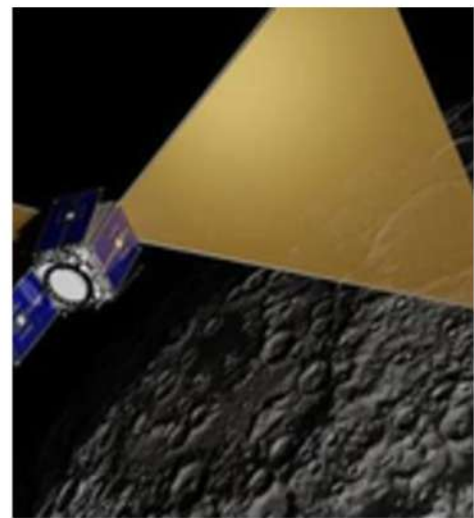


P2. NATIONAL



Illegal Constructions and Safety of Student Accommodation - Examine how the Supreme Court's intervention following the Satya Niketan tragedy highlights gaps in building regulation, safety audits and urban governance.

P3 SCIENCE



CosmoCube and the 21-cm Signal from the Early Universe - Discover how a small lunar CosmoCube could use the Moon's radio-quiet far side to investigate the faint signals that may reveal how the early Universe evolved.

P6. ECONOMICS



Coal Gasification in India: Technology, Policy and Challenges - Discover how coal gasification could help India convert its abundant coal resources into value-added products while reducing dependence on imports.

P7. ECONOMICS

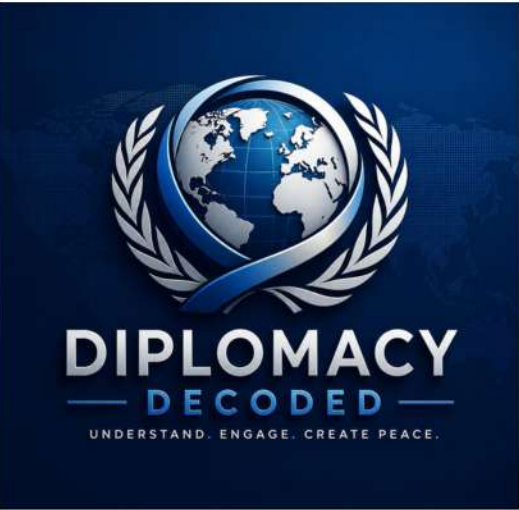


Notebook Industry: FTA, GST and Inverted Duty Structure: Understand how free trade agreements can create opportunities for consumers and trade while also exposing domestic producers to competitive pressures.

Editor's Note

This edition of the Pala Civil Times comes with a special surprise. While our daily articles continue to connect current affairs with static concepts, syllabus linkages and PYQ hooks, we are now taking this approach a step further. Starting today, we are introducing Daily Specials, with our debut feature under the Diplomacy Decoded series, where we will explore India's diplomatic relationships in greater depth. Today, we begin with India-Japan Relations, examining the evolving strategic, defence and maritime partnership. Alongside this special, the edition brings important themes from across the syllabus. Our national page looks at the Supreme Court's push for safer student accommodation following recent building tragedies. The economics page examines FTAs and domestic producers, alongside India's potential in coal gasification. Our Decoded Editorials explore Forest Rights and Gram Sabha consent and the balance between public and private participation in space. Finally, our science section explores what a CosmoCube Satellite could reveal about the Universe's origins. Happy reading!

Daily Special



India-Japan Defence Cooperation: From Strategic Convergence to Operational Capability

Editorials Decoded



Perilous retreat: On gram sabhas, tribal land issues



Examine the debate over gram sabha consent under the Forest Rights Act and the challenge of balancing tribal rights, democratic participation and infrastructure development.



For ISRO, expanding ecosystem is way forward



Explore how India is redefining the roles of ISRO and private companies while seeking to expand commercial space activity.

Illegal Constructions and Safety of Student Accommodation

The Supreme Court indicated that it may expand its existing court-monitored exercise against illegal constructions and unauthorised use of residential premises to examine the safety of student accommodation across the country. This move comes after the collapse of an illegally constructed building being used as a paying guest (PG) facility in Delhi's Satya Niketan killed seven people. The court-appointed amicus curiae sought a time-bound safety audit of PG facilities, private hostels and other student accommodation in and around colleges.

Current Situation

Unauthorised Use: PGs and private hostels often operate from residential properties with unauthorised additions or alterations.

