



**UPSC
Mentorship**
A Unit of Mentorship India

DAILY CURRENT AFFAIRS

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SOURCES



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GS I

1. Shift in Cropping Pattern Dynamics in India and Its Impact

Source: The Indian Express

Context: India's cropping patterns are shifting from traditional subsistence farming to a diversified, commercially-oriented approach. This change impacts agriculture, food security, and resource management.

Cropping Patterns:

- **Kharif Cropping (July-October):** Increased area and record rice production (1357.55 lakh tonnes in 2022-23). Major crops: rice, maize, oilseeds.
- **Rabi Cropping (October-April):** Crucial for food security, with wheat production at 1105.54 lakh tonnes in 2022-23. Major crops: wheat, barley, mustard.
- **Zaid Cropping (March-June):** Significant increase in area under Zaid crops, from 29.71 lakh hectares in 2017-18 to 80.46 lakh hectares in 2020-21. Major crops: watermelon, cucumber.

Factors Shaping Patterns:

- **Environmental:** Climate change affects yields, with irregular rainfall impacting Kharif and Rabi crops.
- **Technological:** Adoption of modern techniques and climate-resilient varieties is altering cropping patterns.
- **Social/Cultural:** Traditional practices and landholdings impact crop choices; marginal landholdings affect mechanisation.
- **Government Interventions:** MSP and crop insurance influence patterns; horticulture production has surpassed foodgrains.

Changes Observed:

- **Increased Cropping Intensity:** From 111% in 1950-51 to 151% in 2019-20.



- **Reduction in Food Crops:** Decline in foodgrains, with a shift towards oilseeds, fruits, vegetables, and non-food crops.
- **Commercial Crops:** States like Punjab and Haryana are shifting from rice and wheat to high-value crops like cotton and sugarcane.

Implications and Challenges:

- **Benefits:** Diversification can enhance income and market orientation of agriculture.
- **Challenges:** Risk to food security due to reduced staple grains; need for balanced cultivation and sustainable resource use.

Conclusion: India's shift towards diversified and commercial cropping patterns offers economic opportunities but also presents challenges for food security and resource management. Balancing high-value crops with staple food grains is essential for agricultural stability and sustainability.

GS II

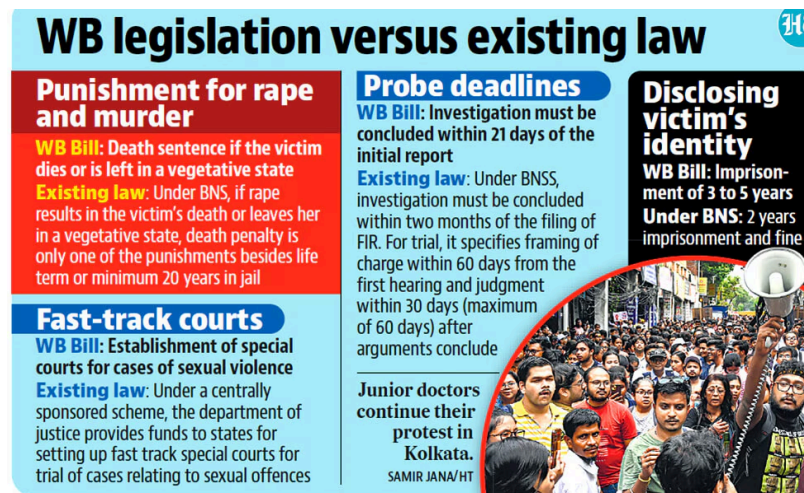
2. West Bengal Passes 'Aparajita' Bill with Death Penalty for Rape

Source: The Indian Express


Context: The West Bengal Assembly has unanimously passed the Aparajita Women and Child (West Bengal Criminal Laws Amendment) Bill, 2024, introducing stricter penalties for rape and sexual assault.

