised bills and treatment alternatives.
- **Standard treatment protocols:** Develop evidence-based clinical guidelines and standard treatment packages to limit unnecessary interventions.
- **Independent regulation:** Strengthen state health regulators, accreditation, clinical audits and grievance-redressal mechanisms.
- **Empowered patients:** Promote health literacy, second-opinion systems and accessible public health facilities to strengthen patients' bargaining power.

Conclusion:

Therefore, health care requires **regulated competition rather than unfettered competition**, combining market incentives with transparency, professional accountability and strong public oversight.

B. International Relations

4. The growing use of tariffs as instruments of economic and geopolitical pressure poses new challenges to the multilateral trading system. Discuss. (10 Marks, 150 Words)

Introduction:

Tariffs, traditionally used for revenue and protection, are increasingly deployed to secure strategic, technological and geopolitical objectives. Their growing use by major economies threatens the rules-based multilateral trading system centred on the World Trade Organization (WTO).

Use of Tariffs as Instruments of Pressure:

- **Domestic protection:** Tariffs shield strategic industries and employment from import competition.
- **Geopolitical leverage:** Tariff threats are used to obtain concessions on trade, migration, security and market access.
- **Strategic autonomy:** Duties on semiconductors, steel, electric vehicles and critical minerals seek to reduce dependence on geopolitical rivals.
- **Corrective action:** Countries justify tariffs as responses to dumping, subsidies, technology transfers and market distortions.

Challenges to Multilateral Trade:

- **Erosion of WTO principles:** Unilateral and discriminatory duties weaken non-discrimination, predictability and bound tariff commitments.
- **Retaliatory protectionism:** Counter-tariffs can escalate into trade wars, increasing consumer prices and production costs.
- **Trade fragmentation:** "Friend-shoring" and competing economic blocs disrupt global value chains.
- **Weak dispute settlement:** Paralysis of the WTO Appellate Body encourages action outside multilateral procedures.
- **Impact on developing countries:** Export uncertainty, trade diversion and higher input costs disproportionately affect smaller economies.
- **Security exception:** Its excessive invocation may create an unchecked escape from trade obligations.

Way Forward:

- Restore the WTO's two-tier dispute-settlement mechanism.
- Clarify limits on national-security exceptions.
- Strengthen rules governing industrial subsidies and non-tariff barriers.
- Promote plurilateral negotiations where universal consensus is difficult.
- Provide special and differential treatment to developing countries.
- Encourage consultation before imposing unilateral tariffs.

Conclusion:

Strategic concerns are legitimate, but tariffs must remain transparent, proportionate and WTO-consistent. Reformed multilateralism is essential to reconcile national interests with stable and equitable global trade.

5. Analyse the implications of the emerging West Asian security triangle for India. How should India safeguard its energy, maritime and diaspora interests while maintaining strategic autonomy? (15 Marks, 250 Words)

Introduction:

The Saudi Arabia–Türkiye–Pakistan security triangle combines **Saudi financial and energy power, Türkiye's defence technology and Pakistan's military capabilities**. Its collective-defence orientation may reshape the strategic balance across West and South Asia, though it should not yet be treated as a fully integrated military bloc.

Implications for India:

Energy security:

- Greater collective deterrence may protect Saudi oil infrastructure and ensure stable supplies.
- Conversely, rivalry with Iran or escalation involving non-State actors could threaten the **Strait of Hormuz and Bab-el-Mandeb**, causing price, freight and insurance shocks.
- Pakistan's enhanced strategic role in Saudi Arabia may complicate India's energy and defence engagement with Riyadh.

Maritime interests:

- India's energy imports and trade depend heavily upon the western Indian Ocean–Hormuz–Red Sea routes.
- Coordinated naval activity could expand Pakistan's operational reach in the Arabian Sea and increase pressure on India's western maritime flank.
- Türkiye's naval technology and Pakistan's location near Gwadar may strengthen the maritime dimension of the grouping.
- However, cooperation against piracy, terrorism and drone attacks on shipping could contribute to sea-lane security.

Diaspora and economic interests:

- Conflict could endanger millions of Indians in the Gulf, interrupt remittances and necessitate evacuation.
- Militarisation may produce stricter immigration and internal-security regulations.
- Conversely, stability and Saudi economic diversification could generate employment and investment opportunities.

Regional diplomacy:

- Pakistan may seek the grouping's support on Kashmir, while Türkiye could amplify its position in Islamic forums.
- A sharper Saudi–Iran divide may complicate India's simultaneous partnerships with Riyadh, Tehran, Israel and the UAE.
- Nevertheless, Saudi Arabia's economic interdependence with India and its pursuit of strategic autonomy limit automatic alignment with Pakistan.

Safeguarding India's Interests:

- **Energy resilience:** Diversify suppliers, expand strategic petroleum reserves and accelerate renewable energy and green hydrogen.
- **Maritime preparedness:** Strengthen the Indian Navy's presence, mission-based deployments and maritime-domain awareness; deepen cooperation with Oman, UAE and France.
- **Diaspora protection:** Maintain updated migrant databases, evacuation plans, emergency funds and enforceable labour-welfare agreements.
- **Diplomatic engagement:** Intensify dialogue through the India–Saudi Strategic Partnership Council while engaging Türkiye and Pakistan selectively.
- **Connectivity:** Advance **Chabahar Port, International North–South Transport Corridor and India–Middle East–Europe Economic Corridor.**
- **Strategic autonomy:** Avoid bloc politics, pursue issue-based partnerships and retain independent relations with both Arab States and Iran.

Conclusion:
India should neither view the triangle as inherently hostile nor remain complacent. Diversification, maritime capability, diaspora preparedness and balanced diplomacy can convert regional uncertainty into strategic resilience.

6. **Why is a predictable and equitable international legal order particularly important for India and the Global South? Discuss with reference to trade, maritime security and emerging transnational challenges. (15 Marks, 250 Words)**

Introduction:
A predictable international legal order rests on consistently applied rules, peaceful dispute settlement and equal sovereign participation. For India and the Global South often possessing limited economic and coercive power such an order restrains unilateralism and enables development without dependence on power-based bargaining.

Importance for India and the Global South:
Trade and Development:
- **Policy certainty:** Stable World Trade Organization rules enable developing countries to plan exports, attract investment and participate in global value chains.
- **Protection against coercion:** Non-discrimination and binding dispute settlement restrain arbitrary tariffs, sanctions and protectionism by major powers.
- **Developmental space:** Equitable rules must preserve special and differential treatment, food-security programmes, technology access and infant-industry protection.
- **Fair representation:** Global South participation is necessary in framing rules on digital trade, subsidies, taxation and intellectual property.