Safety Compliance: Such premises must comply with sanctioned plans, building bye-laws, land-use, structural and fire-safety norms.

Inspection Gaps: Recent incidents has raised concerns over the effectiveness of existing inspection and enforcement mechanisms.

Recurring Risk: A similar collapse in Satya Niketan in April 2022 highlights the continuing risk and questions the effectiveness of inspections.

Supreme Court's Intervention

Existing Proceedings: The present proceedings originated from a Tamil Nadu case involving construction in violation of land-use norms and building bye-laws.

Expanded Scope: In March 2026, the Supreme Court widened the proceedings and sought information from civic bodies in several State capitals, including Delhi, Lucknow, Jaipur, Chennai and Kolkata, regarding action against similar violations.

Pan-India Approach: Following the Satya Niketan incident, the Bench indicated that the issue of student accommodation could be examined on a pan-India basis.

Safety Audit and Inspection

Coverage: The amicus curiae recommended extending the monitoring exercise across Delhi, particularly to PG facilities and student accommodation around universities and colleges.

Existing Committee: The Supreme Court had already constituted a committee to inspect buildings in Lajpat Nagar, Saket and Malviya Nagar. It comprises of two senior IIT professors and two draftsmen, assisted by MCD officials. They completed inspections and identified several potentially unsafe buildings in Saidulajab, Saket and Lajpat Nagar.



Governance, Accountability and Safety Measures

Enforcement: The recurring collapse highlights gaps in inspection, monitoring and enforcement, with five MCD officials suspended after the Satya Niketan incident.

Compliance: Authorities must verify sanctioned building plans, permissible land use, structural safety and fire-safety norms, particularly for residential premises converted into PGs or hostels.

Regular Audits: Time-bound and periodic safety audits can help identify dangerous structures before accidents occur rather than relying on post-disaster action.

Coordination: Effective coordination between civic authorities and judicial institutions is essential for enforcing regulations and addressing recurring urban safety violations.

PYQ Compass



Q. What are 'Smart Cities'? Examine their relevance for urban development in India. Will it increase rural-urban differences? Give arguments for 'Smart Villages' in the light of PURA and RURBAN Mission. (GS III - 2016)

Q. Examine the status of urbanization among the states in India and bring out spatial inequalities. (GS I - 2009)

SCIENCE

CosmoCube and the 21-cm Signal from the Early Universe

The CosmoCube satellite, expected to be launched before the end of this decade, aims to study faint signals from the early universe from the radio-quiet far side of the Moon.

What is CosmoCube Satellite?

CosmoCube is a proposed small satellite that will orbit the Moon and study extremely faint radio signals produced by neutral hydrogen in the early universe. During its planned two-year mission, CosmoCube will use periods behind the Moon to conduct observations free from most terrestrial radio interference.

Why the Far Side of the Moon?

Radio-quiet: The far side of the Moon is considered radio-quiet because the Moon can act as a natural shield against radio interference originating from Earth.

Detection: lunar far side is particularly valuable for detecting extremely faint cosmic radio signals that can otherwise be overwhelmed by much stronger human-generated radio emissions.

Observation time: CosmoCube is expected to spend around 40 minutes behind the Moon during every two-hour orbit, allowing it to collect scientific data during these radio-quiet periods.

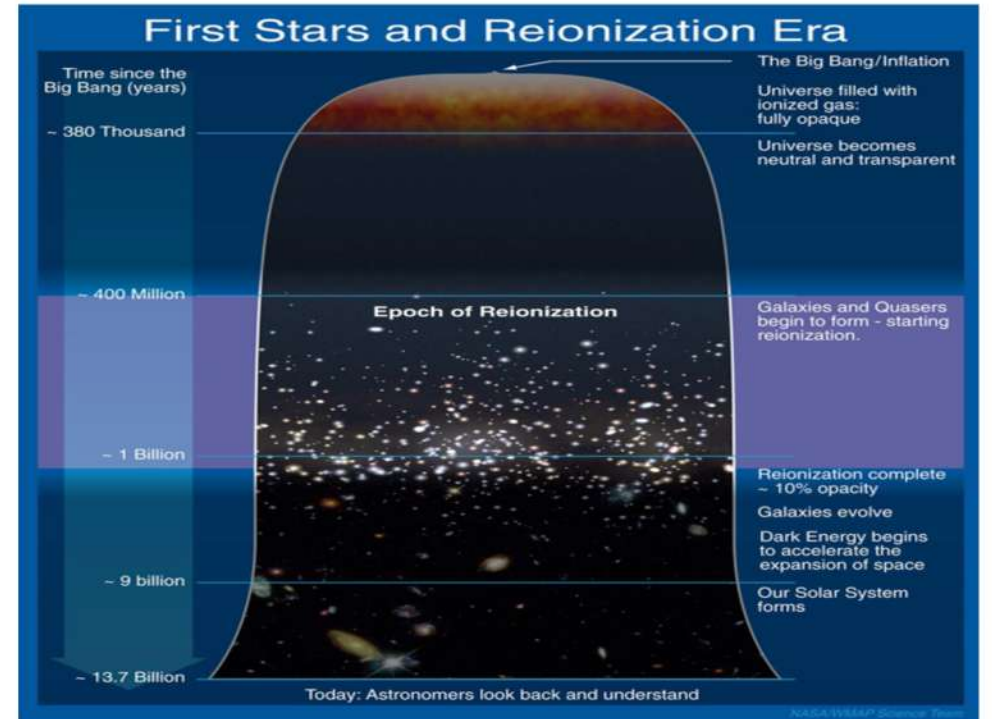
Communication: The satellite would ideally remain radio-silent while conducting observations to avoid contaminating its own measurements.

