

GS PAPER 1 – POVERTY AND DEVELOPMENTAL ISSUES**Strategies to address income inequality**

The article talks about strategies to address income inequality. It suggests progressive taxation, better education, fair labor laws, infrastructure investment, and encouraging the super-rich to contribute. It also highlights local development, decentralization, and the importance of inclusivity and sustainability.

What are the strategies to address income inequality?

1. **Progressive Taxation:** Implement progressive tax systems where the wealthy pay a higher rate, reallocating resources to fund essential public services that benefit the less privileged.
2. **Education and Skill Development:** Increase access to quality education and lifelong learning opportunities to enhance employability and income prospects.
3. **Fair Labor Laws:** Enforce labor laws that guarantee minimum wages, safe working conditions, and rights to collective bargaining to protect workers from exploitation.
4. **Investment in Infrastructure:** Focus on building infrastructure that supports environmental sustainability and economic inclusivity, reducing regional disparities.
5. **Philanthropy of the Super Rich:** Encourage the wealthy to donate a portion of their wealth to public causes, inspired by initiatives like the Giving Pledge, which has seen over 235 billionaires pledge \$600 billion.

Why is decentralisation important for India?

1. Decentralisation promotes local employment and prosperity by focusing on local needs, talent, and resources.
2. India has 800 districts, each with unique climate, resources, and capabilities, which can develop into 800 production hubs.
3. These districts can use digital platforms for supply chains, logistics, and markets, promoting growth across the country.
4. Banks should prioritize small loans to SMEs, encouraging local innovations and production.
5. Decentralisation aligns with the Gandhian model of development, emphasizing local production and self-sufficiency for a sustainable and inclusive economic future.

How Can Future Jobs Be Created?

1. In an AI-dominated world, jobs will still come from sectors like food, education, health services, tourism, and manufacturing.
2. India's young talent can meet global workforce demands, but a new economic model focused on decentralisation and inclusivity is needed for sustained growth.

GS PAPER 3- SCIENCE AND TECHNOLOGY- DEVELOPMENTS AND THEIR APPLICATIONS AND EFFECTS IN EVERYDAY LIFE**India's role in shaping global AI governance**

The article discusses India's role in shaping global AI governance at the upcoming UN Summit of the Future. It highlights geopolitical tensions between the U.S. and China, and India's opportunity to advocate for equitable AI access and representation for the Global South.

What is the Summit of the Future?

1. The Summit of the Future (September 2024) will gather world leaders to discuss the Global Digital Compact (GDC) under the United Nations.
2. The GDC aims to address the digital divide, advance Sustainable Development Goals (SDGs), and create an inclusive digital environment.
3. It also focuses on strengthening international governance for AI to align with human rights and values.

How is AI governance shaping geopolitical contestation?

The UN General Assembly adopted two AI-related resolutions led by the U.S. and China.

1. The U.S.-led resolution on “**Safe, Secure, and Trustworthy AI for Sustainable Development**” promotes a harmonized approach to AI governance, focusing on ethics, data protection, and transparency. It aims to assert U.S. dominance in AI development.
2. China's resolution on “**Enhancing Cooperation on Capacity Building of AI**” emphasizes equitable AI development, bridging the digital divide, and creating an open business environment. China wants to become a key player in global AI standards.

How is India involved in these discussions?

1. **Active Participation in Global Forums:** India is actively engaged in global platforms like the UN, G-20, and Global Partnership on Artificial Intelligence (GPAI), where it emphasizes equitable AI access and governance for developing countries.

2. **Historical Legacy in Negotiations:** India has a strong history of advocating for the Global South, such as its role in integrating the principle of Common but Differentiated Responsibilities (CBDR) in climate negotiations.
3. **Advocacy for Fair AI Governance:** India has raised concerns about equitable access to AI resources, including data, infrastructure, and knowledge-sharing mechanisms.
4. **Recent Achievements:** India's leadership in the G-20 New Delhi Leaders Declaration and GPAI emphasized fair AI benefits and risk mitigation.
5. **Inclusive Global AI Governance:** India is pushing for an AI governance model that includes marginalized voices from the Global South, focusing on fairness, human rights, and diverse global perspectives.

What should India advocate for at the Summit?