Maritime Security:
- The **United Nations Convention on the Law of the Sea (UNCLOS)** safeguards freedom of navigation, sovereign rights over Exclusive Economic Zones and peaceful dispute resolution.
- Predictable rules protect India's energy imports and trade passing through the Indian Ocean's strategic chokepoints.
- Legal cooperation helps address piracy, illegal fishing, trafficking and attacks on commercial shipping.
- Uniform application prevents powerful States from selectively interpreting maritime law or converting common spaces into spheres of influence.

Emerging Transnational Challenges:
- **Climate change:** Equitable rules must reflect *Common but Differentiated Responsibilities* and provide climate finance and technology.
- **Cybersecurity and AI:** Shared norms are required for attribution, critical-infrastructure protection, data governance and autonomous weapons.
- **Pandemics:** Fair access to vaccines, medicines and health technologies requires stronger global obligations.
- **Terrorism and financial crime:** Consistent extradition, information-sharing and anti-financing standards are essential.
- **Space and deep seas:** Rules must prevent monopolisation while ensuring sustainable and peaceful use.

Way Forward:
- Restore effective WTO dispute settlement and strengthen development-oriented trade provisions.
- Reform the UN Security Council and international financial institutions.
- Promote UNCLOS-based maritime conduct and peaceful dispute resolution.

- Create inclusive norms for AI, cyberspace, pandemics and climate finance.
- Expand technology transfer and legal capacity-building for developing countries.
- Build issue-based coalitions through **G20, BRICS, IBSA and the Voice of Global South**.

Conclusion:

For India and the Global South, international law is both a shield against coercion and an instrument of development. Its legitimacy ultimately depends on rules being predictable in application, equitable in design and universal in enforcement.

7. Afghanistan's strategic importance for India extends beyond the bilateral relationship to encompass counter-terrorism, regional connectivity and geopolitical competition. Discuss. (15 marks, 250 words)

Introduction:

Afghanistan occupies the strategic junction of **South Asia, Central Asia and West Asia**. For India, therefore, engagement with Afghanistan is not merely bilateral; it directly affects internal security, continental connectivity, regional balance and India's aspiration to remain an influential Eurasian power.

Strategic Importance for India:

Counter-terrorism and Security:

- Afghanistan's instability can provide operational space to groups such as **Islamic State–Khorasan Province (ISKP), al-Qaeda, Lashkar-e-Taiba and Jaish-e-Mohammed**.
- Pakistan-based groups may exploit Afghan territory for recruitment, training and attacks against India.
- Radicalisation, narcotics trafficking and illegal arms flows can aggravate insecurity in Kashmir and elsewhere.
- A stable and inclusive Afghanistan is therefore essential to prevent a renewed terrorism–crime nexus.

Regional Connectivity:

- Afghanistan is India's potential gateway to the energy resources and markets of Central Asia.
- Pakistan's denial of overland access makes **Iran's Chabahar Port** and the **International North–South Transport Corridor** strategically important.
- Projects such as **TAPI pipeline** could support energy diversification and regional interdependence.
- Connectivity also enables Afghanistan to reduce excessive dependence on any single neighbour.

Geopolitical Competition:

- Pakistan seeks "strategic depth" and influence over Kabul, potentially constraining India.
- China's interests in minerals, infrastructure and the Belt and Road Initiative could expand its regional footprint.
- Russia, Iran, Central Asian States and Gulf powers also seek security and economic influence.
- India's absence would weaken its role in shaping the regional order and leave space for hostile actors.

Developmental and Soft-Power Interests:

- Indian investments in Parliament, dams, electricity, healthcare, education and capacity-building have generated considerable goodwill.
- India has an interest in protecting Afghan minorities, women's rights and humanitarian welfare.
- People-centric assistance strengthens India's credibility without legitimising objectionable policies.

Way Forward:

- Maintain calibrated, issue-based engagement with Afghanistan's de facto authorities without granting premature recognition.
- Seek verifiable assurances against the use of Afghan territory for terrorism.
- Expand humanitarian aid, scholarships, healthcare and people-to-people engagement.

- Strengthen Chabahar-based connectivity and coordination with Iran and Central Asian republics.
- Cooperate through the **United Nations, Shanghai Cooperation Organisation and regional forums** while retaining independent diplomatic space.

Conclusion:
Afghanistan is both a potential bridge to Eurasia and a possible source of transnational insecurity. India requires sustained engagement combining security vigilance, developmental partnership and strategic autonomy rather than either abandonment or unconditional accommodation.

8. What is meant by the 'multi-vector foreign policy' of the Central Asian republics? How does it create both opportunities and challenges for India? (10 marks, 150 words)

Introduction:
A **multi-vector foreign policy** refers to the strategy of Central Asian republics Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan of maintaining diversified relations with multiple powers without becoming excessively dependent on any single one. It helps them preserve sovereignty amid competing Russian, Chinese, Western, Turkish and Iranian influences.

Major Features:
- Russia remains important for security, migration and historical linkages.
- China is a major trade, investment and infrastructure partner.
- Türkiye uses linguistic and cultural connections to expand its influence.
- The European Union and the United States provide technology, markets and diplomatic alternatives.
- Iran, India and Gulf States offer additional connectivity and economic partnerships.
- Central Asian States simultaneously participate in platforms such as the **Shanghai Cooperation Organisation**, Eurasian Economic Union and Organisation of Turkic States.

Opportunities for India:
- Their preference for diversified partnerships creates space for India as a non-dominating and development-oriented partner.
- Central Asia can support India's energy security through uranium, oil and natural gas.
- **Chabahar Port** and the **International North–South Transport Corridor** can improve India's continental connectivity.
- Cooperation can expand in pharmaceuticals, information technology, education, defence training and capacity-building.
- Shared concerns regarding terrorism, radicalisation and narcotics trafficking enable security cooperation.
- Civilisational linkages and India's soft power generate goodwill.

Challenges for India:
- India lacks direct land access because of Pakistan and instability in Afghanistan.
- China's infrastructure scale and Russia's entrenched security role limit India's influence.
- Competing connectivity projects and sanctions involving Russia or Iran complicate commerce.
- Low trade volumes, weak banking links and inadequate private-sector participation constrain engagement.
- Central Asian States may avoid supporting India on sensitive issues to preserve their other partnerships.