What is the 21-cm Signal?

Origin: The 21-cm signal is a characteristic radio emission from neutral hydrogen, produced by a quantum mechanical spin-flip transition.

Wavelength: It has a wavelength of 21 cm and a frequency of about 1,420 MHz. As the universe expands, the radiation is redshifted to longer wavelengths and lower frequencies.

Scientific Significance: Since neutral hydrogen was abundant before the formation of the first stars and galaxies, the 21-cm signal can reveal information about the poorly observed early universe.



Early Universe and Scientific Significance of CosmoCube

Cosmic Dark Ages: The Cosmic Dark Ages began roughly 380,000 years after the Big Bang, after the release of the CMB, when the universe was dominated by neutral hydrogen but the first stars and galaxies had not yet formed.

Cosmic Dawn: The emergence of the first stars and galaxies marked the Cosmic Dawn, when their radiation began transforming the surrounding neutral hydrogen and eventually initiated the Era of Reionisation.

Observation: CosmoCube will use a highly sensitive radio receiver (radiometer) operating at approximately 10–100 MHz to separate incoming radio waves into frequency channels and identify the characteristic 21-cm signal from early neutral hydrogen.

Challenge: The 21-cm signal is extremely faint and is buried beneath foreground radio emissions that can be tens of thousands of times stronger, making its detection highly challenging.

Scientific Value: By studying this signal, CosmoCube could provide observations of the poorly explored period between the CMB and the formation of the first stars and galaxies, improving our understanding of the emergence of the early universe.

PYQ Compass



Q. The terms 'Event Horizon', 'Singularity', 'String Theory' and 'Standard Model' are sometimes seen in the news in the context of: (2017)

- Observation and understanding of the Universe
- Study of the solar and the lunar eclipses
- Placing satellites in the orbit of the Earth
- Origin and evolution of living organisms on the earth

For ISRO, expanding ecosystem is way forward (I.E : 09-09-2026)

ISRO employee associations sought clarification over remarks by Pawan Kumar Goenka, Chairman of IN-SPACe, suggesting that ISRO could eventually stop manufacturing launch vehicles and leave this activity to private companies. Later, ISRO Chairman V. Narayanan clarified that there was no move to privatise ISRO, while also supporting the increasing participation of private companies in the space sector. The debate began after the Indian Space Research Organisation (ISRO) tightened its norms concerning resignation and voluntary retirement of senior scientific personnel.



What is the Emerging Change in ISRO's Role?

Traditional Role: ISRO has historically combined research and development, technology development, manufacturing and launch activities.

Changing Approach: The emerging policy direction appears to be toward an ISRO that focuses more strongly on major scientific, exploratory and technologically ambitious missions, while routine and commercial activities increasingly move towards industry.

NASA-like Model: The government appears to be preparing ISRO for a role similar to that of NASA, where the public space agency concentrates on major scientific and exploration programmes while private industry undertakes a larger share of routine commercial activity.

Industry Handholding: ISRO is expected to help private companies develop the technological and operational maturity needed to undertake complex space activities.

Private Sector Participation: Expansion and Significance

Expertise: Retired ISRO scientists are joining private companies as advisors, transferring institutional experience to industry.

Infrastructure: ISRO is providing access to launch infrastructure and transferring technologies such as SSLV to industry.