1. India should push for fair access to AI technology, support for building AI capacities in developing countries, and the creation of inclusive governance structures that consider the perspectives of the Global South.
2. This includes ensuring that AI governance respects human rights and is aligned with international standards to be truly inclusive and equitable.

What are the challenges in global AI governance?

1. The US and China are shaping the AI governance discourse, potentially sidelining the specific needs of the Global South.
2. There is a significant resource gap between developed and developing countries, which affects their ability to advance in AI.
3. India's role is crucial in ensuring that new global policies consider these disparities and do not deepen existing inequalities.

GS PAPER3- AGRICULTURE

Indian agriculture can drive growth and create jobs

The article argues that Indian agriculture can drive growth and create jobs if ecological, technological, and institutional challenges are addressed. It highlights the need for irrigation, soil regeneration, crop diversity, and group farming to improve productivity and farmer incomes.

What Challenges Does Indian Agriculture Face?

1. **Low Productivity:** Despite a 4% growth rate, agriculture only contributes 18% to GDP while employing 46% of workers. This imbalance highlights inefficiencies.
2. **Groundwater Over-extraction:** Only half of India's cropped area is irrigated, mainly using groundwater, leading to alarming water table declines. Punjab's shift from canal irrigation to groundwater after introducing free electricity in 1997 worsened the situation.
3. **Soil Degradation:** Around 37% of India's geo-area is degraded due to waterlogging, salinity, chemical contamination, and nutrient depletion.
4. **Inefficient Water Use:** Micro-irrigation covers less than 10% of crop areas. However, it has proven successful, increasing fruit and vegetable yields by up to 52% in several states.
5. **Small Farm Sizes:** Most farmers operate on small plots (86% with two hectares or less), limiting their ability to use machines efficiently or achieve economies of scale.

What Should be Done?

1. **Expand irrigation:** Only 50% of India's cropped area is irrigated. Groundwater over-extraction is a problem. Use rainwater harvesting and micro-irrigation to boost productivity, as seen in Gujarat's 9.6% annual agricultural growth.
2. **Improve water efficiency:** Micro-irrigation, especially drip irrigation, can reduce water usage. A 2014 government study found that drip irrigation increased fruit and vegetable yields by 48% and farmer incomes by 48%.
3. **Diversify crops:** Shifting from cereal monocultures to diverse crops (poultry, fruits, vegetables) can revive soils, cut costs, raise yields, and increase profits. It aligns with changing dietary patterns and improves environmental sustainability.
4. **Regenerate soils:** 37% of India's land is degraded. Shifting to diverse crops and agro-ecological farming can improve soil health and increase productivity.
5. **Promote group farming:** Kerala's all-women group farming initiatives show success. Group farms have 1.8 times higher output per hectare and 1.6 times higher net returns compared to individual farms.
6. **Use technology:** Cell phones and drones can enhance farming by increasing yields and enabling pest control and monitoring, with a study showing a 4% yield increase through mobile-based information.

GS PAPER- IISCIENCE AND TECHNOLOGY

Sunlight-Powered Method to Remove Toxic Chromium

Researchers at the Institute of Nano Science and Technology (INST) have developed an affordable method to remove toxic chromium from industrial wastewater.

Use of Sunlight: Sunlight is used as a catalyst to convert the toxic Cr(VI) into the less harmful Cr(III).

Microfluidic Technology: The method uses a continuous flow photoreduction process with the help of microfluidic reactors and TiO₂ nanoparticles.

About Chromium

- It is a steely-grey, shiny, hard, and brittle transition metal.
- Unique feature: Chromium is known for its strong resistance to corrosion and its hardness.
- Applications
- It is used to produce alloys.
- Used in production of stainless steel.
- Its plating is used to give polished mirror finish to steel.
- Its compound is used as an industrial catalyst and pigments.
- Chromium is used to tan leather.

Chromium Toxicity Overview

- **Hexavalent Chromium Risks:** Hexavalent chromium (Cr(VI)) is very toxic and can cause serious health problems such as lung cancer, allergies, and eczema.
- **WHO Guidelines**
- **Hexavalent chromium:** The World Health Organization (WHO) recommends that Cr(VI) in drinking water should be no more than 0.05 mg/L.
- **Trivalent Chromium:** For trivalent chromium (Cr(III)), the limit is 5 mg/L.