Conclusion
Multi-vector diplomacy gives India strategic space but not automatic influence. India must convert goodwill into sustained economic presence through reliable connectivity, energy partnerships, security cooperation and regular high-level engagement.

9. What is meant by the 'early-harvest' approach to boundary settlement? Examine its potential and limitations in resolving the India–China boundary dispute. (10 marks, 150 words)

Introduction:

The India–China boundary dispute extends across the **western, middle and eastern sectors**, with differing perceptions of the Line of Actual Control (LAC). An **"early-harvest" approach** seeks to settle relatively less contentious sectors first instead of waiting for a comprehensive boundary agreement.

Potential of the Early-Harvest Approach:

- **Incremental progress:** Agreement in comparatively stable areas, particularly the **middle sector**, can prevent the entire negotiation from being held hostage to disputes in Ladakh and Arunachal Pradesh.
- **Confidence-building:** Successful demarcation in one sector may restore trust weakened by incidents such as the **Galwan clash of 2020**.
- **Reduced confrontations:** Clarification and delineation of agreed stretches can limit patrol face-offs arising from overlapping perceptions of the LAC.
- **Negotiating model:** Procedures developed for surveying, mapping and demarcation could guide settlements in more difficult sectors.
- **Peace dividend:** Local stability may facilitate troop reduction, border trade and wider bilateral cooperation.

Limitations:

- **Loss of bargaining leverage:** Settling easier sectors separately may remove incentives for compromise in strategically important areas.
- **Interlinked claims:** India may prefer a **package settlement**, as concessions in one sector are often balanced against gains elsewhere.
- **Selective settlement:** China could consolidate favourable positions while postponing difficult questions concerning **Aksai Chin and Arunachal Pradesh**.
- **Trust deficit:** Agreements may remain fragile without disengagement, de-escalation and faithful implementation.
- **Domestic sensitivities:** Territorial concessions can generate strong political opposition in both countries.

Conclusion:

The early-harvest approach can produce limited stability and rebuild confidence, but cannot substitute for a comprehensive settlement. It should therefore operate within an agreed framework covering all sectors and ensuring mutual and equal security.

C. Economy

10. "Mineral abundance does not automatically translate into human development." Examine this paradox with reference to the persistent poverty in India's mineral-rich regions. (15 Marks, 250 Words)

Introduction:

India's mineral heartland Jharkhand, Odisha, Chhattisgarh and parts of Madhya Pradesh possesses abundant coal, iron ore and bauxite. Yet it records persistent poverty, malnutrition and weak social indicators. This contradiction represents the **"resource curse"**, where natural wealth fails to become human capabilities.

Nature of the Paradox:

- Mineral-producing districts contribute substantially to industrial growth, public revenue and energy security, but mining settlements often lack healthcare, education, drinking water and connectivity.
- Adivasi communities, despite inhabiting resource-rich areas, remain disproportionately affected by poverty, displacement and livelihood insecurity.

Causes of Persistent Poverty:

- **Enclave economy:** Capital-intensive mining has weak linkages with local agriculture and small enterprises, thereby creating limited employment.
- **Unequal distribution:** Profits and royalties accrue mainly to corporations and governments, while local communities bear environmental and social costs.
- **Displacement:** Land acquisition disrupts agriculture, forest-based livelihoods and community institutions; rehabilitation is often delayed or inadequate.
- **Ecological damage:** Deforestation, water contamination, dust pollution and land degradation undermine health and food security.
- **Governance deficit:** Illegal mining, revenue leakages and weak administrative capacity prevent mineral income from financing public services.
- **Rights deficit:** Inadequate implementation of the **PESA Act, 1996** and **Forest Rights Act, 2006** weakens Gram Sabha participation.
- **Historical exclusion:** Remote location, tribal marginalisation and poor infrastructure restrict access to markets and opportunities.
- **Conflict trap:** Alienation and Left-Wing Extremism discourage investment and weaken State presence.

Way Forward:

- Utilise **District Mineral Foundation** funds transparently for health, nutrition, education and livelihood restoration.
- Ensure informed Gram Sabha participation, fair compensation and effective rehabilitation.
- Promote local processing, skill development and community enterprises.
- Strengthen environmental monitoring, mine-closure plans and ecological restoration.
- Diversify local economies through agriculture, forestry and MSMEs.
- Introduce social audits and outcome-based monitoring of mineral revenues.

Conclusion:

Minerals become developmental assets only through accountable governance and distributive justice. India must shift from an extraction-centred model to a community-centred approach that converts mineral revenue into sustainable livelihoods and human development.

11. Examine how a purely per-capita food entitlement may adversely affect small and highly vulnerable households under the National Food Security Act, 2013. (10 Marks, 150 Words)

Introduction:

The **National Food Security Act (NFSA), 2013** provides each member of a *priority household* five kilograms of foodgrains per month, while *Antyodaya Anna Yojana (AAY)* households receive 35 kilograms per household. Although per-capita allocation appears equitable, it may disadvantage small but highly vulnerable families.

How Per-Capita Entitlement Creates Disadvantages?

- **Absence of a minimum household guarantee:** A one-member household receives only 5 kg and a two-member household 10 kg, quantities insufficient to meet their monthly cereal requirements.
- **Loss of economies of scale:** Every household has minimum food requirements and fixed cooking costs. Smaller families cannot distribute these costs across several members.
- **Demographic vulnerability:** Small households may comprise elderly persons, widows, persons with disabilities or chronically ill individuals whose vulnerability is not captured by household size.
- **Care-related expenditure:** Such households may have higher medical and caregiving expenses, reducing their ability to purchase additional food from the market.
- **Administrative exclusion:** Though deserving small households may qualify for AAY, outdated beneficiary lists, restrictive quotas and identification errors may leave them under the priority-household category.
- **Nutritional inadequacy:** A cereal-based per-capita entitlement ignores requirements for pulses, edible oil and diverse nutritious foods.
- **Household fragmentation:** Families may be encouraged to manipulate household composition or ration-card arrangements to secure adequate benefits.
- **Gendered impact:** Single women and elderly women living alone are particularly exposed to food insecurity.

Way Forward:

- Introduce a **minimum household floor**, while retaining additional per-member entitlements.
- Ensure automatic AAY inclusion of single elderly persons, widows, disabled persons and other destitute households.
- Regularly update ration cards and permit easy portability through **One Nation One Ration Card**.
- Include pulses, millets or nutritional cash supplements according to regional diets.
- Conduct social audits and grievance redressal to identify exclusion.