Commercial Capacity: Private companies can undertake more commercial launches, expanding India's space-sector capacity.

Employment: A growing private ecosystem can create a larger talent pool and new employment opportunities across space manufacturing, launches, products and services.

Diplomatic Value: India's expanding capabilities in space products and services can also strengthen its international engagement.

ISRO: Concerns, Future Focus and Institutional Balance

Concerns: ISRO may lose commercial revenue and become more dependent on government funding if it withdraws from routine launches, potentially affecting its ability to finance R&D and retain top-tier talent.

Core Focus: ISRO should increasingly concentrate on scientific missions, space exploration and advanced technology development, while transferring mature technologies and supporting private-sector growth.

Institutional Autonomy: Greater government support should not come at the cost of the institutional independence that has contributed to ISRO's scientific and technological success.

Complementarity: Private companies can undertake commercial launches, manufacturing and space services, while ISRO retains its core research, exploration and strategic capabilities.

Balance: Private-sector expansion should strengthen the overall ecosystem without reducing ISRO to a supervisory body or depriving it of the resources, revenue, talent and autonomy needed for ambitious long-term missions.

PYQ COMPASS



Q. Consider the following statements with regard to involvement of private entities in India's space programme:

1. The Indian National Space Promotion and Authorisation Centre (IN-SPACe) is an autonomous agency formed to facilitate participation of private entities.

2. Agnikul Cosmos launched the world's first flight using 3D printed rocket engine. 3. Skyroot Aerospace has developed liquid fuel for GSLV.

Which of the statements given above is/are correct?

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

Perilous retreat: On gram sabhas, tribal land issues (The Hindu : 09-09-2026)

A Parliamentary committee's suggestion to accept consent from 70–75% of affected gram sabhas for certain projects has triggered concerns over weakening the safeguards available to forest-dependent communities under the Forest Rights Act, 2006.

What is Forest Rights Act , 2006?

Purpose: The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 was enacted to address the historical marginalisation of forest-dependent communities and recognise their rights over forest resources.

Rights and Livelihood: The FRA seeks to balance environmental protection with the rights to life, livelihood and customary forest-based existence of tribal and other traditional forest-dwelling communities.



Role of Gram Sabha

Participation: Gram sabhas are central to the participation of forest-dependent communities in decisions affecting their land and resources.

Forest Diversion: Before forest land is diverted for non-forest purposes, the relevant FRA processes must be completed, including identifying claimants, recognising and vesting applicable rights, and obtaining an NOC from the concerned gram sabhas.

Legal Position: Although the FRA does not explicitly use the phrase requiring an NOC from every affected gram sabha, this does not mean that gram sabha decisions can simply be bypassed in the forest-diversion process.

The Current Controversy

Parliamentary Proposal: The Committee on Public Undertakings, citing delays in forest clearances for projects like Teesta-IV, recommended examining a 70–75% qualified super-majority of affected gram sabhas for large projects of national importance.

Government Position: The Ministry of Tribal Affairs has stated that the FRA does not specifically require gram sabha consent for Stage-II forest clearance and that such matters do not fall within its purview.

Regulatory Concern: This has raised concerns over a possible gap between the FRA, forest-diversion procedures and institutional responsibilities.

What is the 70–75% Proposal Significant?

Local Consent: A super-majority system could allow a project to proceed even when a gram sabha directly affected by the project has withheld its consent.

Democratic Protection: It could weaken the gram sabha's role as a body representing the rights of a specific forest-dependent community by allowing its decision to be overridden by consent from other villages.

Community Autonomy: Since land is closely linked to the livelihoods, culture, identity and political autonomy of forest-dependent communities, weakening their decision-making powers could increase concerns over displacement and dispossession.

Challenges : Effective implementation of the FRA requires procedural awareness, proper communication and due process before decisions affecting forest-dependent communities are treated as final.

India must balance the need for timely infrastructure development with the FRA's objective of protecting the rights and livelihoods of forest-dependent communities. Any reform of the forest-diversion framework should preserve meaningful participation of affected gram sabhas and ensure that development does not weaken legally recognised rights. The way forward lies in development with due process, democratic participation and protection of community rights.

PYQ Compass



Q. Does India's tribal development policy reflect the aspirations for a socially grounded and equity-based governance? Justify your answer (GS II - 2026).

Coal Gasification in India: Technology, Policy and Challenges

The Coal Ministry received seven applications in the first window of its financial-support scheme for coal gasification projects, while the second application window began on September 8.

What is Coal Gasification?