Key Provisions Related with Aparajita:

- **Death Penalty for Rape:** Capital punishment for rape cases where the victim dies or is left in a vegetative state.
- **Time-Bound Investigations and Trials:** Investigations must be completed within 21 days, with fast-track courts mandated for swift justice.
- **Aparajita Task Force:** A specialized district-level task force, led by a deputy superintendent of police, to focus on cases of sexual violence.
- **Stricter Penalties for Repeat Offenders:** Life imprisonment for repeat offenders, with the possibility of the death penalty.



WB legislation versus existing law

<p>Punishment for rape and murder</p> <p>WB Bill: Death sentence if the victim dies or is left in a vegetative state</p> <p>Existing law: Under BNS, if rape results in the victim's death or leaves her in a vegetative state, death penalty is only one of the punishments besides life term or minimum 20 years in jail</p>	<p>Probe deadlines</p> <p>WB Bill: Investigation must be concluded within 21 days of the initial report</p> <p>Existing law: Under BNSS, investigation must be concluded within two months of the filing of FIR. For trial, it specifies framing of charge within 60 days from the first hearing and judgment within 30 days (maximum of 60 days) after arguments conclude</p>	<p>Disclosing victim's identity</p> <p>WB Bill: Imprisonment of 3 to 5 years</p> <p>Under BNS: 2 years imprisonment and fine</p>
<p>Fast-track courts</p> <p>WB Bill: Establishment of special courts for cases of sexual violence</p> <p>Existing law: Under a centrally sponsored scheme, the department of justice provides funds to states for setting up fast track special courts for trial of cases relating to sexual offences</p>	<p>Junior doctors continue their protest in Kolkata.</p> <p>SAMIR JANA/HT</p>	



- **Victim Identity Protection:** Provisions to protect the identities of victims, ensuring privacy and dignity during the legal process.
- **Accountability and Penalties:** Penalties for police and health officials who delay justice or tamper with evidence, and restrictions on unauthorized publication of court proceedings, with imprisonment of 3 to 5 years.

Target Legislation:

- The Bill amends relevant sections of the Bharatiya Nyaya Sanhita (BNS) and the Protection of Children from Sexual Offences (POCSO) Act.

3. Amid South China Sea tensions, PM Modi in Brunei to discuss defence ties

Source: The Indian Express

Context: Amid South China Sea tensions, the Indian Prime Minister visits Brunei to enhance bilateral relations and highlights Brunei's role in India's 'Act East' Policy and Indo-Pacific Vision.

Key Points:

- **Diplomatic Milestone:** This inaugural visit seeks to strengthen defence, trade, and cultural ties between India and Brunei.
- **Strategic Importance:** Brunei's maritime claims in the South China Sea make it a key partner for India in the Indo-Pacific region.

Focus Areas:

- **Defence Cooperation:** Discussions will explore new defence collaborations, including a potential working group and existing naval and Coast Guard exchanges.
- **Space Technology:** The partnership includes a Telemetry, Tracking, and Command station in Brunei for monitoring Indian satellites.
- **Economic and Cultural Ties:** The visit aims to bolster commercial and cultural connections.

Strategic Implications:

- **Act East Policy:** The visit reinforces India's Indo-Pacific vision and counters regional influences.
- **Regional Tensions:** Strengthening ties with Brunei aligns with India's strategy to secure its position in the Indo-Pacific.

Future Prospects:



- **Enhanced Cooperation:** The visit is expected to expand defence cooperation, trade, and investment.
- **Strengthened Relations:** It aims to solidify India-Brunei relations and contribute to a stable Indo-Pacific region.

Conclusion:

PM Modi's visit to Brunei is a strategic move to enhance bilateral ties, focus on defence and space technology, and strengthen India's position in the Indo-Pacific.



GS III

4. World Bank Ups India's Growth Forecast to 7% for FY 2024-25

Source: The Hindu

Context: The World Bank has revised its growth forecast for India's economy to 7% for the fiscal year 2024-25, up from an earlier estimate of 6.6%. This revision reflects India's resilience amidst a challenging global environment.

Growth Forecast:

- **Revised Projection:** The World Bank has increased its growth forecast for India from 6.6% to 7% for FY 2024-25.
- **Global Alignment:** The projection is consistent with forecasts from the IMF and ADB, which also estimate 7% growth for the same period.