Challenges in Removing Chromium

- **High soluble:** Removing Cr(VI) from wastewater is a challenging task because it is highly soluble and resistant to traditional treatment methods.
- **Costly and inefficient methods:** Existing techniques like ion exchange, adsorption, and chemical reduction are costly and often inefficient in removing Cr(VI).
- **Harmful byproduct:** Additionally, these methods may produce hazardous byproducts.

Advantages of the New Method

- **Cost-Effective:** The process is affordable and uses renewable energy.
- **Environmentally Friendly:** The method utilizes sunlight as a catalyst which makes it a sustainable and cost-effective approach.
- **High Efficiency**
- **95% Degradation:** The researchers achieved a high degradation efficiency of 95% using a serpentine microreactor at a flow rate of 50 µl/min.
- **Reusability:** The photocatalyst can be reused without the need for recovery agents or complicated processes.

PRELIM FACTS

1. Lothal

A new study by IIT Gandhinagar has provided fresh evidence supporting the existence of a dockyard at Lothal, Gujarat, during the Harappan Civilization.

- The research reveals that the Sabarmati River, which now flows 20 km away, once ran close to Lothal, enhancing its significance as a major trade route.
- The study suggests that Lothal was connected via waterways to other Harappan sites like Dholavira, facilitating trade with regions as far as Mesopotamia.

About Lothal:

- Lothal, located in the Bhāl region of Gujarat, was one of the southernmost sites of the Indus Valley Civilization, built around 2200 BC.
- It was a significant trade centre, known for trading beads, gems, and ornaments with West Asia and Africa.

- The name “Lothal” means “the mound of the dead” in Gujarati, similar to the meaning of “Mohenjo-daro” in Sindhi.
- Lothal is notable for having the world’s earliest known dock, which connected it to the Sabarmati River, facilitating trade between Harappan cities and the Saurashtra peninsula.

2. Konyak Tribes

The Konyak Union, apex body of the Konyak community, has sought the Nagaland government’s intervention in rectifying the “erroneous” boundary line between the State’s Mon district and Assam’s Charaideo district on Google Maps.

About Konyak Tribe:

- A **Naga ethnic group** primarily located in the **Mon district of Nagaland**, with some presence in **Arunachal Pradesh, Assam, and Myanmar**.
- **Known For:**
 - **Tattoos:** Known for **facial and hand tattoos**, which were historically earned by taking the heads of their enemies.
 - **Head-hunting:** Renowned as fierce **warriors and headhunters** who took heads as trophies.
- **Name Origin:** Derived from “**Whao**” (head) and “**Nyak**” (black), meaning “**men with black hair.**”
- **Mongoloid Origin:** The Konyaks are of **Mongoloid** descent.
- **Groups:** Divided into “**Thendu**” (**Tattooed Face**) and “**Thentho**” (**White Face**).
- **Cultural Aspects:**
 - **Patriarchal Society:** **Eldest sons** inherit family property; men hold decision-making power.
 - **Traditional Skills:** Expertise in gunsmithing, iron smelting, brass-working, gunpowder-making, making jangläü (machetes), and wooden sculptures.
 - **Traditional Dance and Morung:** They have a rich tradition of dance and institutions of learning known as morung.
- **Language:** Konyak Language, belongs to the Northern Naga sub-branch of **Sal** subfamily of **Sino-Tibetan**.
- **Religion:** Originally **animists**, about 95% of the Konyaks are now **Christians**.
- **Leadership:** The **Anghs/Wangs** are their Chiefs.

3. Vishanu Yuddh Abhyas

Under the **aegis of National One Health Mission (NOHM)**, “**Vishanu Yuddh Abhyas**” (**Virus War Exercise**), was conducted in **Ajmer** district of Rajasthan state to assess **pandemic preparedness**.