Definition: Coal gasification is the conversion of coal into synthetic gas or syngas, which can then be used to produce products such as urea, methanol, ammonium nitrate, synthetic natural gas (SNG), hydrogen and dimethyl ether.

Resource Base: India possesses approximately 401 billion tonnes of coal and 47 billion tonnes of lignite.

How Does Coal Gasification Work?

Conversion: Coal is subjected to a gasification process that converts it into syngas, which serves as an intermediate feedstock.

Downstream Products: Syngas can subsequently be processed into products such as urea, methanol, SNG, hydrogen and ammonium nitrate, allowing coal to serve as a feedstock for several industrial products.

Indian Coal: The high ash content, variable gross calorific value and complex mineral matter in Indian coal create particular technical challenges for large-scale gasification.

Suitable Technology: Fluidised-bed gasification is considered particularly suitable for Indian coal because a gas stream lifts the coal away from ash while enabling its gasification using heat.

Why is India Promoting Coal Gasification?

Import Dependence: India imports around one-fifth of its urea requirement, almost its entire ammonia requirement and approximately 80–90% of its methanol requirement. Wider coal gasification can support domestic production of these downstream products and reduce import dependence.

Resource Utilisation: Gasification seeks to derive greater value from India's abundant coal and lignite resources by converting them into industrial feedstocks and products.

2030 Target: India has set a target of gasifying 100 million tonnes of coal by 2030, with the latest scheme intended to support gasification of around 75 million tonnes of coal and/or lignite.

Government Support, Projects and Technological Capacity

Policy Support: The Union Cabinet approved a ₹37,500-crore package on May 13 to promote surface coal and lignite gasification, with financial incentives covering one-fifth of plant and machinery costs.

Current Applications: The first application window received seven proposals. This builds on the ₹8,500-crore package approved in January 2024, under which eight projects were approved.

Project Pipeline: The Talcher coal-based ammonia-urea complex is expected in FY 2027–28, while projects involving syngas, ammonium nitrate, direct reduced iron, ethanol and hydrogen are expected in FY 2029–30.

Indigenous Technology: BHEL has developed pressurised fluidised-bed gasifier technology suited to the high ash content and variability of Indian coal, while 16 domestic facilities identified by NITI Aayog can produce critical components.

Indigenisation: Jindal Steel and Greta Energy and Metal have indigenised around 80–90% of their production, helping reduce project costs and strengthen domestic technological capability.

Coal gasification requires suitable technology, adequate scale, assured product offtake and competitive financing to become commercially sustainable. The success of India's gasification programme will therefore depend on balancing government support, technological indigenisation and long-term project viability.

PYQ Compass



Q. Consider the following substances:

- I. Ethanol
- II. Nitroglycerine
- III. Urea

Coal gasification technology can be used in the production of how many of them?

- (a) Only one
- (b) Only two
- (c) All the three
- (d) None

Notebook Industry: FTA, GST and Inverted Duty Structure

The All India Notebook Manufacturers Association has sought government intervention, citing competitive pressure on domestic notebook manufacturers from low-cost imports and the revised GST structure.



What is the issue?

Domestic Industry: India's notebook manufacturing sector comprises around 1,500 units and employs approximately 1.25 lakh people.

Import Competition: The imports of low-cost finished notebooks from ASEAN countries, particularly Indonesia, as an immediate threat to domestic manufacturers.

Trade Advantage: Under the existing ASEAN Free Trade Agreement (FTA), finished paper products such as exercise books, graph books and laboratory notebooks can enter India from countries including Indonesia, Thailand and Malaysia without Basic Customs Duty (BCD).

How Did the GST Change Affect the Industry?

GST Exemption: Recently, GST rate on exercise books and notebooks was revised from 12% to Nil, to support the education sector and reduce students' financial burden.

Imported Notebooks: Since finished notebooks became nil-rated, the Integrated GST (IGST) on imported notebooks also became 0%, according to the Association.

Domestic Inputs: At the same time, important inputs used by domestic manufacturers, including paper, coated paperboard, specialised adhesives, stitching wire, packaging cartons and printing inks, continue to attract 18% GST.

Inverted Duty Structure: This creates an inverted duty structure, where the tax burden on inputs is higher than that on the finished product, placing domestic manufacturers at a competitive disadvantage.

Input Tax Credit: Because the finished notebook is nil-rated while inputs carry GST, domestic manufacturers cannot fully recover the tax paid on their inputs through input tax credit, making part of this tax an unrecoverable cost of production.