Sectoral Performance:

- **Economic Drivers:** India's growth in FY 2023-24 was 8.2%, bolstered by public infrastructure investments and a surge in household investments in real estate.
- **Sectoral Contributions:** Manufacturing grew by 9.9%, and the services sector remained strong, compensating for the weaker performance in agriculture.

Employment Trends:

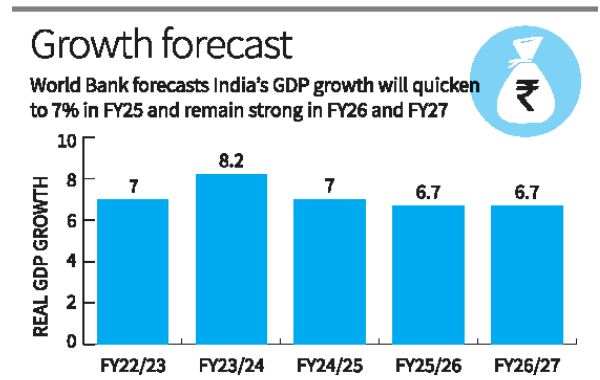
- **Urban Unemployment:** There has been a gradual improvement in urban unemployment rates post-pandemic, with female unemployment dropping to 8.5% in early FY 2024-25.
- **Youth Unemployment:** Despite the overall improvement, urban youth unemployment remains high at 17%.

Future Prospects:

- **Export Potential:** The World Bank emphasized India's potential to further boost growth by diversifying its export basket, particularly in textiles, apparel, footwear, electronics, and green technology products.

Impact on Poverty:

- **Economic and Social Impact:** With robust growth and a declining inflation rate, India is expected to make significant strides in reducing extreme poverty.



5. Could earthquakes explain why gold nuggets are found in quartz veins?

Source: The Hindu

Context: A study in *Nature Geoscience* suggests that most gold nuggets are found in quartz veins in mountainous regions due to seismic activity and the piezoelectric properties of quartz, which facilitate gold accumulation.

Key Findings:

- **Gold in Quartz Veins:** Researchers have long observed that a significant amount of gold is found in orogenic quartz veins. The study suggests that the quartz itself, being piezoelectric, plays a crucial role in this process.
- **Piezoelectric Effect:** Quartz generates an electric field when mechanically stressed, such as during earthquakes. This field can drive electrochemical reactions that cause gold to deposit from surrounding solutions onto the quartz.
- **Experimental Evidence:** The researchers tested this hypothesis by straining quartz slabs in a solution containing dissolved gold. The strained slabs accumulated gold, while the unstrained control slabs did not.
- **Seismic Waves and Gold Deposition:** Seismic waves from earthquakes repeatedly stress quartz crystals, leading to continuous gold deposition over time. This process can explain the formation of large gold nuggets in these veins.



Implications:

- **Localized Gold Deposits:** The study suggests that the piezoelectric effect, coupled with seismic activity, could explain why gold nuggets are highly localized in certain quartz veins.
- **Understanding Gold Formation:** This finding enhances our understanding of natural gold enrichment, using principles of high-school physics and chemistry.

6. ISRO's Aditya-L1: Payloads, significance and impact on day-to-day life

Source: The Indian Express

Context: ISRO's Aditya-L1 mission is India's inaugural solar mission, aimed at studying the Sun's dynamics and space weather effects.



Payloads on Board

Aditya-L1:

- **Visible Emission Line Coronagraph (VELC):** Observes the solar corona; aids in space weather forecasting.
- **Solar Ultraviolet Imaging Telescope (SUIT):** Captures UV images of the Sun's atmosphere; studies solar impact on Earth's climate.
- **Aditya Solar Wind Particle Experiment (ASPEX):** Measures solar wind properties; enhances understanding of solar effects on space.
- **Plasma Analyser Package for Aditya (PAPA):** Analyzes plasma in space; provides insights into solar impacts on space weather.
- **Solar Low Energy X-ray Spectrometer (SoLEXS):** Monitors low-energy solar X-rays; studies solar flare dynamics.
- **High Energy L1 Orbiting X-ray Spectrometer (HEL1OS):** Detects high-energy X-rays from solar flares; assesses solar corona processes.
- **Magnetometer (MAG):** Measures interplanetary magnetic fields; helps understand geomagnetic storms.