Conclusion:

Formal equality through identical per-capita allocation does not ensure substantive food security. NFSA entitlements should combine household-level minimum support with individual needs and vulnerability-based protection.

12. India's food inflation is increasingly shaped by the interaction of domestic weather variability and global commodity-market disruptions. Analyse and suggest measures to strengthen food-price stability. (15 Marks, 250 Words)

Introduction:

Food inflation in India is increasingly driven by overlapping **domestic supply shocks** and **global price transmission**. Erratic monsoons, heatwaves and floods constrain domestic production, while geopolitical conflicts, export restrictions and transport disruptions raise the cost of imported food and agricultural inputs.

Domestic Weather Variability and Food Inflation:

- **Monsoon uncertainty:** Deficient or uneven rainfall affects rain-fed crops, particularly pulses, oilseeds and coarse cereals.
- **Extreme weather:** Heatwaves reduce wheat yields, while floods and unseasonal rain damage standing crops and disrupt harvesting.
- **Perishable commodities:** Vegetables such as onions and tomatoes experience sharp price increases because weather-related losses combine with weak storage facilities.
- **Regional concentration:** Production concentrated in a few States makes national supply vulnerable to local climatic shocks.
- **Delayed supply response:** Long crop cycles prevent farmers from responding immediately to higher prices.
- **Expectations and hoarding:** Anticipated shortages encourage speculative stocking, amplifying temporary price pressures.

Global Commodity-Market Disruptions:

- **Imported inflation:** India's dependence on imported edible oils and pulses exposes consumers to global price and exchange-rate volatility.
- **Input costs:** Higher prices of crude oil, fertilizers and natural gas raise cultivation, processing and transportation expenses.
- **Geopolitical conflicts:** Wars and sanctions disrupt production and trade routes, while Red Sea and other maritime disruptions increase freight and insurance costs.
- **Export restrictions:** Unilateral controls imposed by major producers reduce global availability and transmit scarcity.
- **Policy spillovers:** Biofuel mandates and monetary or currency movements can divert food crops and increase import costs.

Measures for Price Stability:

- Expand irrigation, drought-resistant seeds, climate advisories and diversified cropping.
- Improve warehouses, cold chains, processing and farm-to-market logistics.
- Maintain calibrated buffer stocks of cereals, pulses and onions with transparent release rules.
- Diversify import sources and use timely, predictable tariff adjustments.
- Strengthen real-time crop, stock and price intelligence to prevent hoarding.
- Reform agricultural markets and promote farmer-producer organisations.
- Increase domestic production of pulses and oilseeds through research, procurement and assured incentives.
- Protect vulnerable households through targeted food transfers rather than broad export bans.

Conclusion:

Food-price stability requires moving beyond short-term trade controls. Climate-resilient agriculture, efficient supply chains and predictable buffer-stock and trade policies can protect both consumers and farmers from interacting domestic and global shocks.

13. Mineral-producing States bear substantial environmental and social costs while contributing to national economic growth. Suggest a fiscal framework that can reconcile investment certainty with equitable compensation and cooperative federalism. (150 words, 10 marks)

Introduction:

Mineral-producing States generate raw materials, energy and public revenue for national development, but bear concentrated costs of displacement, pollution, deforestation and infrastructure pressure. A balanced fiscal regime must combine **stable investment rules with compensation based on extraction-related burdens.**

Suggested Fiscal Framework:

Predictable Investment Regime:

- Adopt a transparent, rule-based system for royalties, auction premiums and statutory contributions.
- Revise royalty rates periodically through a predetermined formula linked to mineral prices and profitability.
- Avoid retrospective levies and overlapping Union–State charges.
- Provide time-bound clearances, stable lease conditions and an independent dispute-resolution mechanism.

Equitable Revenue Sharing:

- Divide mineral revenues among the Union, producing States and mining-affected local bodies through a statutory formula.
- Assign greater weight to extraction intensity, ecological damage, tribal population, displacement and infrastructure burden.
- Provide producing States a guaranteed minimum share while creating an equalisation component for non-mineral States.
- Ring-fence part of the revenue for intergenerational savings, recognising that minerals are exhaustible assets.

Community and Environmental Compensation:

- Strengthen **District Mineral Foundations (DMFs)** through Gram Sabha participation, public disclosure and social audits.
- Prioritise drinking water, healthcare, nutrition, education, livelihood restoration and rehabilitation.
- Create an environmental restoration fund based on the **polluter-pays principle**.
- Require mine-closure bonds to prevent abandoned ecological liabilities from falling upon States.

Cooperative Federalism:

- Establish a **Mineral Fiscal Council** comprising the Union, producing States and local representatives.
- Entrust it with recommending royalty revisions, harmonising levies and resolving fiscal disputes.
- Maintain a shared digital platform containing production, revenue and environmental-compliance data.
- Provide transition grants to districts affected by mine depletion, closure or decarbonisation.

Conclusion:

Minerals may be national economic assets, but their adverse consequences are predominantly local. Predictable taxation, burden-sensitive devolution and community-controlled compensation can promote investment while ensuring distributive justice and genuine cooperative federalism.

14. Public expenditure can crowd in private investment by simultaneously stimulating demand and improving productive capacity. Critically examine. Suggest a coordinated policy strategy for reviving corporate investment in India. (250 words, 15 marks)

Introduction:

Public expenditure **crowds in** private investment when it raises aggregate demand and creates infrastructure, skills and technology that improve expected returns on private projects. However, its effectiveness depends upon expenditure quality, financing conditions and complementary structural reforms.

How Public Expenditure Crowds in Investment?

- **Demand channel:** Government consumption, transfers and capital expenditure increase sales and capacity utilisation, encouraging firms to expand.
- **Infrastructure channel:** Investment in transport, power, logistics and digital networks lowers production and transaction costs.

- **Complementarity:** Public spending on health, education, research and skilling improves labour productivity and innovation.
- **Risk reduction:** Government support for green energy, semiconductors and emerging technologies can absorb initial risks and attract private capital.
- **Confidence effect:** A credible public-investment pipeline signals policy continuity and creates opportunities through public–private partnerships.
- **Regional development:** Infrastructure in lagging regions opens new markets and expands the geographical base of investment.