About Vishanu Yuddh Abhyas:

- About: A **comprehensive national mock drill** conducted under the **National One Health Mission (NOHM)**.
- **Objective:** To assess **pandemic preparedness** by simulating a zoonotic disease outbreak and evaluating the response of the **National Joint Outbreak Response Team (NJORT)**.
- **Exercise Components:**
 - **Investigation and Identification:** The mock drill focused on investigating and identifying the virus responsible for the simulated outbreak.
 - **Control Actions:** Emphasis was placed on initiating measures to control the spread of the illness across human and animal populations.
 - **Monitoring:** Independent observers monitored the response, which was found to be mostly prompt and appropriate.

National One Health Mission (NOHM):

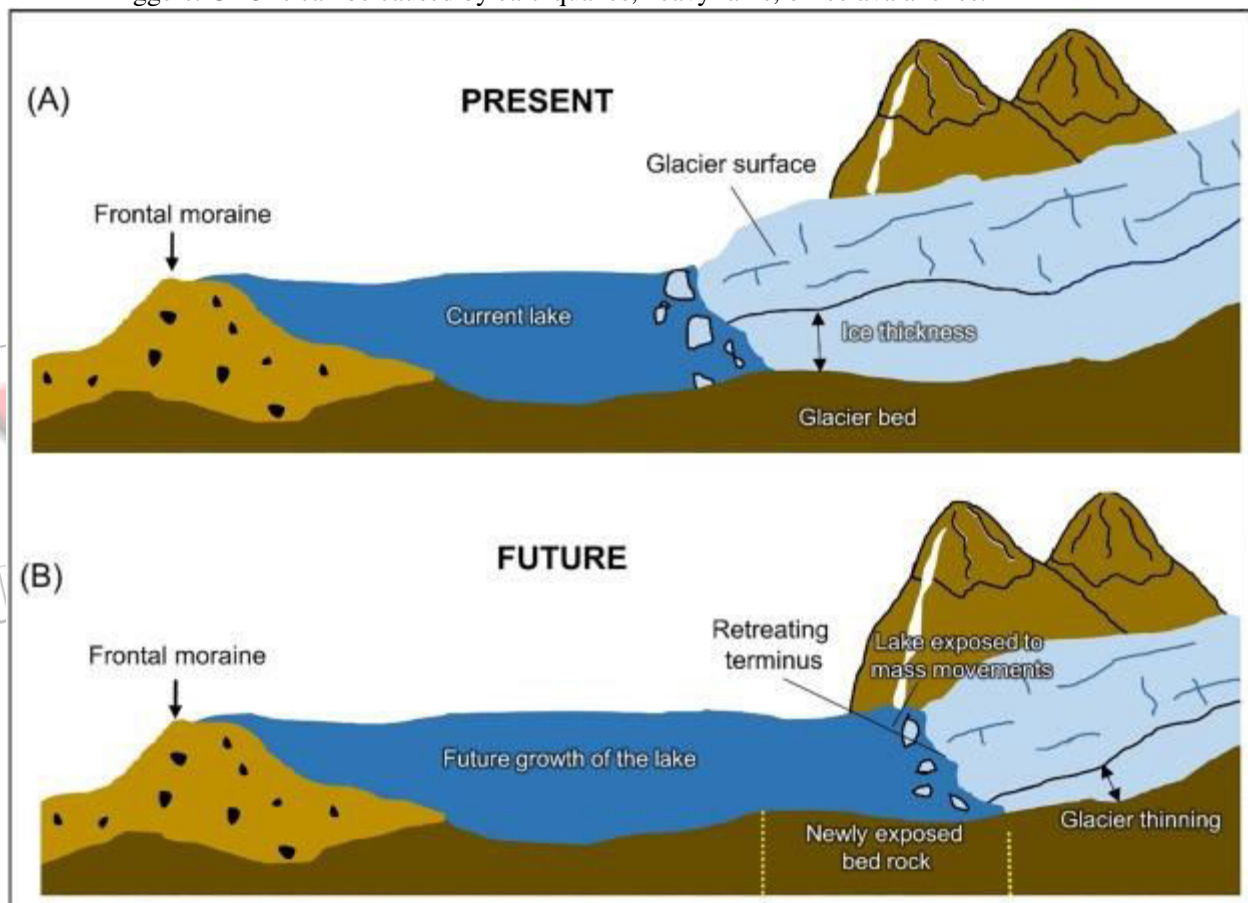
- **Founding:** Endorsed in **July 2022** by the **Prime Minister’s Science, Technology, and Innovation Advisory Council (PM-STIAC)**.
- **Purpose:** To organize, support, and integrate existing **One Health projects** across various sectors including **human health, animal husbandry, wildlife, and environmental health**.
- The mission aims to institutionalize the “**One Health**” approach.
- One Health emphasizes the health of people is closely connected to the health of animals and our shared environment.
- **Inter-Sectoral Collaboration:** Involves the **Ministries of Health and Family Welfare, Fisheries, Animal Husbandry and Dairy, Environment, and Science and Technology**.