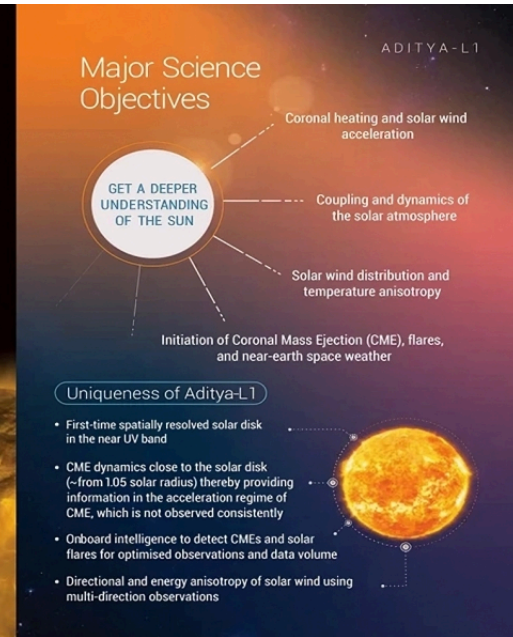
Significance and Impact:

- **Space Weather Forecasting:** Improves forecasts for satellite and power grid protection.
- **Climate Monitoring:** Enhances climate models and disaster preparedness.
- **Radiation Awareness:** Issues alerts for solar radiation exposure during storms.
- **Communication and Navigation:** Improves predictions of satellite and GPS disruptions.

Way Forward:

- **Data Utilization:** Collaborate globally to analyze data and explore new research areas.
- **Future Missions:** Potential for advanced solar missions and deep space studies.
- **Global Collaboration:** Share data to advance scientific knowledge.
- **Space Weather Mitigation:** Develop strategies to protect infrastructure and technology.

Conclusion:



Aditya-L1 enhances understanding of solar activities and impacts, contributing to better space weather forecasting, climate monitoring, and communication systems. Future advancements will further space exploration and technology development.

7. How can biotechnology be harnessed for economic development?

Source: The Indian Express

Context: India's BioE3 (Biotechnology for Economy, Environment, and Employment) policy aims to drive economic transformation through biotechnological advancements, impacting various sectors including manufacturing and environmental sustainability.

Sustainable Manufacturing: Advances like gene editing and synthetic biology offer eco-friendly alternatives to traditional manufacturing processes.

Environmentally Friendly Products:

- **Animal-Free Milk:** Produced via precision fermentation, it reduces carbon footprint while mimicking natural milk.
- **Bioplastics:** Derived from renewable resources, these are biodegradable alternatives to conventional plastics.

Carbon Capture and Storage:

- **Biological Processes:** Micro-organisms capture CO₂ and convert it into biofuels, potentially replacing traditional carbon capture methods.

Synthetic Biology and Organ Engineering:

- **Innovations:** Creating novel organisms and growing lab-engineered organs can address organ shortages and improve health outcomes.

Impact of BioE3 Policy:

- **Economic Growth:**
 - **Biomanufacturing Potential:** Projected to generate \$2-4 trillion in the next decade. The policy is set to enhance India's biomanufacturing capabilities.
- **Building Competencies:**



BioE3 POLICY
HERALDING A NEW ERA OF BIO REVOLUTION...