Limitations and Crowding-Out Risks:

- Large fiscal deficits may raise interest rates and absorb available credit, making private borrowing expensive.
- Revenue expenditure or poorly selected projects may stimulate consumption without creating productive assets.
- Delays, cost overruns and policy uncertainty reduce the multiplier effect.
- Public enterprises may displace viable private activity, while government guarantees can create contingent liabilities.
- Weak consumer demand, excess industrial capacity and global uncertainty may prevent firms from investing despite incentives.
- Tax concessions and production subsidies without competitive discipline can promote rent-seeking.

Coordinated Strategy to Revive Corporate Investment:

- Protect growth-enhancing capital expenditure while pursuing credible medium-term fiscal consolidation.
- Front-load execution of the **National Infrastructure Pipeline** and strengthen urban and State-level capital expenditure.
- Maintain predictable taxation, trade policy and sectoral regulation.
- Coordinate fiscal policy with monetary measures ensuring adequate credit without compromising price stability.
- Deepen corporate-bond markets and expand development-finance and credit-enhancement mechanisms.
- Improve contract enforcement, land access, logistics and insolvency resolution.
- Revitalise PPPs through balanced risk-sharing and independent regulation.
- Support MSME linkages, R&D, skilling and competitive green manufacturing.
- Strengthen household purchasing power to create durable demand rather than relying solely on corporate incentives.

Conclusion:

Public spending is most effective when it creates productive assets and complements rather than substitutes private enterprise. India needs a coordinated **demand – infrastructure - reform strategy** that combines macroeconomic stability with credible opportunities for profitable investment.

15. India's employment challenge concerns the quality and inclusiveness of jobs as much as their quantity. Discuss the indicators required to assess this challenge and suggest appropriate policy measures. (15 marks, 250 words)

Introduction:

India's employment challenge cannot be measured by unemployment alone. A person may be counted as employed despite receiving low wages, working fewer hours than desired or lacking security. Assessment must therefore cover **availability, quality, productivity and inclusiveness** of work.

Indicators Required:

Quantity and Participation:

- **Labour Force Participation Rate (LFPR), Worker Population Ratio (WPR)** and unemployment rate, disaggregated by age, sex, region and social group.
- Youth unemployment and the share of young people **not in employment, education or training (NEET)**.
- Employment elasticity of growth and the number of jobs created relative to new labour-market entrants.
- Time-related underemployment and discouraged workers outside the labour force.

Quality of Employment:

- Distribution among regular salaried, casual and self-employed workers, including unpaid household helpers.
- Real wage growth, hours worked, occupational safety and workplace conditions.
- Coverage of written contracts, paid leave, pensions, health insurance and other social-security benefits.
- Labour productivity and movement from low-productivity agriculture to higher-productivity manufacturing and services.
- Extent of informalisation, contractualisation and involuntary gig work.

Inclusiveness:

- Gender gaps in participation, wages and leadership positions.
- Employment outcomes of Scheduled Castes, Scheduled Tribes, persons with disabilities and rural workers.
- Regional and rural–urban disparities.
- Education–occupation mismatch and returns to different levels of education.

Policy Measures:

- Promote labour-intensive manufacturing in textiles, food processing, footwear and electronics through stable trade and industrial policies.
- Strengthen MSME credit, clusters, logistics and timely-payment mechanisms.
- Expand urban infrastructure, affordable housing and care services to generate local employment.
- Align skilling with district-level demand and strengthen apprenticeships and industry-linked vocational education.
- Increase women's employment through childcare, safe transport, flexible work and enforcement of equal wages.
- Extend portable social security to informal, migrant and platform workers through **e-Shram**.
- Support agricultural diversification, agro-processing and rural non-farm enterprises.
- Improve enterprise-based employment data and publish regular, disaggregated wage and vacancy statistics.

Conclusion:

Employment policy must move beyond counting workers to measuring whether work is productive, secure and fairly rewarded. Employment-intensive growth, universal social protection and removal of gender and social barriers are essential for turning India's demographic potential into inclusive development.

16. India's ethanol policy must balance energy security with food, fodder and water security. Discuss and suggest a sustainable feedstock strategy. (15 marks, 250 words)

Introduction:

India's **Ethanol Blended Petrol Programme** strengthens energy security by reducing crude-oil imports, supporting farmers and lowering vehicular emissions. However, achieving the **20% blending target** through food-based feedstocks may transfer insecurity from oil markets to food, fodder and water systems.

Need for a Balanced Ethanol Policy:

Benefits:

- Domestic ethanol reduces import dependence and conserves foreign exchange.
- It provides additional markets for sugarcane, maize and surplus or damaged grains.
- Ethanol production supports rural employment and helps stabilise sugar-sector finances.
- Second-generation ethanol can utilise crop residues and reduce stubble burning.

Emerging concerns:

- **Food security:** Diversion of rice and maize may reduce availability and raise consumer prices, particularly during droughts or poor harvests.
- **Fodder security:** Maize is important for poultry and livestock feed. Its diversion can increase milk, egg and meat prices.
- **Water security:** Sugarcane is highly water-intensive and is often cultivated in water-stressed regions using subsidised irrigation.
- **Cropping distortions:** Assured ethanol procurement may encourage farmers to replace pulses, oilseeds and nutritious crops with sugarcane or maize.
- **Environmental costs:** Monoculture, fertiliser use and groundwater extraction may reduce ethanol's net climate benefits.

Sustainable Feedstock Strategy:

- Adopt a **feedstock hierarchy** prioritising crop residues, bagasse, municipal organic waste, damaged grains and industrial by-products.
- Rapidly expand **second-generation ethanol** from rice straw, wheat straw, bamboo and other lignocellulosic biomass.
- Divert food grains only after meeting consumption, fodder and buffer-stock requirements.
- Promote low-water crops such as **sweet sorghum** according to regional agro-climatic suitability.
- Develop flexible **multi-feedstock distilleries** to reduce dependence on any single crop.
- Link procurement incentives to lifecycle emissions, groundwater availability and water-use efficiency.
- Undertake annual **food – feed - fuel balance assessments** and prescribe region-specific diversion ceilings.

Conclusion:

India needs a **residue-first, surplus-based and water-sensitive ethanol policy**. Feedstock diversification and ecological safeguards can strengthen energy security without compromising nutrition, livestock livelihoods or long-term water sustainability.

D. Environment, Ecology and Disaster Management

17. The Supreme Court has played a seminal role in the development of environmental jurisprudence in India. Elucidate with reference to the principles evolved by it. (150 words, 10M)

Introduction:
The Constitution did not expressly mention the environment, but **Articles 48A and 51A(g)** created environmental duties. The Supreme Court converted these directives into enforceable safeguards by expanding **Article 21** through Public Interest Litigation.