Why is the Issue Significant?

Competitiveness: Domestic producers face competition from imported finished notebooks that can enter without BCD and IGST.

Cost Structure: Domestic manufacturers continue to bear GST on several inputs, increasing their effective cost of production.

FTA Impact: The existing tariff structure under the ASEAN FTA, combined with domestic tax changes, has created an asymmetrical competitive environment for Indian manufacturers.

Industry Vulnerability: The issue highlights how trade liberalisation and domestic tax rationalisation can have unintended consequences for domestic manufacturing.

What Has the Industry Proposed?

Minimum Import Price: The Association has proposed introducing a Minimum Import Price (MIP) for imported notebooks to prevent excessively low-priced imports from adversely affecting domestic producers.

Anti-Dumping Investigation: an anti-dumping investigation has been sought into notebook imports from Indonesia.

Export Refunds: Streamlining export refund mechanisms have been proposed to improve competitiveness of domestic manufacturers.

Raw Material Costs: The Association has urged investigation into alleged anti-profiteering by domestic paper mills.

PYQ Compass



Q. Consider the following items: (2018)

1. Cereal grains hulled
2. Chicken eggs cooked
3. Fish processed and canned
4. Newspapers containing advertising material

Which of the above items is/are exempted under GST (Goods and Services Tax)?

- a) 1 only
- b) 2 and 3 only
- c) 1, 2 and 4 only
- d) 1, 2, 3 and 4

India-Japan Defence Cooperation: From Strategic Convergence to Operational Capability

Indian Defence Minister Rajnath Singh and Japanese Defence Minister Shinjiro Koizumi met in New Delhi on 20 August 2026 and agreed to deepen defence cooperation, particularly in maritime security, exercises, defence technology, shipbuilding and operational coordination.

Strategic Context

Special Strategic and Global Partnership:

Defence cooperation is an important pillar of the Japan-India Special Strategic and Global Partnership, with both countries reaffirming their commitment to peace, stability and prosperity in the Indo-Pacific.

Free and Open Indo-Pacific: Following the July 2026 Joint Statement, India and Japan reiterated their commitment to a free and open Indo-Pacific and expressed concern over unilateral attempts to alter the status quo through force or coercion.

Strategic Convergence: After years of institutional cooperation through dialogues, the 2+2 mechanism, military exercises, logistics arrangements and technology discussions, the partnership is increasingly moving from strategic convergence towards operational capability.

Maritime and Naval Cooperation

Maritime Security MoA: India and Japan signed a Memorandum of Arrangement on Maritime Security Cooperation to strengthen practical cooperation between their maritime forces.

MDA and SLOCs: The arrangement provides for Maritime Domain Awareness information sharing, protection of Sea Lines of Communication, naval visits, joint exercises and personnel and expert exchanges.

SAR and HADR: Cooperation will expand in Search and Rescue (SAR) and Humanitarian Assistance and Disaster Relief (HADR), supported by greater logistical coordination.

Logistics: Both sides will explore the use of ports, maintenance and repair facilities, strengthening practical maritime connectivity.

Mine Countermeasures: India and Japan will enhance cooperation in mine countermeasures, adding another operational dimension to maritime security.

Defence - Industrial and Technological Cooperation

Shipbuilding: India and Japan will explore joint development in naval shipbuilding and design, combining Japanese technological expertise with Indian production capabilities.

Make in India: Japan will explore greater use of Indian production capabilities under Make in India, while both sides will pursue reciprocal ship-repair arrangements.

Defence Technology: Japan's revised framework for defence equipment and technology transfers provides scope for deeper technological cooperation.

UNICORN: The shipborne UNICORN integrated communications antenna system is being pursued as the first defence equipment transfer project between India and Japan, with both sides seeking its early realisation.

R&D: Cooperation between India's DRDO and Japan's ATLA will be strengthened in advanced defence technologies, alongside plans for a Defence Industry Forum.

Exercises and Operational Capability

Joint Exercises: India and Japan continue to deepen military cooperation through exercises such as Dharma Guardian and JAIMEX.

Air Cooperation: Japanese fighter aircraft are participating in Veer Guardian 26 in India for the first time, marking an important expansion of air-force cooperation.

Advanced Exercises: Both sides will increase the complexity of exercises and incorporate unmanned systems, short-notice exercises and Special Operations Forces cooperation.

Integrated Theatre Commands: Japan will explore cooperation with India's integrated theatre commands following their establishment.