FOCUS AREAS OF THE POLICY:

- Facilitating shift from chemical-based industries to sustainable bio-based models
- Promoting a circular bio economy
- Achieving net-zero carbon emissions
- Encouraging development of bio-based products and expanding job creation

India's bio economy has skyrocketed from **\$10 billion** in 2014 to over **\$130 billion** in 2024, with projections to reach **\$300 billion** by 2030

NET ZERO

BioE3 (Biotechnology for Economy, Employment, and Environment)
Source: GeI



- **Long-Term Vision:** Focuses on developing skills, promoting research, and fostering technology, with long-term benefits expected.
- **Alignment with Other Initiatives:**
 - **Complementary Goals:** Integrates with AI, Quantum, and Green Hydrogen Missions to position India as a leader in futuristic technologies.
- **Biomanufacturing Hubs:**
 - **Establishment:** Focused on bio-based chemicals, functional foods, and climate-resilient agriculture.
- **Marine and Space Research:**
 - **Innovative Applications:** Potential new technologies from marine ecosystems and space biomanufacturing.

Conclusion:

The BioE3 policy aims to leverage biotechnology for significant economic and environmental benefits, positioning India at the forefront of global biotechnological advancements. Effective implementation will be key to realising its potential in economic growth, environmental sustainability, and employment.



Editorial, Ideas and Opinions

8. A discourse on AI governance that India must shape

Source: The Hindu

Context: The UN's upcoming Summit of the Future (September 2024) will advance the Global Digital Compact (GDC), addressing digital divide, SDGs, and AI governance. India has a key opportunity to influence global AI governance.

Key Themes:

Global AI Governance:

- GDC promotes a collaborative, multi-stakeholder approach to AI governance, emphasising inclusivity and alignment with fundamental rights.
- The UN is crucial for harmonizing global AI standards and ensuring equitable benefits.

Geopolitical Contestation:

- The U.S. and China proposed competing AI resolutions at the UN, reflecting strategic interests.
- India must navigate this contestation to ensure AI governance frameworks address Global South needs.

India's Diplomatic Legacy:

- India has a history of advocating for the Global South, particularly in climate change diplomacy, and can similarly influence AI governance.

Challenges and Opportunities:

- The Global South faces AI innovation disparities; India must advocate for their differential needs.
- India's G-20 and GPAI leadership highlight its commitment to fair AI access and benefit sharing.

Strategic Recommendations:

- **Equitable Access:** Advocate for policies ensuring equal access to AI technology and capacity building.
- **Inclusive Governance:** Promote a more inclusive multi-stakeholder model, including marginalised groups.
- **Human Rights and Fairness:** Support AI frameworks that respect human rights and ensure fairness.



Conclusion:

India's active role in shaping global AI governance at the UN will safeguard its interests and contribute to a balanced, inclusive, and sustainable digital future.

9. Addressing Rising Income Inequality

Source: The Hindu

Context: Tackling income inequality requires multifaceted strategies which is a serious global challenge & there must be a realisation that the new economics is all about moving from 'economies of scope and scale' to 'economy of purpose'.

Key Strategies:

Progressive Taxation:

- Implement progressive tax policies to redistribute wealth. Use tax revenues to enhance health, education, skill development, and job creation, rather than penalizing the wealthy.

Education and Skill Development:

- Ensure access to quality education and lifelong learning to boost employability and earnings.

Fair Labour Laws:

- Enforce rights for fair wages, safety, and protections for workers, including measures against child labour and exploitation.

Investment in Infrastructure:

- Invest in infrastructure to reduce regional disparities and ensure inclusion. Focus on areas like environment, sanitation, housing, and transportation.

Super Rich Contributions:

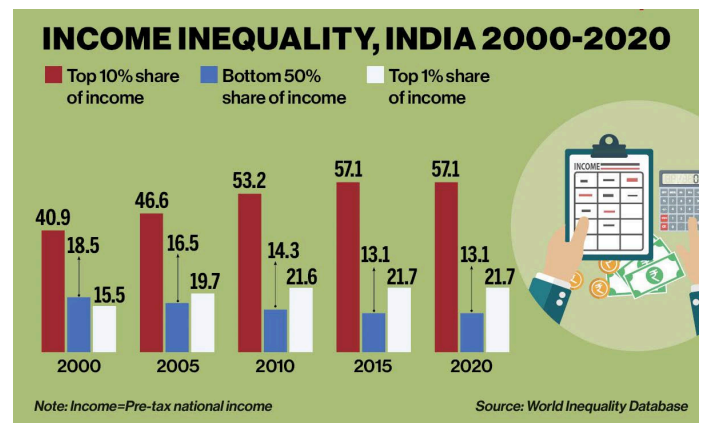
- Encourage the super rich to contribute significantly to public welfare, as seen with the 'Giving Pledge'. Consider inheritance taxes for large asset transfers, as practiced in countries like Japan and South Korea.