Principles evolved:
- **Right to a healthy environment:** In *Subhash Kumar v. State of Bihar*, the Court held that Article 21 includes pollution-free air and water.
- **Liability and restoration:** The **Oleum Gas Leak case** evolved absolute liability for hazardous enterprises. *Indian Council for Enviro-Legal Action* applied **polluter pays** to compensation and ecological restoration.
- **Prevention and sustainable development:** *Vellore Citizens' Welfare Forum* recognised precaution and polluter pays as features of **sustainable development**. Scientific uncertainty cannot justify postponing preventive action.
- **Protection across generations:** In *M.C. Mehta v. Kamal Nath*, the **public trust doctrine** treated the State as trustee of resources. **Intergenerational equity** requires their preservation for future generations.

Institutional contribution:
- **Liberalised locus standi** enabled affected communities and organisations to approach courts.
- **Continuing mandamus**, notably in *T.N. Godavarman*, facilitated monitoring of forest governance and administrative compliance.

Limitations:
- **Judicial overreach** may disturb the **separation of powers**, making courts function like a "super-legislature" or "super-executive" in technical policy matters.
- Courts lack independent enforcement machinery; consequently, landmark orders often suffer from weak implementation by under-resourced or non-compliant agencies.
- Inconsistent treatment of infrastructure projects and dependence on contested expert committees can produce fragmented and scientifically uncertain adjudication.

Conclusion:
The Supreme Court transformed environmental protection from a policy aspiration into a **constitutional entitlement**. Its principles remain foundational, but durable outcomes require consistent adjudication, scientific capacity, regulators and executive implementation.

18. How can grid-connected and community-based solar irrigation models align farmers' economic incentives with groundwater conservation? Examine their advantages and implementation challenges. (250 words, 15 marks)

Introduction:
Solar irrigation reduces farmers' dependence on costly diesel and unreliable electricity. However, stand-alone pumps with near-zero operating costs may accelerate groundwater extraction. **Grid-connected and community-based models** can address this by making conserved electricity and water economically valuable to farmers.

Aligning Incentives with Conservation:

- **Grid-connected pumps:** Farmers use solar power for irrigation and sell surplus electricity to distribution companies. Since excessive pumping reduces saleable power, conserving groundwater generates income.
- **Feeder solarisation:** Dedicated agricultural feeders supply solar electricity during fixed hours; surplus generation is exported to the grid.
- **Community solar pumps:** Farmer groups, cooperatives or panchayats jointly own pumps and distribute water according to agreed quotas.
- **Water budgeting:** Linking electricity payments with aquifer conditions, crop-water requirements and metered consumption rewards efficient irrigation.
- **Convergence:** Solarisation combined with drip irrigation, crop diversification and groundwater recharge strengthens conservation outcomes.

Advantages:

- Provides supplementary and relatively stable farm income.
- Reduces diesel expenditure, emissions and agricultural power subsidies.
- Daytime electricity improves reliability and farmer safety.
- Shared systems lower capital and maintenance costs for smallholders.
- Community monitoring can promote equitable access and collective aquifer management.
- Decentralised generation strengthens rural energy security.

Implementation Challenges:

- Without assured grid buy-back, free solar energy may encourage excessive pumping.
- High initial costs, limited credit and weak maintenance services constrain adoption.
- Inadequate feeder capacity, metering gaps and delayed DISCOM payments reduce farmer confidence.
- Unsuitable tariffs may either weaken conservation incentives or burden DISCOM finances.
- Large landowners may capture benefits, excluding tenants and water-buying farmers.
- Community schemes face elite capture, free-riding and disputes over water allocation.
- Poor groundwater data and fragmented governance impede aquifer-based planning.
- Procurement support for water-intensive crops undermines conservation efforts.

Way Forward:

- Expand **PM-KUSUM feeder solarisation** with predictable power-purchase contracts.
- Link incentives to metered pumping and local aquifer conditions.
- Combine solarisation with drip irrigation, groundwater recharge and crop diversification.
- Provide concessional finance and technical support to community institutions.
- Ensure representation of smallholders, tenants and women.

Conclusion:

Solar irrigation becomes genuinely sustainable when farmers earn more by **selling electricity and saving water than by excessive pumping**. Technology must therefore be embedded in sound pricing, equitable institutions and aquifer-based governance.

19. Environmental remedies must deter deliberate violations without producing greater ecological and social harm. Critically examine this statement in the context of demolition, remediation and post-facto clearance of illegally commenced projects. (15 marks, 250 words)

Introduction:

Environmental remedies must protect the **right to a healthy environment under Article 21** and deter developers from treating violations as a business cost. However, indiscriminate demolition may itself cause ecological damage, waste public resources and harm livelihoods; hence remedies require **eco-centric proportionality**.

Need for Strict Deterrence:

- **Prior environmental clearance (EC)** operationalises the precautionary principle by assessing impacts before potentially irreversible construction begins.
- Routine regularisation creates a *fait accompli* and places compliant enterprises at a competitive disadvantage.
- Demolition or closure is justified where the project is inherently impermissible, located in an ecologically sensitive area, obtained through fraud or has caused irreversible damage.
- Penalties must exceed the economic gains from non-compliance; otherwise, they become merely a "cost of doing business".

Why Automatic Demolition May Be Counterproductive?

- Demolition generates debris, dust, emissions and additional disturbance to land and habitats.
- Destruction of hospitals, treatment plants or other public infrastructure may impose disproportionate social costs.
- Workers, local communities and public finances may suffer despite having no role in the violation.
- Where a project is otherwise environmentally permissible, scientific remediation may produce better ecological outcomes than destruction followed by reconstruction.

Post-Facto Clearance: A Limited Exception:

In **Vanashakti v. Union of India (2026)**, the Supreme Court reaffirmed **prior EC as the rule**, but recognised narrowly tailored, time-bound statutory treatment of exceptional cases involving overriding public interest. It rejected perpetual regularisation through executive instructions.

Way Forward:

- Classify violations by **intent, ecological damage and project permissibility**.
- Undertake independent cumulative-impact and restoration assessments.
- Order demolition where restoration is feasible and illegality deliberate.
- In exceptional cases, require remediation, community compensation and restoration bonds.
- Recover the violator's unlawful gains and impose exemplary environmental compensation.
- Fix personal liability upon responsible promoters and public officials.
- Ensure public consultation, transparent monitoring and judicial review.
- Permit any exceptional post-facto mechanism only through valid delegated legislation, never administrative amnesty.