- **Integrated Disease Surveillance:** Focuses on surveillance of diseases **across human, animal, and environmental sectors**, aiming to improve **pandemic preparedness** and **control** communicable and zoonotic diseases.

4. Glacial lake outburst flood (GLOF)

A central team, as part of the GLOF (Glacial Lake Outburst Flood) Early Warning Systems Mission, visited Tenchungkha Lake in Sikkim, marking the first of 16 planned assessments in the region.

- The NDMA (National Disaster Management Authority) has identified 188 critical lakes across the Indian Himalayan Region, vulnerable to GLOF events, and is working with state governments and experts, including ISRO scientists, to implement early warning systems and risk mitigation strategies.
- Glacial lakes are large bodies of water formed by meltwater from glaciers, located in front of, on top of, or beneath melting glaciers.
- They develop near the glacier’s snout as meltwater accumulates.
- Hazard: As these lakes grow, they are often dammed by unstable ice or loose sediment, making them dangerous.
- GLOF (Glacial Lake Outburst Flood): This occurs when the dam or boundary around a glacial lake fails, causing a sudden release of water that can flood downstream areas.
- Triggers: GLOFs can be caused by earthquakes, heavy rains, or ice avalanches.



5. Zero First Information Report (FIR)

Recently, the Ministry of Home Affairs has directed Union Territories to ensure that ‘zero FIRs’ recorded in local languages carry a translated copy if forwarded to states where different languages are used.

About Zero FIR

The term FIR is not defined in the Indian Penal Code (IPC), Code of Criminal Procedure (CrPC), 1973, or in any other law, but in police regulations or rules, information recorded under Section 154 of CrPC is known as FIR.

- Refers: An FIR that can be registered at any police station irrespective of jurisdiction or the area where the crime was committed, in case of cognisable offenses.

- It is then sent to the police station concerned, which could even be in another state, for re-registration as a regular FIR.
- Origin of Zero FIR: The provision of Zero FIR was established based on the recommendation on the report of the Justice Verma Committee.
- The Justice Verma Committee was formed after the 2012 Nirbhaya gang rape case.
- Purpose of Zero FIR: To provide speedy redressal to the victim so that timely action can be taken after the filing of the FIR.
- Boundation: Under the Bharatiya Nagarik Suraksha Sanhita (BNSS), which replaced the CrPC, police are now bound to register a 'zero FIR'.

6. Project Strawberry

OpenAI's Project Strawberry is an upcoming AI model expected to be significantly more advanced in math, programming, and reasoning than existing chatbots.

- Likely to be integrated into ChatGPT-5, this model represents a step towards achieving Artificial General Intelligence (AGI), with capabilities akin to the human brain.
- Project Strawberry, previously known as Project Q*, is designed to autonomously conduct internet research, solve complex puzzles, and improve AI's reasoning abilities.
- It is also expected to generate high-quality synthetic data, addressing the scarcity of accessible training data on the internet.
- This synthetic data aims to reduce biases and errors, potentially leading to breakthroughs in fields like scientific research and personalized education.

The project underscores OpenAI's commitment to advancing AI while addressing security concerns raised by its rapid development.

ANSWER WRITING

Q. Analyze the role of inclusion and equity in mitigating income inequality. Evaluate the effectiveness of current measures in achieving these goals.

Inclusion and equity are critical to mitigating income inequality by ensuring fair access to resources, opportunities, and social services. Addressing structural disparities and promoting equitable growth enable marginalised groups to enhance their socio-economic status. Such measures contribute to a more balanced distribution of income and wealth, furthering a society where economic benefits are more widely shared.