Challenges and Opportunities:

- **Equity and Inclusion:** The goal is to lift millions out of poverty through productive and efficient means while ensuring dignity and justice.
- **Gandhian Model:** Emphasise decentralization, local production, and small enterprises to foster local employment and prosperity.
- **Future Jobs:** Focus on sectors like food, education, health, and manufacturing. Leverage India's talent and digital platforms to drive growth and inclusion.

Conclusion:

- Addressing income inequality involves bold, innovative strategies. Embrace decentralisation and digital solutions to create a fairer, more resilient economy.



In Brief

10. How Agriculture Can Be an Engine for Growth

Source: The Indian Express

Context: Agriculture in India can drive growth and job creation if it undergoes modernization, prioritizes environmental sustainability, and embraces institutional innovation.

Current Challenges:

- **Low-Tech Agriculture:** Predominantly subsistence-oriented with erratic growth and environmental concerns.
- **Inadequate Infrastructure:** Limited irrigation, groundwater over-extraction, and poor regulation, exemplified by Punjab's reliance on groundwater due to free electricity.

Opportunities for Growth:

- **Enhanced Irrigation:** Techniques like groundwater regulation, rainwater harvesting, and micro-irrigation can boost productivity. Gujarat's success with rainwater harvesting is a notable example.
- **Technological Advancements:** Modern technologies such as cell phones for advice and drones for pest control, along with crop diversity and agro-ecological farming, can transform agriculture. Research indicates cell phone-based advice improved yields in India and Sub-Saharan Africa.
- **Institutional Innovation:** Group farming and cooperatives, such as Kerala's Kudumbashree, enhance efficiency and yield compared to individual farming.

Strategic Measures:

- **Regeneration of Resources:** Address soil degradation and water management issues to maintain soil health and improve water use.
- **Supporting Smallholders:** Enhance credit access, provide technical support, and encourage voluntary cooperation among small farmers to boost productivity.
- **Diversification and Integration:** Expand into high-value crops, livestock, fisheries, and agro-processing to create jobs and increase incomes. For instance, the fisheries sector grew at 10% in 2022-23.

Linkages with Non-Farm Sector:

- **Synergizing Activities:** Strengthen connections between agriculture and non-farm sectors like agro-processing and eco-tourism to enhance rural incomes and job creation.

Future Prospects:

TREND ANNUAL GROWTH RATE IN AGRICULTURE

Figures in (%)



*Pre-Green Revolution (GR); **Food crisis/droughts; ***GR 1st phase; @Oil shocks; @@Spread of GR; #Post-reform globalisation; ##GR 2nd phase.

Source: Ramesh Chand and Jaspal Singh, NITI Aayog.



- **Youth Engagement:** Attract younger generations by evolving the sector with technology and institutional support. Group farming initiatives have proven successful in creating profitable opportunities for youth.

Conclusion:

- Modernizing agricultural practices, improving resource management, and fostering technological and institutional innovation can transform agriculture into a key engine for economic growth and job creation. By embracing these changes, agriculture can drive economic progress and enhance rural prosperity in India.



Daily Quiz

Q1. In the context of cropping pattern shifts in India, which of the following trends is most likely to exacerbate regional disparities in agricultural income?

- The shift from food crops to commercial crops in water-scarce regions.
- Increased cultivation of drought-resistant crops in semi-arid regions.
- Diversification into horticulture in rain-fed regions.
- Enhanced mechanization in regions with fragmented landholdings.