Conclusion:

Neither automatic demolition nor routine regularisation constitutes environmental justice. A proportionate remedy must restore damaged ecosystems, remove unlawful benefits and deter violations while avoiding greater ecological and social harm.

20. "Coal flexibilisation can serve as a bridge between India's coal-dependent present and renewable-energy future." Discuss its role in maintaining grid stability and facilitating greater renewable-energy integration. (15 marks, 250 words)

Introduction:

India's electricity system must integrate rapidly expanding solar and wind capacity while coal continues to supply dependable power. **Coal flexibilisation** enables thermal plants to vary their output according to renewable generation, allowing coal to function as a transitional balancing resource rather than continuous baseload power.

Role in Grid Stability:

- **Demand–supply balancing:** Flexible plants reduce generation when renewable electricity is abundant and increase it when renewable output declines.
- **Managing the duck curve:** They ramp up during the evening, when solar generation falls but electricity demand remains high.
- **Frequency control:** Faster ramping and **Automatic Generation Control** help maintain grid frequency close to 50 hertz.
- **Reserve capacity:** Coal plants can provide spinning reserves, reactive power and other ancillary services during sudden renewable fluctuations.
- **Grid reliability:** Flexible operation reduces dependence on emergency load shedding and costly short-term power procurement.

Facilitating Renewable-Energy Integration:

- Lower **minimum technical load** creates space for solar and wind electricity during periods of high generation.
- Flexible scheduling reduces **renewable curtailment** and prevents over-injection into the grid.
- It can utilise existing thermal assets while storage, transmission and green-hydrogen capacity are gradually developed.
- Greater system flexibility supports higher renewable-energy penetration without compromising round-the-clock supply.

Limitations and Challenges:

- Frequent ramping and start–stop cycles increase equipment fatigue, maintenance costs and heat-rate deterioration.
- Operation at low loads may raise emissions per unit of electricity and require additional pollution-control measures.
- Older plants may lack suitable boilers, control systems and trained personnel.
- Existing **Power Purchase Agreements (PPAs)** reward fixed availability and coal consumption rather than flexibility.
- Flexible coal cannot substitute for storage, demand response or transmission expansion and may create technological lock-in.

Way Forward:

- Retrofit suitable plants and retire old, inefficient units.
- Reform PPAs to compensate ramping, reserve and ancillary services.
- Introduce market-based scheduling and accurate renewable forecasting.
- Strengthen interstate transmission, battery storage, pumped-storage projects and demand response.
- Establish plant-specific flexibility standards with continuous emissions monitoring.

Conclusion:

Coal flexibilisation can provide a pragmatic bridge by making thermal generation responsive to renewable variability. However, it must remain a transitional strategy embedded within a broader shift towards storage, stronger grids and progressively declining coal dependence.

E. Science and Technology

21. "India's challenge is not merely to produce capable scientists but to create institutions in which they can flourish." Examine the factors affecting the retention of scientific talent in India's public research institutions. Suggest suitable reforms. (15 Marks, 250 Words).

Introduction:

India has created a substantial scientific talent pool through the IITs, IISc, universities and publicly funded laboratories. However, retaining scientists depends on whether institutions provide **intellectual freedom, professional dignity, adequate resources and fair opportunities for advancement**.

Factors Affecting Scientific Talent Retention:

- **Inadequate and uncertain funding:** Low R&D expenditure, delayed grants and outdated equipment constrain sustained, high-risk research.
- **Administrative rigidities:** Complex procurement, recruitment and approval procedures divert scientists from research.
- **Hierarchical culture:** Seniority and proximity to authority may receive greater importance than scientific merit and originality.
- **Limited scientific autonomy:** Young researchers may hesitate to question senior colleagues, challenge prevailing hypotheses or pursue unconventional ideas.
- **Career insecurity:** Contractual appointments, delayed promotions, limited tenure-track positions and opaque evaluation criteria weaken institutional commitment.
- **Unhealthy workplace environment:** Harassment, discrimination, administrative retaliation and public discrediting erode professional dignity.
- **Weak grievance redressal:** Internal mechanisms may lack independence, confidentiality and protection against victimisation.
- **Limited innovation opportunities:** Weak industry - academia collaboration and difficulties in patenting or commercialising discoveries reduce research impact.
- **Global pull factors:** Overseas institutions often offer better infrastructure, interdisciplinary exposure, remuneration and recognition.

Challenges to Institutional Reform:

- Balancing scientific autonomy with accountability for public funds.
- Overcoming entrenched administrative hierarchies and resistance to change.
- Increasing research expenditure amid competing developmental priorities.
- Designing performance indicators that reward research quality rather than publication quantity.

Way Forward:

- Provide predictable, multi-year grants and progressively increase public and private R&D investment.
- Introduce merit-based recruitment, independent peer review, tenure-track positions and time-bound promotions.
- Grant operational autonomy with transparent financial and ethical oversight.
- Digitise procurement and simplify grant and collaboration approvals.
- Establish independent grievance-redressal, anti-harassment and whistle-blower protection mechanisms.
- Reward patents, mentoring, interdisciplinary research and societal impact.
- Promote **academia - industry mobility** and attractive return pathways for overseas Indian scientists.

Conclusion:

Scientific excellence cannot be commanded through hierarchy; it must be nurtured through freedom, trust and fairness. India must build **well-funded, meritocratic and researcher-friendly institutions** that enable scientists to innovate and contribute their best work at home.

22. The rapid digitisation of books for training Large Language Models (LLMs) has raised concerns over copyright, transparency and cultural preservation. Critically analyse. (15 Marks, 250 Words)

Introduction:

Large Language Models (LLMs) require vast and diverse textual datasets to develop linguistic competence, factual understanding and contextual reasoning. However, the mass digitisation of books for AI training creates tensions among technological innovation, authors' rights, transparency and preservation of cultural heritage.

Need for AI Training Data:

- Books provide curated, long-form and domain-specific knowledge that improves an LLM's accuracy, reasoning and linguistic diversity.
- Multilingual and regional literature can reduce the dominance of English-centric data and make AI systems socially inclusive.
- However, indiscriminate data acquisition cannot be justified merely by the scale required for training.

Scanning Methods and Preservation:

- **Non-destructive scanning** uses overhead cameras or specialised book scanners without unbinding the book. It protects rare manuscripts but is slower and costlier.
- **Destructive scanning** removes bindings and scans individual pages rapidly. Though efficient for mass digitisation, it may permanently destroy physical books, including out-of-print and historically valuable editions.
- Digital copies also cannot fully preserve paper, annotations, bindings and provenance that carry historical meaning.