Analysis of Inclusion and Equity in Mitigating Income Inequality:

- **Progressive Taxation:** Implementing progressive taxation ensures wealth redistribution from the affluent to the marginalised, funding social programs and public services.
For instance: India's **Income Tax Act** incorporates progressive rates where higher earners are taxed more, funding initiatives like the **Pradhan Mantri Garib Kalyan Yojana**.
- **Education and Skill Development:** Access to quality education and skill development is vital for improving employability and income levels, particularly for disadvantaged groups.
For instance: The **Samagra Shiksha Abhiyan** aims to ensure inclusive education for all children and youth, focusing on marginalised communities.
- **Fair Labour Laws:** Enforcing labour laws ensures minimum wages, job security, and safe working conditions, safeguarding workers' rights and narrowing the income disparity.
For instance: The **Minimum Wages Act, 1948** in India mandates minimum wage rates for different sectors, protecting low-income workers from exploitation.
- **Investment in Infrastructure:** Infrastructure investment, particularly in underdeveloped regions, promotes economic inclusion by providing necessary amenities and access to markets.
For instance: The **Bharatmala Pariyojana** focuses on developing road networks in remote areas, enhancing connectivity and promoting economic activities that benefit local populations.
- **Support for Small and Medium Enterprises (SMEs):** Supporting SMEs fosters local entrepreneurship and job creation, particularly in underserved areas.
For instance: The **MUDRA scheme** provides micro-financing to small entrepreneurs, enhancing financial inclusion and supporting job creation in low-income communities.

Evaluation of Current Measures:

- **Effectiveness of Progressive Taxation:** While progressive taxation in India aims to redistribute wealth, loopholes and tax evasion undermine its effectiveness.

For instance: Despite progressive tax rates, wealth concentration remains high among India's top earners, indicating the need for stricter tax enforcement.

- **Education and Skill Development Programs:** Current education and skill development initiatives have improved access but are often limited by quality issues and regional disparities.

For instance: The **Skill India Mission** has reached many youth, but disparities in training quality between urban and rural areas persist, limiting its effectiveness in reducing inequality.

- **Enforcement of Fair Labor Laws:** While labour laws exist to protect workers, enforcement is inconsistent, particularly in the informal sector.

For instance: Despite the **Minimum Wages Act**, many informal workers in agriculture and domestic work receive wages below the legal threshold due to poor enforcement.

- **Infrastructure Investment and Regional Disparities:** Infrastructure investments have largely focused on already developed areas, exacerbating regional inequalities.

For instance: Most investments under **Smart Cities Mission** have been concentrated in metropolitan areas, leaving rural regions with inadequate infrastructure and connectivity.

- **Support for SMEs and Financial Inclusion:** Support for SMEs has been effective in some regions, but access to finance and markets remains a barrier in many underserved areas.

For instance: Under the **Stand-Up India scheme**, access to credit for women and SC/ST entrepreneurs has increased.

Way Ahead:

- **Strengthening Progressive Taxation:** Increasing transparency and tightening regulations can enhance the efficacy of progressive taxation.

For instance: Using **Aadhaar-based** tracking and better digital infrastructure can help minimise tax evasion, promoting more equitable wealth distribution.

- **Enhancing Education and Skills Training:** Improving the quality of education and aligning skill development programs with market needs can ensure that all citizens have the opportunity to improve their economic status.

For instance: Updating the curriculum under **National Education Policy 2020** to include digital literacy and 21st-century skills aims to better prepare students for future job markets.

- **Ensuring Fair Enforcement of Labor Laws:** Strengthening labour inspections and providing incentives for compliance can ensure fair treatment of workers, particularly in the informal sector.

For instance: Deploying digital monitoring tools for labour law compliance can enhance transparency and protect workers' rights more effectively.

- **Balanced Infrastructure Development:** Directing more resources to underdeveloped areas and ensuring balanced regional development can reduce income inequalities and promote inclusive growth.

For instance: Expanding the **Pradhan Mantri Gram Sadak Yojana** to improve rural connectivity can help integrate remote regions into the national economy.

- **Expanding Support for SMEs:** Enhancing access to finance and markets for SMEs, particularly in underserved regions, can foster local economic development and reduce income inequality.