Q2. Consider the following statements regarding the 'Aparajita Women and Child (West Bengal Criminal Laws Amendment) Bill, 2024':

- The bill mandates the death penalty for all rape cases.
- It introduces the Aparajita Task Force to handle cases of sexual violence at the district level.
- It includes amendments to the Bharatiya Nyaya Sanhita (BNS) and the Protection of Children from Sexual Offences (POCSO) Act.

Which of the statements given above is/are correct?

- 1 and 2 only
- 2 and 3 only
- 1 and 3 only
- 1, 2, and 3

Q3. Which of the following countries does NOT share a land border with Brunei?

- Malaysia
- Indonesia
- Philippines
- None of the above

Q4. Assertion (A): The manufacturing sector in India grew by 9.9% in FY 2023-24.

Reason (R): The World Bank revised India's growth forecast to 7% for FY 2024-25 because of the manufacturing sector's contribution.

Which of the following is the most accurate assessment of the relationship between Assertion (A) and Reason (R)?

- Both A and R are true, and R is the correct explanation of A.
- Both A and R are true, but R is not the correct explanation of A.
- A is true, but R is false.
- A is false, but R is true.

Q5. Consider the following statements about the piezoelectric effect in quartz and its role in gold deposition:

- Quartz can generate an electric field under mechanical stress due to its piezoelectric properties.
- The piezoelectric effect is responsible for the direct formation of gold in quartz veins.
- Gold deposition in quartz veins occurs through electrochemical reactions driven by the electric field generated by the piezoelectric effect.

Which of the statements given above is/are correct?

- 1 and 3 only
- 2 only
- 1 and 2 only
- 1, 2, and 3

Q6. Consider the following pairs related to the payloads on board ISRO's Aditya-L1 mission and their corresponding functions:

Payload	Function
1. Visible	Captures UV images



Emission Line Coronagraph	of the Sun's atmosphere.
2. Aditya Solar Wind Particle Experiment	Measures solar wind properties.
3. Solar Low Energy X-ray Spectrometer	Detects high-energy X-rays from solar flares.
4. Magnetometer	Measures interplanetary magnetic fields.

How many of the above pairs are correctly matched?

- Only one
- Only two
- Only three
- All four

Q7. With reference to the environmental benefits of biotechnology under the BioE3 policy, which of the following statements is/are correct?

- Animal-free milk production reduces the carbon footprint compared to traditional dairy farming.
- Bioplastics derived from renewable resources are biodegradable.

Select the correct answer using the codes given below:

- 1 only
- 2 only
- Both 1 and 2
- Neither 1 nor 2

Q8.Assertion (A): India should take a proactive role in shaping global AI governance, emphasizing equitable access, inclusive governance, and human rights considerations.

Reason (R): The UN's Global Digital Compact (GDC) aims to address digital divides, promote inclusivity, and align AI governance with fundamental rights, making it an essential

platform for India to influence AI policies.

Which of the following is the most accurate assessment of the relationship between Assertion (A) and Reason (R)?

- Both Assertion (A) and Reason (R) are correct, and Reason (R) is the correct explanation for Assertion (A).
- Both Assertion (A) and Reason (R) are correct, but Reason (R) is not the correct explanation for Assertion (A).
- Assertion (A) is correct, but Reason (R) is incorrect.
- Assertion (A) is incorrect, but Reason (R) is correct.

Q9. Consider the following statements:

- Statement I:** Progressive taxation involves increasing tax rates on higher incomes to redistribute wealth and fund public services.
- Statement II:** Fair labour laws aim to reduce income inequality by enforcing minimum wages and improving worker safety.
- Statement III:** Investment in infrastructure primarily focuses on urban development without addressing regional disparities.
- Statement IV:** Encouraging the super-rich to contribute to public welfare can help address income inequality by redistributing wealth.

Which of the above statements are correct?

- Only Statement I and Statement II
- Only Statement I, Statement II, and Statement IV
- Only Statement II and Statement III
- All statements

Q10. Assertion (A): Investing in infrastructure can significantly enhance agricultural productivity and economic growth.

Reason (R): Technological advancements in precision farming have greatly improved crop yields in recent years.