Operational Focus: These initiatives seek to move cooperation beyond symbolic exercises towards greater preparedness, responsiveness and interoperability.

India–Japan Defence Cooperation

Institutional Coordination

Working Group: India and Japan will establish a Director-General/Joint Secretary-level Working Group to coordinate operational, intelligence, equipment, technology and industrial cooperation.

Implementation: The mechanism is intended to maximise synergies and accelerate the implementation of decisions taken by the two Defence Ministers.

2+2 Mechanism: Both sides will accelerate preparations for the Fourth Japan–India Foreign and Defence Ministerial Meeting (2+2) in Tokyo in 2026.

Sovereignty: Cooperation will continue while respecting the policies and sovereign choices of both countries.

Regional and Third-Country Cooperation

Trilateral PASSEX: India, Japan and Indonesia conducted their first trilateral naval PASSEX in February 2026, expanding maritime cooperation beyond the bilateral framework.

Third-Country Engagement: India and Japan will deepen cooperation with third countries through high-level exchanges, exercises and other initiatives.

Indo-Pacific Logistics Network: Both countries will promote the Indo-Pacific Logistics Network (IPLN) to support partner countries during natural disasters through the movement of personnel and supplies.

Regional Resilience: Such initiatives extend the partnership from bilateral defence cooperation towards wider Indo-Pacific security, disaster response and regional resilience.

Broader Strategic Significance

Complementary Strengths: India contributes production capabilities and a central position in the Indian Ocean, while Japan contributes advanced technology and maritime capabilities.

Defence-Industrial Resilience: Joint production, shipbuilding, repair and technology cooperation can strengthen defence-industrial capabilities and reduce vulnerabilities in regional supply chains.

Maritime Security: Greater MDA, logistics, exercises and SLOC cooperation can strengthen the capacity of both countries to contribute to a stable and secure Indo-Pacific.



Beyond a Single Threat: Although regional security concerns form an important backdrop, India–Japan cooperation extends beyond a China-centric framework to include maritime security, technology, defence industry, logistics and third-country cooperation.

Strategic Partnership: Defence cooperation increasingly complements wider cooperation in economic security, critical technologies and resilient supply chains.

Key Challenge: From Agreements to Outcomes

Implementation: The principal challenge is to translate the growing number of agreements and institutional mechanisms into tangible operational capabilities.

Project Delivery: The progress of initiatives such as UNICORN, shipbuilding, ship repair and defence-technology projects will determine the depth of practical cooperation.

Interoperability: More complex exercises, unmanned systems and short-notice deployments can test whether strategic convergence translates into actual operational preparedness.

Institutional Coordination: The new Working Group can help prevent fragmentation by connecting the operational, intelligence, technological and industrial dimensions of the partnership.

PYQ Compass



Q. The terms 'Event Horizon', 'Singularity', 'String Theory' and 'Standard Model' are sometimes seen in the news in the context of: (2017)

- a) Observation and understanding of the Universe
- b) Study of the solar and the lunar eclipses
- c) Placing satellites in the orbit of the Earth
- d) Origin and evolution of living organisms on the earth

Ans : a

The terms relate to various aspects of theoretical physics and cosmology:

Event Horizon: Refers to the boundary around a black hole beyond which nothing, not even light, can escape. It is crucial for studying black holes and their properties.

Singularity: A point at the center of a black hole where gravity is so intense that space and time break down, and known laws of physics cease to apply.

String Theory: A theoretical framework that attempts to unify all fundamental forces of nature by proposing that particles are not point-like but rather tiny vibrating strings.

Standard Model: A theory in particle physics that describes the fundamental particles (quarks, leptons, bosons) and their interactions, excluding gravity.

Q. Consider the following statements with regard to involvement of private entities in India's space programme: (2026)

1. The Indian National Space Promotion and Authorisation Centre (IN-SPACe) is an autonomous agency formed to facilitate participation of private entities.
 2. Agnikul Cosmos launched the world's first flight using 3D printed rocket engine.
 3. Skyroot Aerospace has developed liquid fuel for GSLV.
- Which of the statements given above is/are correct?

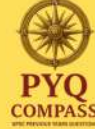
- (a) 1 only
- (b) 2 and 3 only
- (c) 1 and 2 only
- (d) 1, 2 and 3

Ans : C

IN-SPACe (Indian National Space Promotion and Authorisation Centre) was established in 2020 as an autonomous body under the Department of Space to promote, support, and authorize private sector participation in India's space ecosystem. Agnikul Cosmos successfully launched its Agnibaan SOrTeD mission, featuring the world's first flight using a single piece 3D-printed semi-cryogenic rocket engine.