For instance: Increasing the reach of the **Credit Guarantee Fund** for micro-enterprises can provide collateral-free loans to small businesses in backward regions.

Achieving income equality in India requires a holistic approach that emphasises inclusion, equity, and sustainable development. By enhancing access to education, enforcing fair labour laws, and promoting regional development, India can move towards a more equitable society. Future policies should focus on reducing structural inequalities, ensuring that economic growth benefits all sections of society.

MCQ

1. Consider the following statements regarding 'Zero First Information Report':

1. The provision of Zero FIR was established based on the recommendation on the report of the Justice Verma Committee.

2. Under the Bharatiya Nagarik Suraksha Sanhita (BNSS), which replaced the CrPC, police are now bound to register a 'zero FIR'.

3. The term FIR is defined in the Indian Penal Code (IPC), Code of Criminal Procedure (CrPC), 1973, or in any other law.

Which of the statements given above are not correct?

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

2. Consider the following statements about ‘Aparajita Women and Child (West Bengal Criminal Laws Amendment) Bill, 2024’:
- The bill stipulates a life sentence without parole for those convicted of rape, along with a fine.
 - A task force will be formed under the provisions of the bill to punish the accused within 21 days of the preliminary report.
- Which of the statements given above is/are correct?
- a) 1 only b) 2 only
c) Both 1 and 2 d) Neither 1 nor 2
3. Consider the following statements in respect of Bharat Ratna and Padma Awards:
- The total number of awards to be given in a year (excluding posthumous awards and to NRI/foreigners/OCIs) should not be more than 120.
 - Padma Awards are prohibited under Article 18(1) of Indian Constitution
- Which of the above statements are correct?
- a) **Only 1** b) Only 2
c) Both 1 and 2 d) Neither 1 or 2
4. Which of the following accurately describes the Munich Agreement of 1938?
- It was a peace treaty signed between Germany and the Soviet Union.
 - It was a treaty to end World War II.
 - It was a non-aggression pact signed between the United States and Germany.
 - It allowed Nazi Germany to annex the Sudetenland region of Czechoslovakia**
5. Consider the following statements about the Indian Gray Wolf:
- It is listed in Schedule I of the Wildlife (Protection) Act of 1972 in India, granting it the highest level of protection.
 - The Indian Gray Wolf is classified under Appendix III of CITES, reflecting its vulnerability in international trade.
 - The Indian Gray Wolf is a critically endangered species, as per the IUCN Red List.
- Which of the statements given above is correct?
- a) **1 only** b) 2 only
c) 1 and 3 only d) 3 only
6. Which body of water does Sudan share a coastline with?
- Mediterranean Sea
 - Arabian Sea
 - Red Sea**
 - Atlantic Ocean
7. Konyak tribes are naga ethnic group primarily live in which of the following states?
- Nagaland**
 - Manipur
 - Tripura
 - Assam
8. Consider the following statements regarding Glacial Lake Outburst Floods (GLOF):
- GLOFs are caused by the failure of unstable dams made of ice or loose sediment around glacial lakes.
 - Glacial lakes are primarily formed due to water accumulating from rainfall.
 - GLOFs can cause downstream flooding and are triggered by natural events such as ice avalanches or earthquakes.
- Which of the above statements is correct?
- a) 1, 2, and 3
b) 1 and 2 only
c) 2 and 3 only
d) 1 and 3 only
9. Consider the following statements about the advancements expected in Project Strawberry:
- Project Strawberry will bring AI capabilities closer to Artificial General Intelligence (AGI).
 - It aims to integrate real-time access to internet searches into its capabilities.
 - The project focuses primarily on enhancing AI’s creative writing skills.
- Which of the above statements is correct?
- a) **1 only** b) 1 and 2 only
c) 1 and 3 only d) 1, 2, and 3
10. Consider the following statements about the dockyard at Lothal:
- Lothal’s dockyard was connected to the Indus River, which facilitated maritime trade.
 - The dockyard is one of the oldest known examples of water transport infrastructure in the world.
 - Lothal’s dockyard primarily handled goods traded with the western region of Mesopotamia.
- How many of the above statements is/are correct?
- a) Only one **b) Only two**
c) All three d) None