Which of the following is the correct relationship between Assertion and Reason?

- A. Both Assertion and Reason are correct, and the Reason is the correct explanation for the Assertion.
- B. Both Assertion and Reason are correct,

but the Reason is not the correct explanation for the Assertion.

- C. Assertion is correct, but the Reason is incorrect.
- D. Assertion is incorrect, but the Reason is correct.



Solutions

1. **Correct Answer is A**

Explanation:

- Shifting from food crops to commercial crops in water-scarce regions can exacerbate regional disparities in agricultural income.
- Commercial crops often require more water and resources, leading to increased vulnerability in water-scarce areas, potentially widening the income gap between regions with sufficient water and those without.

2. **Correct Answer is B**

Explanation:

- Statement 1 is incorrect because the bill mandates the death penalty only for rape cases where the victim dies or is left in a vegetative state, not for all rape cases.
- Statement 2 is correct as the bill introduces the Aparajita Task Force to handle cases of sexual violence at the district level.
- Statement 3 is correct since the bill amends sections of the Bharatiya Nyaya Sanhita (BNS) and the Protection of Children from Sexual Offences (POCSO) Act.

3. **Correct Answer is C**

Explanation:

- Brunei shares a land border only with Malaysia, specifically with the state of Sarawak.
- It does not share a land border with the Philippines or Indonesia,

although these countries are in close proximity in Southeast Asia.

4. **Correct Answer is B**

Explanation:

- While the manufacturing sector did grow by 9.9%, the World Bank's revision of the growth forecast was due to overall economic resilience, including various sectors, not solely because of the manufacturing sector's contribution.

5. **Correct Answer is A**

Explanation:

- **Statements 1 and 3 are correct :** Quartz generates an electric field under mechanical stress, and this field drives electrochemical reactions that lead to gold deposition.
- **Statement 2 is incorrect** because the piezoelectric effect does not directly form gold but rather facilitates its accumulation from surrounding solutions.

6. **Correct Answer is C**

Explanation:

- Pair 1 is incorrect : The Visible Emission Line Coronagraph (VELC) observes the solar corona, not UV images of the Sun's atmosphere.
- Pair 2 is correct: The Aditya Solar Wind Particle Experiment (ASPEX) measures solar wind properties.
- Pair 3 is incorrect: The Solar Low Energy X-ray Spectrometer (SoLEXS) monitors low-energy



solar X-rays, not high-energy X-rays.

- Pair 4 is correct: The Magnetometer measures interplanetary magnetic fields.

7. Correct Answer is C

Explanation:

- Both statements are correct: Animal-free milk production can reduce the carbon footprint, and bioplastics from renewable resources are designed to be biodegradable.

8. Correct Answer is A

Explanation :

- **Assertion (A) is correct** because India, given its diplomatic legacy and leadership roles in international forums, indeed has a significant opportunity to shape global AI governance. The focus on equitable access, inclusive governance, and human rights is crucial in addressing disparities and ensuring fair AI practices, especially for the Global South.
- **Reason (R) is also correct** because The Global Digital Compact (GDC) aims to promote inclusivity and align AI governance with fundamental rights, which directly supports India's need to advocate for equitable access and fair AI governance. The GDC provides a platform where India can influence AI policies to address global inequalities and ensure that the needs of the Global South are considered.

9. Correct Answer is B

Explanation:

- **Statement I is correct** as progressive taxation helps redistribute wealth by taxing higher incomes at higher rates.
- **Statement II is correct** because fair labour laws include provisions for minimum wages and worker safety.
- **Statement III is incorrect** because investment in infrastructure is aimed at reducing regional disparities, not just urban development.
- **Statement IV is correct** as encouraging contributions from the wealthy can aid in addressing income inequality.

10. Correct Answer is B

Explanation :

- **Assertion (A) is correct** because investing in infrastructure, such as irrigation and transport, can improve agricultural productivity.
- **Reason (R) is correct** as technological advancements like precision farming do enhance crop yields, but it does not explain why infrastructure investment is important for agricultural productivity.





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