Skyroot Aerospace developed the Vikram-S suborbital rocket using solid propulsion technology. It has not developed liquid fuel systems for GSLV, whose cryogenic engines were developed by ISRO. Hence statement 3 is incorrect.

PYQ Compass



Q. Consider the following substances:

- I. Ethanol
- II. Nitroglycerine
- III. Urea

Coal gasification technology can be used in the production of how many of them?

- (a) Only one
- (b) Only two
- (c) All the three
- (d) None

Ans : b

Syn Gas produced from Coal gasification can be usable in producing Synthetic Natural Gas (SNG), energy fuel (methanol & ethanol), ammonia for fertilizers and petro-chemicals. Synata Bio has designed an advanced syngas to ethanol technology to ferment syngas. **So option 1 is correct.**

Talcher Fertilizer Ltd. (a joint venture of CIL, GAIL, RCF and FCIL) is engaged in setting up of an integrated coal gasification based urea plant wherein high ash coal from nearby Talcher coalfields blended with Pet-coke shall be utilized to produce 1.27 Million Metric Tonnes Per Annum (MMTPA) neem coated Urea. Currently, construction activities are underway. **So option 3 is correct.**

Q. Consider the following items: (2018)

1. Cereal grains hulled
2. Chicken eggs cooked
3. Fish processed and canned
4. Newspapers containing advertising material

Which of the above items is/are exempted under GST (Goods and Services Tax)?

- a) 1 only
- b) 2 and 3 only
- c) 1, 2 and 4 only
- d) 1, 2, 3 and 4

Ans : C

This is a good example of how UPSC can question the latest developments in India's tax administration.

PRACTICE QUESTIONS

Q. Consider the following statements regarding the recent concerns of India's domestic notebook industry:

1. Finished notebooks imported from certain ASEAN countries can enter India at zero Basic Customs Duty under the ASEAN Free Trade Agreement.
2. Domestic manufacturers can claim Input Tax Credit on GST paid on raw materials used to manufacture notebooks.
3. The present tax structure can create an inverted duty structure for domestic notebook manufacturers, as several inputs continue to attract GST while the finished product is exempt.
4. The industry has sought measures such as a Minimum Import Price and an anti-dumping investigation into notebook imports from Indonesia.

Which of the statements given above is/are correct?

- a) 1, 3 and 4 only
- b) 1 and 2 only
- c) 2, 3 and 4 only
- d) 1, 2, 3 and 4

Answer: a) 1, 3 and 4 only

Statement 1 — Correct: Finished notebooks from countries such as Indonesia can enter India with zero Basic Customs Duty under the ASEAN FTA.

Statement 2 — Incorrect: Since the finished notebook is exempt from GST, domestic manufacturers cannot claim ITC for GST paid on eligible inputs in the normal manner.

Statement 3 — Correct: Inputs such as paper, coated paperboard and packaging can attract GST, while the finished notebook is exempt, creating a cascading/inverted tax burden for domestic producers.

Statement 4 — Correct: The industry has sought a Minimum Import Price (MIP) and an anti-dumping investigation into Indonesian notebook imports.

Q. With reference to coal gasification in India, consider the following statements:

1. Coal gasification converts coal into a gaseous mixture known as syngas, which can serve as a feedstock for producing chemicals, fuels and fertilisers.
2. Indian coal poses technological challenges for gasification because of its relatively high ash content and variable calorific value.
3. Fluidised-bed gasification technology can be particularly relevant for processing Indian coal with such characteristics.
4. The primary objective of India's coal gasification initiative is to completely replace coal-based power generation with renewable energy.

Which of the statements given above are correct?

- (a) 1, 2 and 3 only
- (b) 1 and 4 only
- (c) 2, 3 and 4 only
- (d) 1, 2, 3 and 4

Ans: (a) 1, 2 and 3 only

Statement 1 — Correct: Coal gasification produces syngas, which can be used to manufacture products such as methanol, ammonia, urea and synthetic natural gas.

Statement 2 — Correct: India's coal has high ash content, variable GCV and complex mineral matter, creating technological challenges for gasification.

Statement 3 — Correct: Fluidised-bed gasification is considered suitable for Indian coal because of these characteristics.

Statement 4 — Incorrect: India's coal gasification initiative focuses on converting coal into value-added products and reducing import dependence, not replacing coal-based power generation with renewables.