Copyright and Transparency Concerns:

- Copyrighted works may be copied without the author's consent, licensing or remuneration.
- Whether AI training constitutes "fair dealing" remains legally contested, especially when models generate content resembling protected works.
- Authors may lose bargaining power while technology firms derive commercial benefits from their creations.
- Secret training datasets prevent rights-holders from identifying unauthorised use and obstruct independent scrutiny.
- Conversely, overly restrictive rules may benefit large publishers, raise entry barriers and hinder research and Indian-language AI development.

Cultural Preservation Concerns:

- Digitisation can preserve fragile texts, improve access and revive marginalised languages.
- Yet commercial selection may privilege popular works while excluding oral traditions, regional literature and community-controlled knowledge.
- Decontextualised extraction may misrepresent indigenous knowledge and facilitate cultural appropriation.

Way Forward:

- Mandate dataset disclosure, provenance records and independent audits.
- Develop transparent licensing, collective remuneration and opt-out mechanisms.
- Prefer non-destructive scanning for rare works and deposit preservation-quality copies in public repositories.
- Apply consent and benefit-sharing principles to indigenous knowledge.
- Promote public, multilingual and ethically curated datasets.

Conclusion:

AI innovation and cultural rights are not mutually exclusive. A transparent, licensed and preservation-oriented framework can convert digitisation into a public good without treating authors or cultural heritage merely as raw data.

F. Society

23. What is the access–affordability paradox in India's medical education system? Explain its implications for equity and the distribution of healthcare professionals. (10 Marks, 150 Words)

Introduction:

The **access - affordability paradox** refers to a situation where India expands medical colleges and seats, improving the numerical availability of medical education, but high fees and unequal geographical distribution prevent many meritorious students from accessing it.

Nature of the Paradox:

- Government medical colleges offer relatively affordable education, but their seats remain limited and highly competitive.
- Private and deemed universities have expanded capacity, yet their high tuition and additional expenses remain beyond most low- and middle-income families.
- Consequently, some students pursue cheaper medical education abroad, despite concerns regarding quality, clinical exposure and licensing.
- Rural, tribal and educationally backward regions face shortages of colleges, coaching facilities and well-equipped schools.

Implications for Equity:

- **Socio-economic exclusion:** Admission may increasingly depend on paying capacity rather than merit alone.
- **Educational inequality:** Urban and affluent students possess better access to coaching and preparatory resources.
- **Debt burden:** Large educational loans may influence graduates to choose better-paying specialisations and private practice.
- **Under-representation:** Rural, tribal and disadvantaged communities remain inadequately represented in the medical profession.
- **Commercialisation:** Excessive fees can weaken the conception of medical education as a public good.

Impact on Distribution of Professionals:

- Graduates tend to concentrate in cities offering higher incomes, infrastructure and professional opportunities.
- High training costs discourage service in rural and primary healthcare.
- This produces simultaneous **urban clustering** and **rural shortages**, despite an overall increase in doctors.

Way Forward:

- Expand affordable public medical seats, particularly in underserved districts.
- Regulate private-college fees transparently and provide need-based scholarships.
- Strengthen district hospitals as teaching institutions.
- Use rural-origin admissions, incentives and supportive service conditions to improve retention.
- Align seat expansion with specialty-wise and regional workforce requirements.

Conclusion:

Medical-seat expansion must be accompanied by affordability and equitable distribution. Otherwise, greater capacity will neither democratise medical education nor adequately address India's regional healthcare shortages.

G. Internal Security

24. The convergence of Artificial Intelligence and cyberspace can strengthen cyber defence while simultaneously increasing the speed, scale and autonomy of cyberattacks." Discuss the emerging national-security challenges arising from this dual-use character of Artificial Intelligence. Suggest measures to enhance India's preparedness. (15 Marks, 250 Words)

Introduction

Artificial Intelligence (AI) is transforming cyberspace by enabling real-time threat detection, automated incident response and predictive defence. However, the same capabilities can automate sophisticated cyberattacks, creating a dual-use national-security challenge where both defenders and attackers operate at machine speed.

AI as a Force Multiplier in Cyber Defence:

- **Early detection:** AI can identify malware, network anomalies and unusual user behaviour across large datasets.
- **Automated response:** It enables rapid isolation of compromised systems and containment of attacks.
- **Predictive security:** Machine learning can anticipate vulnerabilities and emerging attack patterns.
- **Critical infrastructure protection:** AI-based monitoring strengthens the resilience of power, banking, defence and communication networks.

Emerging National-Security Challenges:

- **Automated cyberattacks:** AI can scan vulnerabilities, generate malicious code and alter attack methods without continuous human control.
- **Precision social engineering:** Generative AI enables personalised phishing, voice cloning and deepfake-based impersonation.
- **Information warfare:** Synthetic media and bot networks can manipulate elections, intensify social divisions and undermine trust in institutions.
- **Attacks on critical infrastructure:** Autonomous malware may disrupt electricity grids, financial systems, transport and military networks.
- **Adversarial attacks:** Manipulated data can deceive AI systems, while data poisoning can corrupt their training.
- **Proliferation to non-State actors:** Criminal organisations and terrorist groups can acquire capabilities earlier requiring advanced technical expertise.
- **Attribution problem:** AI-generated and rapidly evolving attacks make identification of perpetrators difficult, complicating deterrence and retaliation.
- **Autonomous escalation:** Machine-driven responses may produce unintended escalation between States.
- **Foreign dependence:** Reliance on imported chips, cloud infrastructure and AI models creates supply-chain and espionage vulnerabilities.

Measures to Enhance India's Preparedness:

- Formulate a comprehensive **AI - cybersecurity doctrine** with clear human oversight and accountability.
- Strengthen coordination among **CERT-In, NCIIPC, Defence Cyber Agency, NTRO** and State agencies.
- Establish sector-specific AI security operation centres for critical infrastructure.
- Mandate adversarial testing, secure-by-design standards, audits and incident reporting.

- Develop sovereign compute capacity, trusted datasets, indigenous chips and cyber tools.
- Expand cyber ranges, red-team exercises and specialised human resources.
- Promote international norms against AI-enabled attacks on civilian infrastructure.

Conclusion:

India must treat AI security as an integral part of national security. Technological self-reliance, resilient institutions, skilled personnel and responsible human control can help harness AI defensively while limiting its destabilising misuse.

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